

147603

**BRAIN DRAIN FROM TURKEY:  
AN EMPIRICAL INVESTIGATION OF THE DETERMINANTS OF SKILLED  
MIGRATION AND STUDENT NON-RETURN**

**A THESIS SUBMITTED TO  
THE GRADUATE SCHOOL OF SOCIAL SCIENCES  
OF  
MIDDLE EAST TECHNICAL UNIVERSITY**

**BY**

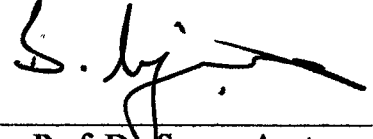
**NİL DEMET GÜNGÖR**

-147603-

**IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY  
IN  
THE DEPARTMENT OF ECONOMICS**

**DECEMBER 2003**

Approval of the Graduate School of Social Sciences

  
Prof. Dr. Sencer Ayata  
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy.

  
Prof. Dr. Erol Çakmak  
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Doctor of Philosophy in Economics.

  
Prof. Dr. Aysit Tansel  
Supervisor

Examining Committee Members

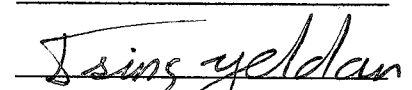
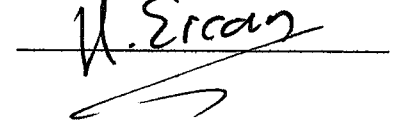
Prof. Dr. Aysit Tansel

Prof. Dr. Erinc Yeldan

Prof. Dr. Yusuf Ziya Özcan

Assoc. Prof. Dr. Cem Somel

Assoc. Prof. Dr. Hakan Ercan

## **ABSTRACT**

### **BRAIN DRAIN FROM TURKEY: AN EMPIRICAL INVESTIGATION OF THE DETERMINANTS OF SKILLED MIGRATION AND STUDENT NON-RETURN**

**Güngör, Nil Demet**

**Ph.D., Department of Economics**

**Supervisor: Prof. Dr. Aysit Tansel**

**December 2003, 315 pages**

This study deals with skilled migration from a developing country perspective. The migration of skilled individuals from developing countries to developed countries is often viewed as a costly subsidy from the poor nations to the rich, and a threat to their economic development. The first part of the study brings up to date both the theoretical and the policy debate on the impact of skilled migration on the sending economies. The second purpose of the study is to take a closer look at the motivations for skilled emigration from Turkey.

The emigration of skilled individuals from Turkey has attracted greater attention in recent years, particularly after the experience of back to back economic crises that have led to increased unemployment among the highly educated young. A survey study was undertaken during the first half of 2002 in order to collect information on various characteristics of Turkish professionals and Turkish students residing abroad. Over 2000 responses were received from the targeted populations. The information from this survey

was then used to determine the empirical importance of various factors on return intentions by estimating ordered probit models for the two samples.

In the migration literature, wage differentials are often cited as an important factor explaining skilled migration. The findings of the study suggest, however, that other factors are also important in explaining the non-return of Turkish professionals. Economic instability in Turkey is found to be an important push factor, while work experience in Turkey also increases non-return. In the student sample, higher salaries offered in the host country and lifestyle preferences, including a more organized and ordered environment in their current country of study increase the probability of not returning. For both groups, the analysis also points to the importance of prior intentions and the role of the family in the decision to return to Turkey or stay overseas.

**Keywords:** Labor Economics, Skilled Migration, Brain Drain, Student Non-Return, Higher Education.



## ÖZ

### TÜRKİYE'DEN YURT DIŞINA BEYİN GÖÇÜ: YURT DIŞINDA OKUYAN ÖĞRENCİLERİN VE YÜKSEK ÖĞRENİMLİ İŞGÜCÜNÜN DÖNME NİYETLERİ ÜZERİNE AMPİRİK BİR ÇALIŞMA

Güngör, Nil Demet

Doktora, Ekonomi Bölümü

Tez Yöneticisi: Prof. Dr. Aysıt Tansel

Aralık 2003, 315 sayfa

Çalışmada, yüksek eğitilmiş işgücü göçü kalkınmakta olan ülkeler açısından irdelenmektedir. Gelişmekte olan ülkelere gelişmiş ülkelere gerçekleşen nitelikli işgücü göçü, gelişen ülkeler açısından yüksek maliyetli bir hibe olarak nitelendirilebilir. Çalışmanın ilk bölümünde bu göçün göçveren ülkeler üzerindeki etkisini tartışan yazın ele alınarak tartışmada ulaşılan son noktayı ortaya konulması amaçlanmaktadır. Çalışmanın diğer amacı, Türkiye'den yurt dışına gerçekleşen nitelikli insan göçünü belirleyen etmenleri inceleyerek, bu göçte en etkili olanları belirlemektir.

Türkiye'den yurt dışına nitelikli işgücü göçü özellikle son dönemlerde peşpeşe yaşanan ekonomik krizlerden sonra daha da önem kazanmaktadır, çünkü ekonomik krizlerin ardından eğitilmiş gençlerde işsizlik önemli bir ölçüde artmıştır. Çalışma, 2002 senesinin ilk yarısında gerçekleştirilen anket uygulamasının sonuçlarına dayanmaktadır. Anketin hedef kitlesi yurt dışında öğrenimlerini sürdüren lisans, yüksek lisans ve doktora öğrencileri ile üniversite eğitilmiş işgücü olarak belirlenmiştir. Bu iki gruba ayrı anket soruları dağıtılmış ve 2000'in üzerinde yanıt toplanmıştır. Anketlerden elde edilen verilerle,

alıřan profesyonellerin ve ğrencilerin Trkiye'ye geri dnme olasılıkları ve nedenleri, sıralı probit modelleriyle tahmin edilmiřtir.

Literatrde, yksek nitelikli iřgcnn yurt dıřına g etmesinde ekonomik nedenlerin nemi vurgulanmaktadır. Yurt dıřında kazanılan yksek maařlar, beyin gnn en nemli nedenlerinden biri olarak grlmektedir. alıřma sonularına gre yurt dıřında alıřanların Trkiye'ye geri dnmeme kararında bařka etkenlerin etkili olduėu anlařılmaktadır. Yurt dıřında alıřanların Trkiye'ye geri dnmeme kararındaki en nemli itici nedenlerden birinin Trkiye'deki ekonomik ve siyas istikrarsızlık olduėu anlařılmıřtır. ğrenci grubunda ise yurt dıřındaki yksek gelirler ve yurt dıřındaki sistemli ve dzemli yařam tarzı geri dnmeme niyetinde nemli bulunmuřtur. Analizde, her iki grup iin Trkiye'ye geri dnme veya yurt dıřında kalma kararında gitmeden nceki dnme niyetleri ve ailenin rol nemli bulunmuřtur.

**Anahtar Kelimeler:** alıřma Ekonomisi, Nitelikli İřgc G, Beyin G, Yksek ğretim.

**Bu tez Türkiye Bilimler Akademisi Sosyal Bilimlerde Yurtiçi - Yurtdışı Bütünleştirilmiş  
Doktora Burs Programı tarafından desteklenmiştir.**

**This thesis has received the financial support of the Turkish Academy of Sciences  
Fellowship Programme for Integrated Doctoral Studies in Turkey and/or Abroad in the  
Social Sciences and Humanities.**

**To my parents Ayşe and Kâni G ng r**

**and in memory of my grandparents**

**Nil fer and Őemsettin Ak ođlu, Maksude and Ali Rıza G ng r**

## **ACKNOWLEDGEMENTS**

I am indebted to my supervisor, Prof. Dr. Aysit Tansel, for her untiring support and unwavering belief in me. Her persistent encouragement has made this study possible, which has been for me a new and rewarding learning experience.

I am very grateful to the members of my examining committee, Prof. Dr. Erinc Yeldan, Prof. Dr. Yusuf Ziya Özcan, Assoc. Prof. Dr. Cem Somel and Assoc. Prof. Dr. Hakan Ercan, for their kind encouragement and constructive remarks, which have greatly improved the final version of this dissertation.

I have been very fortunate to have the continuous support and encouragement of Prof. Dr. Fikret Şenses and Assoc. Prof. Dr. Cem Somel throughout the years of our acquaintance. I am also very grateful to them for providing a careful reading of a preliminary version of the survey questionnaire.

In addition, I would like to express my deepest appreciation to Prof. Dr. Fikret Görün and Prof. Dr. Oktar Türel for the interest and encouragement they have shown me during the course of my studies.

My warmest thanks go to Prof. Dr. Mehmet Tomak and lawyer Mr. Necati Aras for their unhesitant support of my studies. The financial support of the Turkish Academy of Sciences and METU Research Fund, coded AFP-2000-4-03-06, are also very much appreciated.

I gratefully acknowledge the support of the Middle East Technical University Computer Center, Director Ayla Altun and the assistance given by the Informatics Group Director Cihan Yıldırım in working out the bugs in the web survey form. The efforts of many undergraduate students in the Faculty of Economic and Administrative Sciences were

essential in building an e-mail database for the survey application. I would like to thank in particular Nazlı Konaç, Esen G ng r and Burcu Őensoy for their extra efforts.

I am also very grateful to the survey participants for their generosity in taking the time to answer the survey questions and for providing invaluable feedback on my thesis topic. By sharing their stories and making helpful suggestions for improvements in survey design, they have greatly added to the value of this study.

Many friends, teachers and fellow PhD candidates in the economics department and elsewhere have shared their experiences and helped me feel less alone during this lengthy period. I am thankful to all of them.

Last but not least, I acknowledge with utmost gratitude the unlimited patience and support shown to me by my family during the course of my studies.



## TABLE OF CONTENTS

|                                                                                  |     |
|----------------------------------------------------------------------------------|-----|
| ABSTRACT .....                                                                   | iii |
| ÖZ .....                                                                         | v   |
| ACKNOWLEDGEMENTS .....                                                           | ix  |
| TABLE OF CONTENTS .....                                                          | xi  |
| LIST OF TABLES .....                                                             | xv  |
| LIST OF FIGURES .....                                                            | xx  |
| CHAPTER                                                                          |     |
| 1. INTRODUCTION .....                                                            | 1   |
| 2. BRAIN DRAIN AND ECONOMIC DEVELOPMENT:<br>COSTS AND BENEFITS .....             | 6   |
| 2.1 Introduction .....                                                           | 6   |
| 2.2 The Early Debate on the Impact of Skilled Migration .....                    | 7   |
| 2.2.1 The “Internationalists” .....                                              | 9   |
| 2.2.2 The “Nationalists” .....                                                   | 13  |
| 2.3 New Perspectives on the Impact of Skilled Migration .....                    | 17  |
| 2.3.1 “Brain Circulation” and Scientific Diasporas .....                         | 17  |
| 2.3.2 Recent “Brain Drain” and “Brain Gain” Models .....                         | 19  |
| 2.4 Concluding Remarks .....                                                     | 27  |
| 3. THEORETICAL MODELS OF THE BRAIN DRAIN .....                                   | 30  |
| 3.1 Introduction .....                                                           | 30  |
| 3.2 Human Capital Theory of Migration .....                                      | 31  |
| 3.3 Theoretical Models of the Brain Drain based on Human<br>Capital Theory ..... | 31  |

|       |                                                                                                   |           |
|-------|---------------------------------------------------------------------------------------------------|-----------|
| 3.3.1 | Information Asymmetry as a Cause of Brain Drain .....                                             | 34        |
| 3.3.2 | Increasing Returns to Scale in Advanced Education .....                                           | 37        |
| 3.3.3 | On-the-Job Training as a Cause of Brain Drain .....                                               | 40        |
| 3.3.4 | Incorporating Learning-by-Doing into a Theory of<br>Brain Drain .....                             | 43        |
| 3.3.5 | Migration Chains and Herd Effects .....                                                           | 44        |
| 3.4   | Other Considerations .....                                                                        | 46        |
| 3.5   | Concluding Remarks .....                                                                          | 49        |
| 4.    | <b>LABOR MARKET CONDITIONS IN TURKEY AND TURKEY'S<br/>EXPERIENCE WITH SKILLED MIGRATION .....</b> | <b>52</b> |
| 4.1   | Introduction .....                                                                                | 52        |
| 4.2   | Supply and Demand in Higher Education .....                                                       | 54        |
| 4.3   | A Closer Look at Non-Returning Students .....                                                     | 58        |
| 4.3.1 | Private Students .....                                                                            | 58        |
| 4.3.2 | Government-Sponsored Students .....                                                               | 59        |
| 4.4   | Output of the Higher Education System: Stock of Graduates .....                                   | 63        |
| 4.5   | Can Turkey Afford to Ignore Skilled Emigration? .....                                             | 65        |
| 4.6   | Concluding Remarks .....                                                                          | 68        |
| 5.    | <b>SURVEY METHODOLOGY .....</b>                                                                   | <b>71</b> |
| 5.1   | Introduction .....                                                                                | 71        |
| 5.2   | Review of Empirical Studies of the Brain Drain .....                                              | 72        |
| 5.3   | Survey Design and Methodology .....                                                               | 77        |
| 5.3.1 | The Survey Population Defined .....                                                               | 77        |
| 5.3.2 | Sampling and Distribution Strategies .....                                                        | 80        |
| 5.3.4 | Questionnaire Design .....                                                                        | 83        |
| 5.3.5 | Survey Implementation .....                                                                       | 84        |
| 5.4   | Concluding Remarks .....                                                                          | 85        |
| 6.    | <b>SURVEY RESULTS AND<br/>PRELIMINARY DATA ANALYSIS .....</b>                                     | <b>92</b> |
| 6.1   | Introduction .....                                                                                | 92        |
| 6.2   | Respondent Profiles .....                                                                         | 92        |



|        |                                                                                    |     |
|--------|------------------------------------------------------------------------------------|-----|
| 6.2.1  | Age, Gender and Marital Status .....                                               | 93  |
| 6.2.2  | Stay Duration and Country of Residence .....                                       | 93  |
| 6.2.3  | Parental Education Levels and Parental Occupations .....                           | 94  |
| 6.2.4  | Bachelor's Degree Institutions and Fields of Study .....                           | 96  |
| 6.2.5  | Reasons for Going Overseas .....                                                   | 98  |
| 6.2.6  | Family Support .....                                                               | 105 |
| 6.2.7  | Initial and Current Return Intentions .....                                        | 106 |
| 6.2.8  | Reasons for Returning and the Time Frame of Return .....                           | 108 |
| 6.2.9  | General Assessments of Study, Work, Social and Living<br>Conditions .....          | 111 |
| 6.2.10 | Difficulties Abroad and Adjustment Factors .....                                   | 113 |
| 6.2.11 | Evaluation of Various Push and Pull Factors .....                                  | 117 |
| 6.3    | A Closer Look at Student Respondents .....                                         | 123 |
| 6.3.1  | Current Program and Field of Study .....                                           | 123 |
| 6.3.2  | Types of Financial Support .....                                                   | 124 |
| 6.3.3  | Reasons for Choosing Current Institution of Study .....                            | 126 |
| 6.3.4  | Work Intentions after Completion of Studies .....                                  | 127 |
| 6.3.5  | Types of Organizations and Activities at Work after<br>Completion of Studies ..... | 128 |
| 6.3.6  | Push-Pull Factors by Degree Program and by Return<br>Intentions .....              | 130 |
| 6.3.7  | Compulsory Military Service as a Reason for Not<br>Returning .....                 | 132 |
| 6.3.8  | Views of National Scholarship Recipients .....                                     | 135 |
| 6.4    | A Closer Look at Overseas Professionals .....                                      | 137 |
| 6.4.1  | Highest Degree Held and Field of Highest Degree .....                              | 137 |
| 6.4.2  | Stay Duration and Return Intentions .....                                          | 138 |
| 6.4.3  | Return Intentions according to Location of Highest<br>Degree .....                 | 140 |
| 6.4.4  | Return Intentions by Level of Highest Degree .....                                 | 141 |
| 6.4.5  | Respondents by Occupation and Job Activities .....                                 | 143 |

|       |                                                                                                 |     |
|-------|-------------------------------------------------------------------------------------------------|-----|
| 6.4.6 | Work Experience and Overseas Training .....                                                     | 145 |
| 6.4.7 | Respondents by Type of Organization .....                                                       | 146 |
| 6.4.8 | Positive Contributions to Turkey During Stay .....                                              | 148 |
| 6.5   | Concluding Remarks .....                                                                        | 149 |
| 7.    | EMPIRICAL INVESTIGATION OF THE RETURN INTENTIONS OF<br>TURKISH STUDENTS AND PROFESSIONALS ..... | 151 |
| 7.1   | Introduction .....                                                                              | 151 |
| 7.2   | Estimation Procedures and Model Selection .....                                                 | 151 |
| 7.3   | Empirical Specification of the Model: Explanatory Variables .....                               | 157 |
| 7.3.1 | Income Differentials .....                                                                      | 158 |
| 7.3.2 | Explanatory Variables for Testing Specific Brain Drain<br>Theories .....                        | 159 |
| 7.3.3 | Other Explanatory Variables .....                                                               | 161 |
| 7.4   | Determinants of the Return Intentions of Turkish Professionals .....                            | 166 |
| 7.5   | Determinants of the Return Intentions of Turkish Students .....                                 | 189 |
| 7.6   | Concluding Remarks .....                                                                        | 201 |
| 8.    | CONCLUSIONS .....                                                                               | 205 |
|       | REFERENCES .....                                                                                | 213 |
|       | APPENDICES                                                                                      |     |
| A.    | SUPPLEMENTARY TABLES FOR CHAPTER SIX .....                                                      | 227 |
| B.    | SUPPLEMENTARY TABLES FOR CHAPTER SEVEN .....                                                    | 249 |
| C.    | SURVEY LETTERS AND SURVEY QUESTIONNAIRES .....                                                  | 264 |
| C.1   | E-Mail Cover Letter (English and Turkish Versions) .....                                        | 264 |
| C.2   | Courtesy Reply Message (English and Turkish Versions) .....                                     | 266 |
| C.3   | English Mail-out Version of Tertiary-Educated Workforce Abroad<br>Survey .....                  | 267 |
| C.4   | English Mail-out Version of Turkish Students Abroad Survey .....                                | 287 |
| D.    | TURKISH SUMMARY .....                                                                           | 305 |
| VITA  | .....                                                                                           | 316 |

## LIST OF TABLES

### TABLE

|      |                                                                                                                               |     |
|------|-------------------------------------------------------------------------------------------------------------------------------|-----|
| 3.1  | Theoretical Models of the Brain Drain .....                                                                                   | 33  |
| 4.1  | YÖK Scholarship Recipients by Status, 2002 .....                                                                              | 62  |
| 4.2  | Demand and Supply Projections for Selected Occupations, 2005 ('000) .....                                                     | 65  |
| 4.3  | School Expectancy in 2000 for Selected Countries .....                                                                        | 67  |
| 5.1  | A Sample of Previous Brain Drain Studies .....                                                                                | 76  |
| 6.1  | Respondents by Father's Educational Attainment Level (%) .....                                                                | 95  |
| 6.2  | Respondents by Mother's Educational Attainment Level (%) .....                                                                | 95  |
| 6.3  | Bachelor's Degree Disciplines by Survey Group and Gender (%) .....                                                            | 98  |
| 6.4  | Reasons for Going Abroad by Survey Type (%) .....                                                                             | 99  |
| 6.5  | Reasons for Going Abroad by Gender (%) .....                                                                                  | 99  |
| 6.6  | Reasons for Going Abroad by Program of Study, Students (%) .....                                                              | 103 |
| 6.7a | Top Reasons for Going Abroad by Academic Program, Students .....                                                              | 104 |
| 6.7b | Top Reasons for Going Abroad by Highest Degree, Professionals .....                                                           | 105 |
| 6.8  | Family Support for the Decision to Study or Work Overseas and for<br>Settling Abroad Permanently (%) .....                    | 106 |
| 6.9  | Initial Return Intentions (%) .....                                                                                           | 107 |
| 6.10 | Initial and Current Return Intentions, Professionals (%) .....                                                                | 107 |
| 6.11 | Initial and Current Return Intentions, Students (%) .....                                                                     | 107 |
| 6.12 | Predicted Return Dates for Respondents with Return Intentions (%) ....                                                        | 108 |
| 6.13 | Future Plans for Overseas Stay, by Survey Type and Gender (%) .....                                                           | 110 |
| 6.14 | Respondents' General Assessment of Social Conditions in their<br>Current Country of Residence versus in Turkey (%) .....      | 111 |
| 6.15 | Respondents' General Assessment of the Standard of Living in their<br>Current Country of Residence versus in Turkey (%) ..... | 111 |

|      |                                                                                                                               |     |
|------|-------------------------------------------------------------------------------------------------------------------------------|-----|
| 6.16 | Turkish Professionals' General Assessment of Work Conditions in their Current Country of Residence versus in Turkey (%) ..... | 112 |
| 6.17 | Turkish Students' General Assessment of Academic Conditions in their Current Institution of Study versus in Turkey (%) .....  | 112 |
| 6.18 | Difficulties Faced Abroad by Gender and Survey Type (%) .....                                                                 | 113 |
| 6.19 | Top Difficulties by Gender and Survey Type (%) .....                                                                          | 114 |
| 6.20 | Push and Pull Factors Viewed as Important by Professionals and Students (%) .....                                             | 119 |
| 6.21 | Fields of Study and Return Intentions, Students (%) .....                                                                     | 124 |
| 6.22 | Return Intentions and Compulsory Academic Service Requirement (%) .....                                                       | 125 |
| 6.23 | Work Destinations and Current Country of Residence .....                                                                      | 128 |
| 6.24 | Intended Work Destinations and Organizations Immediately after Completing Studies (%) .....                                   | 129 |
| 6.25 | Intended Organization Five Years after Completing Studies by Initial Work Destination (%) .....                               | 130 |
| 6.26 | Program of Study and Push / Pull Factors Viewed as Important by Students (%) .....                                            | 131 |
| 6.27 | Return Intentions and Push and Pull Factors Viewed as Important by Students (%) .....                                         | 133 |
| 6.28 | Top Five Push and Pull Factors according to Return Intentions .....                                                           | 134 |
| 6.29 | Highest Degree Held and Field of Highest Degree (%) .....                                                                     | 137 |
| 6.30 | Highest Degree by Level and Country (%) .....                                                                                 | 138 |
| 6.31 | Broad Occupation Groups and Return Intentions .....                                                                           | 143 |
| 6.32 | Occupation Categories Sorted by Return and Non-Return Intentions ...                                                          | 143 |
| 6.33 | Percentage of Time Spent on Various Job Activities .....                                                                      | 144 |
| 6.34 | Type of On the Job Training and Return Intentions (%) .....                                                                   | 146 |
| 6.35 | Type of Formal Training and Return Intentions (%) .....                                                                       | 146 |
| 6.36 | Return Intentions by Whether Respondent is Working in an Academic or Related Environment .....                                | 147 |
| 7.1  | Dependent Variable: Return Intentions of Turkish Professionals .....                                                          | 152 |
| 7.2  | Dependent Variable: Return Intentions of Turkish Students .....                                                               | 152 |
| 7.3  | Marginal Effect of Gender, Professionals .....                                                                                | 167 |
| 7.4  | Marginal Effect of Having No Work Experience in Turkey .....                                                                  | 171 |

|      |                                                                                                  |     |
|------|--------------------------------------------------------------------------------------------------|-----|
| 7.5  | Marginal Effect of Working in Turkey Immediately after Completing Overseas Studies .....         | 172 |
| 7.6  | Marginal Effect of Contributions to Turkey .....                                                 | 172 |
| 7.7  | Marginal Effect of Initial Return Intentions, Professionals .....                                | 173 |
| 7.8  | Marginal Effect of Family Support and Marital Status .....                                       | 175 |
| 7.9  | Marginal Effects of the Initial Reasons for Going .....                                          | 177 |
| 7.10 | Marginal Effects of Social and Standard of Living Assessments .....                              | 179 |
| 7.11 | Marginal Effect of Highest Degree being a PhD from a Turkish University .....                    | 180 |
| 7.12 | Marginal Effects of Fields of Study, Professionals .....                                         | 181 |
| 7.13 | Marginal Effect of Organization-Specific Formal Training .....                                   | 182 |
| 7.14 | Marginal Effect of Working in Academia or a Research Institution .....                           | 183 |
| 7.15 | Marginal Effects of Various Push Factors .....                                                   | 183 |
| 7.16 | Marginal Effects of Various Pull Factors .....                                                   | 186 |
| 7.17 | Marginal Effects of Difficulties Faced Abroad and Adjustment Factors .....                       | 187 |
| 7.18 | Marginal Effect of the Last Visit to Turkey and of September 11 .....                            | 188 |
| 7.19 | Marginal Effect of Gender, Students .....                                                        | 189 |
| 7.20 | Marginal Effects of Initial Return Intentions, Students .....                                    | 191 |
| 7.21 | Marginal Effects of the Family Support Variables, Students .....                                 | 192 |
| 7.22 | Marginal Effects of Social and Standard of Living Assessments, Students .....                    | 194 |
| 7.23 | Marginal Effect of Turkish Student Association Membership, Students .....                        | 194 |
| 7.24 | Marginal Effects of the Reasons for Going Abroad, Students .....                                 | 196 |
| 7.25 | Marginal Effects of Difficulties Abroad and Adjustment Factors, Students .....                   | 198 |
| 7.26 | Marginal Effects of Compulsory Academic Service and Plans for an Academic Career, Students ..... | 198 |
| 7.27 | Marginal Effects of Various Push Factors, Students .....                                         | 200 |
| 7.28 | Marginal Effects of Various Pull Factors, Students .....                                         | 200 |
| 7.29 | Marginal Effects of the Last Visit to Turkey and Sept. 11, Students .....                        | 201 |
| 7.30 | Factors that have the Greatest Negative Impact on Return Intentions, Professionals .....         | 202 |

|      |                                                                                          |     |
|------|------------------------------------------------------------------------------------------|-----|
| 7.31 | Factors that have the Greatest Positive Impact on Return Intentions, Professionals ..... | 203 |
| 7.32 | Factors that have the Greatest Negative Impact on Return Intentions, Students .....      | 204 |
| 7.33 | Factors that have the Greatest Positive Impact on Return Intentions, Students .....      | 204 |
| A.1  | Respondents by Age and Gender (%) .....                                                  | 227 |
| A.2  | Marital Status of Respondents .....                                                      | 227 |
| A.3  | Stay Duration of Respondents by Gender (%) .....                                         | 228 |
| A.4  | Respondents by Country of Residence .....                                                | 228 |
| A.5  | Respondents by Father's Occupation .....                                                 | 230 |
| A.6  | Respondents by Mother's Occupation .....                                                 | 231 |
| A.7  | Language of Instruction in High School, Science and Social Science Courses (%) .....     | 231 |
| A.8  | Bachelor's Degree Institutions of Respondents .....                                      | 232 |
| A.9  | Detailed Undergraduate Fields of Students with Bachelor's Degrees ...                    | 233 |
| A.10 | Detailed Undergraduate Fields of Overseas Turkish Workforce .....                        | 235 |
| A.11 | Current Program of Study by Gender, Students .....                                       | 237 |
| A.12 | Highest Degree Planned by Gender, Students .....                                         | 237 |
| A.13 | Living Accommodations by Study Program, Students (%) .....                               | 237 |
| A.14 | Living On or Off Campus by Study Program (%) .....                                       | 238 |
| A.15 | Current Field of Study by Gender, Students (%) .....                                     | 238 |
| A.16 | Students by Current Program and Field of Study (%) .....                                 | 238 |
| A.17 | Field of Study and Compulsory Academic Service Requirement (%) ...                       | 239 |
| A.18 | Work Destinations after Completion of Studies .....                                      | 239 |
| A.19 | Intended Organization Immediately after Completing Studies by Work Destination .....     | 240 |
| A.20 | Intended Organization Five Years after Completing Studies by Work Destination .....      | 241 |
| A.21 | Respondents by Standard Occupation Classification, Broad Groups ....                     | 242 |
| A.22 | Respondents by Detailed Occupation Categories, SOC classification ...                    | 243 |
| A.23 | Percentage of Time Spent on R&D Activities by Occupation .....                           | 246 |

|      |                                                                                                                         |     |
|------|-------------------------------------------------------------------------------------------------------------------------|-----|
| A.24 | Return Intentions and R & D Intensity of Job Activities (%) .....                                                       | 246 |
| A.25 | Full Time Jobs Held in Turkey (number) .....                                                                            | 247 |
| A.26 | Full Time Jobs Held Abroad (number) .....                                                                               | 247 |
| A.27 | Number of Years Worked Abroad .....                                                                                     | 247 |
| A.28 | Sector of Current Organization .....                                                                                    | 248 |
| A.29 | Type of Organization .....                                                                                              | 248 |
| A.30 | Location Where Current Job was Found .....                                                                              | 248 |
| B.1  | Associations of Explanatory Variables with Return Intentions ( $y$ ),<br>Professionals .....                            | 249 |
| B.2  | Summary Statistics and Descriptions of the the Variables used in the<br>Final Model, Professionals .....                | 252 |
| B.3a | Estimation Results and Marginal Effects for Outcomes $y = 1$ and $y = 2$ ,<br>Ordered Probit Model, Professionals ..... | 254 |
| B.3b | Estimation Results and Marginal Effects for Outcomes $y = 3, 4$ and $5$ ,<br>Ordered Probit Model, Professionals .....  | 256 |
| B.4  | Marginal Effects for the Multinomial Logit Model, Professionals .....                                                   | 258 |
| B.5  | Summary Statistics and Descriptions of the the Variables used in the<br>Final Model, Students .....                     | 261 |
| B.6  | Estimation Results and Marginal Effects for Each Outcome, Ordered<br>Probit Model, Students .....                       | 263 |



## LIST OF FIGURES

### FIGURE

|      |                                                                                                 |     |
|------|-------------------------------------------------------------------------------------------------|-----|
| 4.1  | Private Overseas Students in 2000, by Program of Study and Gender ..                            | 59  |
| 4.2  | Government-Sponsored Students, 1963-1998 .....                                                  | 60  |
| 4.3  | Number of Research Assistants Sent Abroad on YÖK Scholarships .....                             | 61  |
| 4.4  | Graduates from Universities in Turkey, by Discipline 1970-1999<br>(number) .....                | 64  |
| 4.5  | Graduates from Universities in Turkey, by Discipline 1970-1999<br>(percentage) .....            | 64  |
| 4.6  | Mean Years of Schooling for Selected Countries, 1960-1999 .....                                 | 66  |
| 4.6  | Difference in Mean Years of Schooling between Turkey and Selected<br>Countries, 1960-1999 ..... | 66  |
| 4.8  | Stock of Physicians and Inhabitants per Physician in Turkey, 1928-1999                          | 69  |
| 4.9  | Stock of Nurses and Inhabitants per Nurse in Turkey, 1928-1999 .....                            | 69  |
| 4.10 | Practicing Physicians per 1000 Population for Selected OECD<br>Countries .....                  | 70  |
| 5.1  | Turkish Student Enrollments at US Universities (numbers) .....                                  | 79  |
| 5.2a | Homepage of the Brain Drain Survey (English Version) .....                                      | 87  |
| 5.2b | Homepage of the Brain Drain Survey (Turkish Version) .....                                      | 87  |
| 5.3  | Turkish Brain Drain Student Survey Sample Web Page – Top .....                                  | 88  |
| 5.4  | Turkish Brain Drain Student Survey Sample Web Page – Middle .....                               | 89  |
| 5.5  | Turkish Brain Drain Student Survey Sample Web Page – End .....                                  | 90  |
| 5.6  | “Thank You!” Page .....                                                                         | 91  |
| 6.1  | Bachelor’s Degree Institutions of Turkish Students Abroad ( $n = 967$ ) ..                      | 97  |
| 6.2  | Bachelor’s Degree Institutions of Turkish Workforce Abroad<br>( $n = 1223$ ) .....              | 97  |
| 6.3  | Reasons for Choosing Current Institution of Study .....                                         | 101 |
| 6.4  | Top Reasons for Choosing Current Institution .....                                              | 101 |



|      |                                                                                                                                                |     |
|------|------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 6.5  | Return Reasons for Turkish Professionals (%) .....                                                                                             | 109 |
| 6.6  | Return Reasons for Turkish Students (%) .....                                                                                                  | 109 |
| 6.7  | Adjustment Factors by Survey Type (%) .....                                                                                                    | 116 |
| 6.8  | Top Adjustment Factors by Survey Type (%) .....                                                                                                | 117 |
| 6.9  | Students Abroad by Type of Financial Support (%) .....                                                                                         | 125 |
| 6.10 | Reasons for Choosing Current Institution of Study (%) .....                                                                                    | 126 |
| 6.11 | Most Important Reason for Choosing Current Institution (%) .....                                                                               | 127 |
| 6.12 | Correspondence Analysis of Initial and Current Return Intentions and Stay Duration .....                                                       | 139 |
| 6.13 | Correspondence Analysis of Return Intentions: Student Non-Return versus Professional Migration .....                                           | 141 |
| 6.14 | Correspondence Analysis of Return Intentions and Level of Highest Degree: Student Non-Return versus Professional Migration .....               | 142 |
| 6.15 | Channels for Finding First Full-Time Job Abroad (FFTJ) and Current Job (CJ) (%) .....                                                          | 147 |
| 6.16 | Positive Contributions to Turkey During Stay (%) .....                                                                                         | 149 |
| 7.1  | Return Intentions of Turkish Professionals, Observed Frequencies                                                                               | 155 |
| 7.2  | Return Intentions of Turkish Students, Observed Frequencies                                                                                    | 155 |
| 7.3a | Effect of Stay Duration on Return Intentions .....                                                                                             | 169 |
| 7.3b | Cumulative Probabilities: Stay Duration and Return Intentions .....                                                                            | 169 |
| 7.4  | Effect of Work Experience in Current Country on Return Intentions ....                                                                         | 170 |
| 7.5  | Cumulative Probabilities: Social Assessment of Life Abroad .....                                                                               | 179 |
| 7.6  | Cumulative Probabilities: Standard of Living Assessment of Life Abroad .....                                                                   | 179 |
| 7.7  | Effect of the Interaction between Age and Importance of Advanced Training Opportunities on the Probability of Not Returning ( $y = 4$ or $5$ ) | 185 |
| 7.8  | Effect of Stay Duration on Return Intentions, Students .....                                                                                   | 190 |

## **CHAPTER 1**

### **INTRODUCTION**

This study deals with skilled migration from a developing country perspective. The first part of the study brings up to date both the theoretical and the policy debate on the impact of skilled migration on the sending economies. The second purpose of the study is to take a closer look at the motivations for skilled emigration from Turkey. The focal group consists of Turkish professionals and Turkish students residing abroad. A survey study is undertaken to collect information on the background characteristics, return intentions and various factors affecting the return intentions for these two groups. The second part of the study, therefore, consists of an empirical analysis of the determinants of the return intentions of Turkish professionals and Turkish students, with a view to shedding light on the reasons as well as offering possible remedies for the brain drain from Turkey.

The persistent development gap between much of the developing world and the advanced countries has cast doubt on the convergence prediction of the neoclassical theory of growth. The history of the development of nations has shown that while some less developed countries have been able to develop and join the ranks of the advanced countries, other developing countries appear destined to remain in an underdevelopment trap. The importance of initial conditions in the relative endowment of various resources is frequently emphasized in explaining the diverse development experiences of the developing countries. Human capital—as endowed in the stock of skilled workers—continues to receive increasing attention as a valuable resource in the development process, apart from the usual resources included in traditional economic growth models. It is contended, for example, that the post-World War reconstruction of Europe and Japan could not have proceeded at the pace that it did without the expediting role of an educated workforce. Similarly, a prior base of human capital is believed to have played a key role in the rapid economic progress

of certain developing countries—particularly in East Asia—that has set them apart from other LDCs in the development path.

Given the significance of human capital in development, an important issue is the extent that less developed countries are affected by the continuous transfer of their human resources to developed countries at apparently little cost to the receiving countries. Much of the debate in the 1960s involved the moral dilemma faced by the developed nations in accepting educated immigrants from resource-poor developing countries. One approach centering on the individual, referred to as the “internationalist” paradigm, dismissed the notion of a loss to developing countries. Skilled migration—being based on a rational welfare-enhancing decision process—necessarily made individual migrants better off. At the extreme end, whether migration of educated workers helped or hurt those “left behind” was a matter of irrelevance for some “individualists” since migration ensured the efficient allocation of global resources and increased global output, which they claimed benefited all countries. Advocates of the “nationalist” paradigm, on the other hand, maintained that the losses to the less developed sending countries were indeed very real and proposed policy measures to mitigate developing country losses, including the much discussed Bhagwati tax in the 1970s. Chapter Two presents a synopsis of these early paradigms that have placed the brain drain phenomenon within a “nationalist” and an opposing “internationalist” or “individualist” context, and the corresponding policy implications that follow from these views.

More recently, attention has shifted to the possibility of benefits from brain drain for the source countries. The concepts of “brain gain” and “brain circulation” have become recurring themes in this literature and are used to illustrate the possibility that human capital movements may not net out to a loss for sending countries. On the contrary, these studies contend that a more complex picture emerges when skilled migration is viewed as a dynamic process whereby those going abroad return home, even temporarily, to teach or work in some productive capacity. With the advances in technology and the widespread use of communications technologies, it is even argued that the physical presence of individuals is no longer as necessary as it once was for countries to benefit from the knowledge and expertise of expatriate populations. It is thus suggested that less developed countries can make use of these new communications channels to transfer the knowledge of their expatriate population, without the need for them returning.

On the theoretical side, the growth in the dynamic endogenous growth literature has also influenced the modeling of the effects of skilled migration. There is a clear departure from the earlier literature based on the neoclassical framework to models that account for education and knowledge externalities. One segment of this literature has reinforced a negative outcome for developing countries, while another segment has introduced the possibility that emigration can have a positive impact on source countries by increasing the incentive to invest in education. The latter part of Chapter Two reviews this current strand of the brain drain literature that considers the possibility of positive effects on the source country in addition to the traditionally cited benefit from remittances.

While much of the theoretical work on the brain drain has focused on the macroeconomic impact to the developing country from the loss of human capital, the number of studies that examine the theoretical causes behind the decision to migrate has been limited. Since aggregate migration is the result of a complex decision-making process on the part of highly skilled individuals, modeling this process becomes important to understanding its causes. Chapter Three provides a review of the theoretical contributions to the modeling of the migration decision. Some of these include placing the brain drain within a framework of asymmetric information, while others emphasize the role of high premiums given to specialized skills formed in the host country. These theories provide the theoretical framework for the empirical investigation presented in the remainder of the study.

The motivation for migration is, in general, set within a framework wherein various forces act on the individual's migration decision. These forces are usually expressed in terms of a set of "push" factors emanating from an individual's current environment in the source country and a set of factors external to this environment that serve to "pull" the individual to a new location. Migration takes place when the individual, after weighing the various alternatives before her, makes the assessment that her welfare will improve as a result of the decision to migrate.

In economic models of the brain drain, the weighing of alternatives takes place within a rational decision-making process in which individuals are assumed to be capable of evaluating the total lifetime welfare to be derived from working in the native country and compare it with the total welfare from working in a foreign country. Income differentials

are believed to weigh heavily in this decision and are often presented as the central reason for why individuals with high levels of education choose to migrate abroad. The expectation of a higher income stream to be received in the foreign country is thus believed to act as an important trigger for migration. When presented with the opportunity, the rational individual from a developing country is expected to migrate to where she will earn a higher return than she can expect in her native country.

Given the central role of income differentials in theoretical work, an important question is how significant income differentials actually are in the decision to migrate to a foreign country. And what is the relative importance of other factors that are most often cited as playing a role in this decision? The second part of the study is thus concerned with determining the factors that are of greatest influence in the international migration decision of educated workers. Specifically, the focus is on the brain drain from Turkey to the rest of the world. With a view to understanding the reasons behind the migration decision of highly skilled individuals from Turkey, a survey was conducted during the first half of 2002 to determine the characteristics and return intentions of Turkish professionals and Turkish student residing overseas. The survey yielded over 2000 responses from the targeted populations. Prior to presenting the survey methodology and findings, a general background section on labor market conditions and skilled migration in Turkey is provided in Chapter Four.

Chapter Five is devoted to a detailed discussion of the survey methodology. The questionnaire results are then used to identify empirically the importance of the various factors involved in the decision to stay (or leave). This decision is motivated in part by “pull” factors such as favorable compensation packages, a world-class work environment, better living conditions, active recruitment by employers and so on and in part by “push” factors that originate in the home country that may include political instability, cost of living/inflation, and the inability to find work. Chapters Six and Seven present the analysis of the results for both the student and professionals samples. The information collected from the survey is used to determine whether some of the theoretical reasons given for the brain drain in Chapter Three hold for the targeted groups.

The main findings of the empirical analysis may be summarized as follows: Economic instability and uncertainty appears to be an important push factor for the Turkish professionals working overseas. In addition, respondents who have returned to Turkey to

work after completing their studies and then decided to go abroad a second time are among the least likely to return. For the student sample, pull factors including higher income levels appear to have greater importance in determining return intentions. Higher salaries offered in the host country and lifestyle preferences, including a more organized and ordered environment in their current country of study increase the probability of student non-return. For both groups, the analysis also points to the importance of prior intentions and the role of the family in the decision to return to Turkey or stay overseas.



## **CHAPTER 2**

### **BRAIN DRAIN AND ECONOMIC DEVELOPMENT: COSTS AND BENEFITS**

#### **2.1. Introduction**

The term “brain drain” describes the migration of highly skilled individuals from their countries of origin to countries and regions that offer them greater opportunities. The early debate on the brain drain commenced in the 1960s, and focused initially on the welfare consequences of skilled migration for the sending and receiving countries. According to one group of analysts, international labor mobility provided a mechanism for the efficient reallocation of resources across borders, and international labor movements were viewed as an equilibrating force for labor demand and labor supply on a global scale. Another group of analysts maintained that the migration of skilled workers left the sending countries worse off—especially less developed countries with low levels of human capital. For these economies, the loss of valuable human resources through the emigration of their skilled populations was believed to be particularly damaging, given that human capital investments are costly and skilled workers are difficult to replace.

The two different views on the effects of skilled migration have been labeled the “internationalist” and “nationalist” paradigms, reflecting the particular vantage point of the advocates of each. One of the aims of the present chapter is to provide an overview of the evolution of the brain drain literature since the early 1960s, starting from the early welfare-theoretic analyses set within a neoclassical framework to the present-day studies inspired by the human capital-based “endogenous” growth theories. The central role given to human capital accumulation in the new growth literature has added to the relevance of the concern for the loss of skill individuals through emigration. While some of these studies have reinforced the negative results of the early analyses (Miyagiwa, 1991; Haque and Kim, 1994; Galor and Tsiddon, 1997), other studies have taken a different approach and claim



that sending countries may actually stand to benefit from allowing a certain amount of skilled emigration to take place. These are the so-called “beneficial brain drain” models (Mountford, 1997; Vidal, 1998; Beine, Docquier and Rapoport, 2001). The chapter provides an assessment of the early debate and the newer perspectives on the migration of skilled workers and discusses the costs and benefits of skilled migration within both frameworks. The early debate on the impact of skilled migration is presented in Section 2.2. This is followed, in Section 2.3, by a review of the more recent contributions to the “brain drain” literature including some recent, initial attempts to test the validity of the “brain gain” assumption.

## **2.2. The Early Debate on the Impact of Skilled Migration**

The brain drain phenomenon has been widely investigated since the mid-1960s both in academic circles and by policymakers. In the United States, for example, special commissions were set up by the U.S. Congress (1967, 1968a, 1968b) to specifically examine and produce policy suggestions for the brain drain problem. Skilled migration from the less developed countries to the advanced countries was viewed as a serious threat to the development of these countries. The policy of accepting highly skilled immigrants and allowing talented foreigners to work in the United States thus appeared to fall in contradiction to the spirit of the aid packages provided by the U.S. that were intended to train local manpower in these countries (U.S. Congress 1968b: 14-15). It was suggested that “to the maximum feasible degree” foreign technicians in the United States be encouraged to return to their home countries.

Too much reliance on foreign skills was a concern for the United States since it provided an “easy solution” to structural problems within the U.S. economy that prevented skilled individuals from being trained nationally. One of the proposed solutions to the brain drain problem was the adoption of policies that would enable the U.S. to produce the needed skills “at home”. This included easing monopolistic restrictions that created artificial internal barriers to certain professions, such as medicine. It was argued that the U.S. had the resources to invest in producing the needed skills without the need to resort to immigration to the scale that it did (U.S. Congress 1968a: Report by W. Adams: 60-61).

The brain drain, it seems, raised not only economic concerns, but ethical and moral dilemmas as well for developed countries. While the advanced countries also experience



outflows of national talent, the flow of skilled labor among the developed nations (“north-north migration”) is generally seen as less problematic, since these nations have a greater amount of resources and policy options at their disposal for remedying the structural insufficiencies within their economies that lead to the loss of their skilled manpower. The ability of advanced countries to replace their own emigrants with skilled immigrants from less developed countries also carries the implication that the consequences of manpower losses are less severe for developed economies than for the LDCs. Consequently, developed countries appeared to be facing a moral obligation to help in the economic development of developing countries that suffer economic losses from the brain drain, either by extending aid packages or applying more restrictive immigration policies.

Tied to the early policy debate, separate views on the welfare effects of skilled labor movements emerged in the academic literature. The concern of much of this early literature involved the distinction between the welfare of emigrants and the welfare of those “left behind”. Voluntary migration—the category that skilled migration is presumed to fall into—was, in general, viewed to be welfare-improving since it was based on the rational choice of individuals acting on the desire to improve their personal well-being (under the implicit assumption of no uncertainty in outcomes). The more pertinent welfare concern, from the standpoint of the LDCs, then became the issue of whether non-emigrants were affected by losses in skilled manpower.

Neoclassical economic theory provides the framework for this early discussion of the effects of skilled migration on the economies of the source countries. Neoclassical theory has clear predictions for the effect of factor movements (the migration of capital and labor) on factor prices (the rental rate of capital and wages offered to workers). Capital and labor will flow from locations where they are relatively abundant to locations where they are relatively scarce. This is explained by the law of “diminishing marginal productivity”: increases in the quantity of an input will eventually lead to a decline in the productivity of each additional unit of the input, if every other factor of production remains constant.

Given the assumption that factors are paid the value of their marginal product, each factor will elicit a higher return in locations where it is relatively scarce. Migration, by altering the capital-labor ratios (the relative factor endowments) of the source and host countries, leads to changes in the marginal productivities and rates of return to capital and labor. In the source country, there will be a rise in the marginal productivity and wage level

of the factor that emigrates (labor) and a fall in the marginal productivity of the factor that stays put (capital or unskilled labor depending on the treatment). In the host country, the inflow of labor will lead to a fall in its level of productivity and in its rate of return. Labor will continue to flow out of the source country as long as a wage differential exists between the source and host countries, and will stop only when the returns are equalized in both locations. Given the free movement of individuals and full flexibility of factor prices, neoclassical theory predicts that income differences between countries will vanish in the long run.

Within this framework, the early theoretical discussion of the effects of skilled migration may be divided into two distinct views, labeled the “internationalist” and “nationalist” paradigms. The focal point of the two views in the debate over the migration of skilled workers is better understood by categorizing the first as an “individualistic” approach and the latter as an approach that brings societal or national welfare to the forefront. These views are discussed in turn along with their policy implications in the next two sub-sections.

### **2.2.1 The “Internationalists”**

The supporters of the internationalist paradigm claim that one of the positive effects of skilled migration is the increase in overall output from greater worldwide allocational efficiency. The reallocation of skilled individuals to areas that make better use of their skills increases their productivity, and this has a positive effect on world output. The increase in total output, in turn, is purported to benefit all economies including the economy of the source country (Johnson, 1968). The “internationalist” paradigm involves the belief that individuals should be free to move about as they fit in search of greater opportunities and better lifestyles in order to improve their welfares. They place great importance on the freedom to act as an individual and in the freedom to exercise personal choice. Harry Johnson (1965, 1967 and 1968), who is representative of the internationalist paradigm, suggests that the notion of a “nation” and that of “nationalistic ties” are outdated concepts, and that individual well-being or welfare is what matters in the migration decision, provided that the private gains from migration do not bring a social cost to the *world*.

In general, the private gains to the skilled migrant are believed to be positive since the migration decision is motivated by significant private welfare gains to the individual. This is believed to be especially true for migrants from developing countries where income differentials between the country of immigration and the country of origin are substantial. Johnson (1968: 79) has argued that national ties bring an “artificial barrier” to migration and the “efficient allocation of ... talents among countries” since individuals with strong ties to their native countries will migrate only when it involves quite significant gains in their private incomes. Given that there is “very little possibility” of a loss to the migrant, the pertinent question, according to Johnson, was whether any social costs are incurred from the migration. Migration is viewed as beneficial if the private gains of the migrant exceed the net social loss to the *world*. Specifically, Johnson (1968: 80-81) maintains that “any possibility of a world loss ... hinge[s] on a loss of externalities to the country of emigration, *unmatched* by an offsetting gain of externalities to the country of immigration, and quantitatively large enough to outweigh the private income gains to the migrants”. Thus, so long as the private gains to the individual and the social gains to the country of emigration are greater than the social loss to the country of origin, there is a net world gain.

This represents a more extreme position within the “internationalist” paradigm. While other analysts associated with this paradigm do not necessarily take the position that losses to the migrant’s country of origin are not important so long as gains everywhere else outweigh them, they nonetheless minimize the extent of these losses. For example, Grubel and Scott (1966a) have acknowledged the possibility of redistribution effects through changes in the marginal products of the remaining population. Yet, they have also maintained that these income redistribution effects are negligible because of the “small” numbers involved in the migration of skilled workers from the less developed countries.

In general, it is claimed that within a free market, laissez-faire setting, and in the absence of (significant) externalities, there will be no adverse consequences for source countries (Grubel and Scott, 1966a). In a market economy, each person is paid the marginal product of her services. Since the migrating individual takes both the value of her marginal product and her share in national income with her when she leaves, the incomes of the remaining population are unchanged. Although per capita income may be reduced, this is labeled a “statistical phenomenon” with no real welfare costs to the remaining population. This analysis holds for small or *marginal* movements of skilled labor, which is one of the

important assumptions underlying the internationalist analysis. Within the same framework, however, Berry and Soligo (1967) have shown that for non-marginal flows, the welfare of the remaining population will, in fact, be reduced. It is pertinent at this point to note that skilled migration flows from less developed countries to the developed world have grown substantially over the years (Cervantes and Guellec, 2002), which is to say that the claim of “marginal” or “inconsequential” flows has become less and less convincing.

The “internationalists” or “individualists” who adopted the neoclassical framework in investigating the welfare consequences of international migration movements in the 1960s and 1970s reached the conclusion that in a *market economy* any long run losses for the countries involved would be small, and that benefits to individuals in the form of increased incomes and benefits to the world in the form of an increase in world output would be greater than losses to non-emigrants in the LDCs. Possible adverse consequences could arise from *short run* delays in the structural adjustment of economies to migration flows. Grubel and Scott (1966a) have claimed that welfare losses are more likely to occur in planned or centralized economies where workers may not be fully compensated for their contribution to output. The policy conclusion is that markets should be kept free of distortions including subsidies to education and policies that prevent wages from adjusting freely and quickly to market conditions. It is also suggested that the developing countries should adopt a “laissez-faire” policy toward study and work abroad since “foreign education and immigration [are seen] as a ‘private investment’ outside the sphere of government interference” (Chang and Deng, 1992: 56). A laissez-faire approach is purported to benefit the home country governments by eliminating the financial burden of sponsoring overseas studies.

The “internationalist” viewpoint is also called the “cosmopolitan liberal position” by Harry Johnson, who has been one of its staunchest supporters. This view may simply be summarized as the position that when individuals take actions to better their personal welfare, the end result will be an improvement in global welfare. Ellerman (2003) identifies two major weaknesses of the cosmopolitan liberal argument. First, he argues that the actions of individuals and groups should not be viewed as independent, since there are myriad interdependencies among various actors in development that will affect the final outcome of any single action they may take. To illustrate, Ellerman presents an interesting view of development as a multi-person prisoners’ dilemma situation in which the gains to

the individual from migrating quickly vanish as more and more individuals migrate. This is due to the assumption of “diminishing returns to migration”, which may be “interpreted as a tightening of controls at the receiving end and thus a raising of the costs of migration.” While it is always in the best interest of the marginal individual to migrate, the end result when everyone migrates is that no one reaps the benefits of migration and no one reaps the benefits of development. The dominant outcome of the “game” is a situation where everyone cooperates (e.g., stays home to work for the development of their home country.) Although this presents a very simplified model of the possible effects of migration on development, it is nevertheless a useful conceptual device for recognizing that individual actions combine to form social phenomenon that may have very significant aggregate repercussions, which are then reflected back on the individual. As Schelling (1978: 24-25) has pointed out, although “people may care how it all comes out in the aggregate, their *own* decisions and their *own* behavior are typically motivated toward their *own* interests, and often impinged on by only a local fragment of the overall pattern” implying that “there is no presumption that the self-serving behavior of individuals should usually lead to collectively satisfactory results.”

Ellerman also calls attention to another very pertinent criticism of the liberal view of migration, which is that while exit restrictions by the home country are considered to be a violation of the rights of the individual, developed countries justify the restrictive immigration policies that they themselves impose on the ground that such policies are “the ‘proper’ exercise of national sovereignty” (Ellerman, 2003). Developed countries have been quick to advocate trade liberalization in goods and in the services of certain types of highly skilled individuals (e.g., high-level personnel transfer within multinational corporations and the movement of personnel on exploratory business trips), but have been less enthusiastic about increasing unskilled labor mobility<sup>1</sup>. If the liberal viewpoint is to be taken at face value, then permitting the movement of unskilled and semi-skilled labor from the LDCs to the developed countries should result in substantial *world* gains by allowing LDCs to exploit their comparative advantage in less skilled labor.

---

<sup>1</sup> See Mattoo and Carzaniga (2003) for recent discussions on the General Agreement on Trade in Services (GATS), mode 4, which pertains to the temporary movement of service providers across borders.



### 2.2.2. The “Nationalists”

According to the “nationalists”, the long term indirect contributions to the source country’s economy from an increase in world output are unlikely to counter the immediate short term losses to the developing country that result from the absence of skilled workers and their services (Watanabe, 1969). The supporters of the “nationalist” view, in contrast to the internationalists, do not consider the migration of skilled individuals to developed countries to be simply a matter of freedom of movement. The net loss to the developing country matters since the consequence is a worsening global income distribution. The developed countries, for their part, do not stay indifferent to the possibility of distributional effects within their borders as a result of in-migration, especially when immigrants are viewed as a threat to native jobs. Patinkin (1968: 101) argues that the nation-state gains even greater significance when the “world welfare” perspective of the internationalists is adopted because:

...whereas nation-states can and do carry out fiscal policies (progressive income taxes, transfer payments and the like) to ‘correct’ the effects on the distribution of income generated by a free market process within their borders, there is no world government to do this on an international basis. There are indeed flows of aid from one nation to another—but the relative impact of such aid on the world distribution of income is surely much less than that achieved by a nation-state within its borders.

Another criticism aimed at the internationalist approach is that, while it considers the possibility of positive externalities from having an educated population for the less developed country, these are judged to be too small to have important welfare consequences and to warrant further attention. Positive externalities occur because the social returns to education are greater than the private returns to the individual. Since individuals do not take into account social returns when deciding on their investment in education, they may obtain an amount of schooling that is less than socially optimal.

In the absence of externalities, the foremost cost of skilled worker emigration to the sending country is believed to be the investment, both public and private, made in educating the migrant. The total cost of education is the direct costs and the foregone earnings from not participating in the labor market. In calculating the loss in national income to the sending country, the present value of the emigrant’s expected future income stream must be taken into account (Watanabe, 1969). Grubel and Scott (1966a) have argued

that the home country will not lose from the emigration if the migrant's marginal productivity equaled the income he/she received—in other words, if the costs (remuneration) from his/her employment was fully compensated by his/her contribution. This argument is flawed for the following reasons: 1) the difficulty in measuring marginal productivities; 2) ignoring the replacement cost of the skilled worker<sup>2</sup>; 3) viewing income as a “cost” to the national economy and overlooking the multiplier effects that this income would have generated through spending; and related to this 4) ignoring the higher propensity to save outcome of income of a more educated workforce.

The argument that the loss of skilled manpower is not welfare-reducing for developing countries also hinges strongly on the distinction made between the short run and the long run. The internationalist framework concentrates on the long run steady state consequences of labor movements, and ignores the short to medium term “transition dynamics” of the economy in the adjustment from the earlier non-migration steady state to the new post-migration steady state. The transition involves a slow process of re-educating and replacing skilled workers lost to the economy through migration.

The aggregate data on human capital movements even differentiated for the level of education mask “quality” differences in the movements in and out of a country. It has been pointed out that the loss of one key scientist or innovator may mean immeasurable losses to the domestic country. On the other hand, if the key scientist is not provided a productive environment (e.g. given the facilities or required materials to carry out high value-added projects), then the domestic country may not stand to gain as much by keeping this individual than would the receiving country. For less developed countries, some would argue that the top priority may not be to raise scientists and innovators especially when the basic education system is lagging behind in investments in infrastructure and improvements in quality.

Shortages or surpluses within the source country for different types of skilled labor are also important in determining the severity of the manpower loss for the national economy. The “costs” in replacing the emigrants with less qualified individuals (the loss in efficiency within the national economy) should be accounted for, as well as the loss in the positive externalities that would have been created from having a greater pool of skilled individuals together in the economy. Some have argued that the loss of even one key highly

---

<sup>2</sup> These are labelled “frictional costs” by Grubel and Scott.

skilled individual may entail significant repercussions for the developing economy. An example of this is given by Watanabe (1969: 410):

There may be cases ... where, but for the emigration of highly trained personnel, a new enterprise could be launched, absorbing a large number of hitherto unemployed workers. In such cases, which may not be rare in developing countries, the total impact on employment could be considerable owing to the multiplier effect and, at the same time, technological progress and consequent improvements in productivity would be greatly retarded.

Thus, as the passage illustrates the possibility that potential benefits of retaining key personnel may be compounded for the source country through the multiplier effect. However, there is uncertainty involved in whether and to what extent such benefits will be realized. This type of potential benefit that the skilled emigrants would have bestowed on the home economy, if they had stayed, is difficult to incorporate into a measurement of their marginal productivities. On the other hand, the presence of skilled individuals in an economy increases the probability that new enterprises are launched. This is akin to the “increasing returns” argument given in the “new growth literature” for the positive externalities created by networks of firms or individuals. The host economy reaps the benefits from this externality, while the source country because of her relative lack of skilled workers in the first place suffers a loss.

According to Baldwin (1970), the losses to the source country will be less severe if there is an abundance of surplus in the economy of the types of workers that are emigrating. The expansion of the higher education system in many developing countries has brought with it considerable increases in the number of college graduates in these countries. Manpower surpluses in certain disciplines are usually the consequence of the education system of the country. Surpluses or deficiencies in certain disciplines may be the result of the joint influence of institutional factors stemming from the structure of the higher education system and “prestige factors” that compel students to choose disciplines based on the “points” allocated to them. It may be argued that the institutional inefficiencies of the higher education system cause a mismatch between the supply of workers and jobs available in various disciplines. Viewed from this perspective, skilled migration becomes a means of eliminating the “structural mismatch” across labor markets on a global scale.



But why does such a mismatch occur in the first place? That there would be a mismatch between the supply of graduates and the needs of the domestic labor market suggests that manpower planning strategies may be appropriate to increase the employability of students locally once they graduate.

Ironically the externalities argument, summarily dismissed as inconsequential by some of the proponents of the internationalist view, is the centerpiece of the recent “beneficial brain drain” studies. While the early challengers of the neoclassical theory of migration were critical of the dismissal of the externalities created from an educated population, their approach and the outcome they predicted for the effects of educational externalities on the welfare of LDC residents were in direct opposition to that of the beneficial brain drain (BDD) studies. (Section 2.3 takes a detailed look at the BDD studies.)

The early theoretical contribution by Grubel and Scott (1966a) to the brain drain literature is set within a neoclassical framework of perfect competition, flexible wages and the absence of unemployment. The implications that emerged from the framework, developed by Grubel and Scott (1966a), Johnson (1967) and Berry and Soligo (1967) were challenged more rigorously in the 1970s. One of the critical assumptions for the predictions of the neoclassical theory of migration is that factor prices are flexible and adjust rapidly in response to labor movements to bring about factor price equalization across countries. However, once market distortions are introduced into these models, their welfare implications may be altered. The work of Bhagwati and others in this area in the mid-1970s has shown that market distortions in the form of wage rigidities and education subsidies may significantly change the welfare consequences for the countries involved. Bhagwati and Hamada (1975) abandoned the assumption of flexible wages in order to provide a more realistic setting for studying the consequences of the brain drain on the economic growth of the sending country. They adopted instead the assumption of “rigid” wages, which enables the possibility of unemployment in the economy.

Given the possibility of significant economic losses for the source country, which is purported to be the case for developing countries in particular, this raises the question of finding appropriate policies to mitigate these losses. Should the flow of skilled workers be stemmed through selective restrictions on migration or should there be some income transfer between skilled migrants to those remaining in the home country as reparation for the economic losses to the source economy. Policies that focus on compensation through

taxation and other income transfer schemes require accurate measurements of the losses and benefits, both direct and indirect, that the move may entail, and this is a formidable task. The much-debated tax proposed by Bhagwati has never been implemented.

### **2.3 New Perspectives on the Impact of Skilled Migration**

Many of the theoretical studies of skilled migration in the 1960s and 1970s concentrated on the negative repercussions of international migration on developing countries. Advancements in technology since then have greatly improved communication among remote places, lowered travel costs and, on the whole, have increased interactions between countries, and between expatriates and local residents. More recent discussions have placed greater emphasis on positive aspects of international migration, such as the existence of feedback mechanisms between natives and “scientific diasporas” and on the possibility of positive externalities, which was discussed in the early literature but not formalized. The more formal treatment of positive externalities has emerged in parallel to the new approaches that place technology and learning within an “endogenous growth” framework (see, for example, Aghion and Howitt, 1998). Some of the recent endogenous growth theories of the impact of brain drain on economic growth underscore the possibility that skilled migration may create incentives for greater educational investment in the source economy and thus lead to greater human capital formation than would have occurred without the possibility of migration. The positive influence of the possibility of emigration on educational incentive structures in the home country has been dubbed the “beneficial brain drain” or “brain gain”. Section 2.3.1 gives a brief summary of the emerging literature on the new complexities of international skilled migration including “brain circulation”, “reverse brain drain” and the effects of scientific diasporas and networks on sending countries. Section 2.3.2 outlines some of the new growth models that incorporate externalities in the study of the effects of skilled migration on economic growth.

#### **2.3.1 “Brain Circulation” and Scientific Diasporas**

Lower transportation costs have made it easier to travel globally, and the overall mobility of skilled labor has increased as a result. It is argued that this has contributed positively to developing countries by facilitating the “return” of expatriates, even if for short periods of employment. Those who return are believed to impart valuable knowledge

and skills, gained from overseas experience, to their colleagues and work environment in their native countries. Recent evidence suggests, however, that while skilled migration between *advanced* countries is often of a temporary nature, emigrants from developing countries are less likely to return to their home countries (Cervantes and Guellec, 2002). A recent study of the Italian brain drain (Becker, Ichino and Peri, 2003), for example, shows that the outflows of skilled individuals during the 1990s did actually represent a “brain drain” when compared to the number of returnees—the stock of foreign college graduates in Italy. The human capital content of this outflow also appeared to be significant, since a greater share of graduates from the best Italian universities were going abroad. Given that Italy has one of the lowest shares of college graduates among the OECD countries according to the 2000 OECD figures, this suggests a significant loss in human capital for Italy. The extent that a country benefits from return migration is dependent on its level of development, and the least developed of the advanced countries can also suffer from a brain drain, as in the case of Italy.

Thus, advanced economies appear to benefit more extensively from what has been called “brain circulation” or “brain exchange”—the return of skilled workers after a period of study or work abroad—in contrast to underdeveloped countries, unless the LDCs take specific policy measures to make the return option more attractive for their expatriate populations. South Korea provides a good example of a model of state-led return migration or repatriation. The reversal of brain drain in South Korea is described as being “not a spontaneous phenomenon, but ... a concerted state activity, vigorously pursued from the early phase of Korea’s industrialization in the mid-1960s” (Yoon, 1992: 5). The success of South Korea in repatriating its skilled elite is attributed to the strong commitment of the Park regime to building a scientific and technical base and the use of “directive” measures, including very active and deliberate recruitment policies, the setting up of the Korea Institute of Science and Technology (KIST), and assigning a significant degree of power to technicians and scientists, which was unprecedented in Korean society. According to Yoon (1992), the success and leading role of the state in institution-building, increasing R&D capacity and recruiting overseas personnel provided a strong example, which the private sector readily followed.

The emerging literature on the “benefits of brain drain” also focuses attention on interactions between expatriates and local residents as another means by which a source

country may gain from “brain drain”. Meyer and Brown (1999) investigate the recent rise of “diaspora networks”, some of which have the specific aim of contributing to the development of their home countries. A problem with diaspora networks, however, is that they may face commitment problems and disband easily. Large developing countries, such as China and India, produce large diasporas and are more likely to benefit from these networks than smaller countries, which means that making use of diaspora networks cannot be a viable option for all developing countries (Kapur, 2001). It may be too soon to reach a conclusion about the success of these formal networks, although the question is not so much whether these networks are beneficial, but whether they can be used effectively as a serious policy option for less developed countries.

Technology has greatly increased the number of informal networks as well, allowing for greater interactions among professionals in different countries. Local professionals can make use of these networks to consult and collaborate with expatriate colleagues. In the academic professions, for example, project and study collaborations with overseas colleagues undoubtedly benefit individual researchers by increasing their research productivity and helping them advance in their professions. Yet, one could ask whether improvements in the individual productivity of academicians through such interactions are as significant to the needs of the higher education systems of developing countries as would be the actual returning of scholars. There is, for example, chronic understaffing in the state universities of Turkey that would be eased by the return of academicians to university posts in Turkey. India is another case in point. Although a massive state-led expansion of the higher education system—in terms of the number of higher degree granting institutions and affiliated colleges—took place after India’s Independence in 1947, this was not matched by an equal devotion to raising the quality of education and providing adequate funding for building and updating facilities (World Bank, 2000: 40-41). As a result, India’s higher education system has been unable to attract and retain qualified academic staff and has lost many of its best graduates to overseas universities and to private enterprise, which offer better pay and work conditions.

### **2.3.2 Recent “Brain Drain” and “Brain Gain” Models**

This section considers in detail some recent models of “brain drain” and “brain gain” that are set within a human capital-driven endogenous growth framework, which became popular with the seminal article of Lucas (1988). Lucas’ study amended the

neoclassical theory of growth by giving a vital role to human capital accumulation in explaining the income diversities that appear to exist and persist between countries. His study inspired numerous theoretical studies that place emphasis on the endogenous accumulation of human capital as a source of long run growth, be it through formal education and training or through informal learning-by-doing.

The “beneficial brain drain” and traditional “brain drain” studies considered in this section are set within an overlapping generations (OLG) framework. Overlapping generations models provide a dynamic framework for analyzing macroeconomic phenomenon based on the micro-level behavior of individuals and households. The OLG framework is ideal for looking at the global or macro consequences of the saving, education, workforce and bequest decisions of individuals. Heterogeneity of agents arises naturally from generational differences, since at any given point in time there will be individuals who differ in terms of the stage they are in their life-cycles, although they may be identical in every other respect such as preferences and endowments.

#### *“Brain Gain Models” within an OLG Framework*

In this section, the focus is on two recent studies that carry the analysis of the earlier brain drain literature to a dynamic, overlapping generations setting with emphasis on endogenous human capital accumulation as a source of long run growth. The theoretical models developed by Haque and Kim (1994) and Wong and Yip (1999) are consistent with the view that skilled migration will have a negative impact on economic growth in developing countries. Each study also examines the impact of tax-financed education subsidies under “human capital flight” and draws conclusions for education policy.

The set-up of each model is similar, taking place within an OLG setting in which individuals live for two periods and derive utility from consumption in both periods. Individuals decide on the optimal amount of time to spend on educational and labor market activities in order to maximize their utilities across periods. Since neither saving behavior nor intergenerational altruism is considered, all incomes are consumed in the period in which they are earned.

In the first period of life, each individual spends a fraction of her non-leisure time on education and the remainder working as an unskilled laborer. Education is an investment in human capital that rewards the individual with greater income in the next period. In



Wong and Yip's model individuals differ only in terms of the generation in which they are born. The members of each generation are identical in that they follow the same life-cycle, have the same endowments and make identical decisions with respect to the time they spend on education and work. Individual-level decisions for each generation can therefore be depicted by a representative individual. Heterogeneity of individuals, the breakdown into the unskilled and skilled categories, occurs because there are two generations (young and old) in any given period. The "young" represent the unskilled population and the "old" represent the skilled worker population.

Haque and Kim (1994), on the other hand, differentiate individuals not only in terms of their generation (young versus old), but also in terms of their latent abilities, denoted by  $\alpha$ . "More able" individuals will invest in greater amounts of schooling because the pay-off in terms of productivity and income will be greater for them than it is for "less able" individuals. As a result, at any given time there will be a continuum of heterogeneous individuals with differing ability and productivity levels, rather than two separate, but otherwise homogeneous categories of workers.

In addition to direct investments in education, human capital accumulation also occurs through an intergenerational human capital externality, denoted by  $h$ . Each generation inherits the human capital accumulated by the previous generation. Long run increases in growth are therefore possible through this intergenerational transfer of knowledge, which is based in part on the previous generations' decisions to invest in schooling. This explicit modeling of the human capital externality is what sets these models apart from the previous literature.

Haque and Kim interpret the intergenerational human capital externality,  $h_t$ , as the average human capital level in the economy. The accumulation of human capital is a linear process that is linked to individual-specific ability, the amount of time spent on education and the economy-wide human capital externality. Wong and Yip, on the other hand, interpret  $h_t$  as the general knowledge level, which is modeled as a positive function of the individual investment in schooling (knowledge gained through one's own effort), the number of educators in the economy (knowledge gained from the research of the educators) and the previous period's level of accumulated knowledge. Unlike the Haque-Kim study, human capital accumulation is a concave function of the time spent on education. This

means that the increments to human capital decrease with the time spent accumulating it through education.

In Wong and Yip (1999), there are two inputs into production, skilled and unskilled labor, while Haque and Kim (1994) consider a single input, “effective labor”, which varies across individuals depending on the human capital they inherit and the human capital they accumulate from education. These models thus differ from the other models considered in this section in that physical capital does not enter into the production function. This means that any interactions and complementary effects between physical and human capital, which may have great pertinence in explaining skilled wage differentials between developing and developed countries, are necessarily ignored. In Haque and Kim’s model, the most able are the ones who actually migrate abroad. There is an ability threshold where individuals that have higher abilities than this threshold will migrate.

Both studies also examine the impact of government education and tax policies on human capital accumulation and economic growth. Education (at all levels) is provided free by the home country government. As a result, the only cost of education is the foregone earnings from participating in the labor market. The government is assumed to keep a balanced budget so that its expenditures are exactly offset by its revenues in each period. Educational expenditures by the government are financed by an ad valorem tax on income. Haque and Kim (1994) consider direct subsidies to individual incomes where the education subsidy, denoted  $E_t$ , grows in proportion to the average level of human capital in the economy. Wong and Yip (1999) consider a situation where the government hires skilled individuals as educators to provide free education to students. The number of educators at time  $t$  is given by  $ED_t$ .

The main findings of these studies in terms of education policy are as follows. The Haque-Kim study shows that tax-financed subsidies to education are beneficial for economic growth in a closed economy through their effect on human capital formation. The subsidies bring down the cost of education and induce individuals to invest in more schooling than they otherwise would have. In an open economy setting, however, some of the investments in education—particularly at the higher levels of schooling—are not reaped by the domestic economy because of human capital flight. Those with higher levels of ability invest in higher levels of education because they expect greater returns on their investment. Migration abroad is a selective process in which those with abilities greater



than some threshold level will actually migrate, and others with lower levels of ability will remain behind. Given this, the source country loses both its most able (or productive) human assets and does not get to collect on its investment at the higher education levels. The policy conclusion reached under this scenario is that subsidies should be directed toward lower levels of education in order to increase the human capital of those most likely to remain behind to ensure growth even under a brain drain.

In the Wong-Yip study there are two categories of workers in each period—skilled and unskilled. All individuals of a given generation are identical and as a result their schooling decisions are identical. The only way for the number of unskilled (skilled) workers to increase is for the next generation to decide to collectively invest in less (more) education than the previous generation. This decision is based on the returns to education in the labor market.

#### *The “Beneficial Brain Drain” Models*

Recent studies looking at the relationship between brain drain and economic growth have challenged the conventional view that skilled migration inevitably leads to a “brain drain” with the implied adverse consequences for the economy of the sending country (Mountford, 1997; Stark, Helmenstein and Prskawetz, 1997 and 1998; Vidal, 1998; Beine, Docquier and Rapoport, 2001). In these models, opening a developing country’s economy to the possibility of migration increases the incentive to acquire skills. The prospect of earning higher wages abroad leads to an overall increase in the investment in skills by individuals in the domestic economy, which has positive consequences for economic growth in the source country. Beine *et al.* (2001: 276) summarize the rationale of these models:

In a poor economy with an inadequate growth potential, the return to human capital is likely to be low and hence, would lead to limited incentive to acquire education, which is the engine of growth. However, the world at large does value education and hence, allowing migration to take place from this economy would increase the educated fraction of its population. Given that only a proportion of the educated residents would emigrate, it could well be that *in fine*, the average level of education of the remaining population would increase.

In these models, uncertainty plays an important role in establishing the positive growth effect for the source economy. Mountford (1997) develops an open economy

overlapping generations (OLG) model in which a brain drain is shown to improve the aggregate productivity level in the source country. His model follows the intuition of the study by Miyagiwa (1991), which emphasizes the importance of scale economies in education for attracting skilled migrants to locations with greater concentrations of skilled workers. The greater concentration of skilled individuals in the host country is believed to increase productivity levels by facilitating interactions, idea exchange, and collaborations among skilled individuals. Using similar intuition, Mountford shows that the scale effect of education can also work for the benefit of the source country, since the possibility of migration leads to greater investment in education, and an increase in the number of skilled individuals in the population. The growth externality created by the scale effect in education is brought into the model by linking technology / productivity improvements to the share of educated workers in the source economy in the previous period. The “beneficial brain drain” (BBD) result is achieved when the relative wage differential between the source and host countries is sufficiently high, and if the probability of emigration is sufficiently low. In other words, a brain drain will have positive growth effects for the source economy if a small possibility of emigration (e.g., only the very highly skilled individuals leave) combined with high returns from migration induces a sufficiently large number of people to invest in education in the source country.

The model presented by Stark, Helmenstein and Prskawetz (1997) is similar to the Kwok-Leland (1982) model in that asymmetric information plays an important role in explaining emigration and return decisions. However, asymmetric information in this instance refers to the inability of the host country to discern the ability/skill levels of incoming immigrants. When immigrants first arrive, they are offered a wage rate that is based on the average productivity of the group of migrants. Individual skills and productivities can only be identified after the migrants have spent some time working in the host country. Once the true productivities of the migrants are discovered, the wages are adjusted accordingly: the high-skill group receives a wage increase while the low-skill group experiences a reduction in its wage.

Stark *et al.* (1997) proceed by characterizing the situation in which a “brain drain” would occur, which is defined as high-skill workers remaining abroad and low-skill workers returning home after the wage adjustments. Under the “brain drain” assumption, a “brain gain” is possible for the source country only through the accumulation of human

capital by low-skill workers, since all the high-skill workers migrate permanently to the host country. Consequently, a country that has a relatively high share of low-skill workers stands to benefit from the emigration of its high-skill workforce. The possibility of receiving higher wages abroad leads to human capital accumulation of the low-skill workers, who return in the following period. Although Stark *et al.* (1997) provide a model whereby a “brain gain” is possible for the source country, their analysis does not directly look at the consequences for economic growth. However, the outcome in which the source country ends up with a higher average level of human capital when “brain drain” is allowed can easily provide the motivation for a human capital driven-model of endogenous economic growth. In the following section some of the key features of the BBD models are looked at in greater detail.

*Closer look at Mountford (1997) and Beine et al. (2001)*

Mountford (1997) and Beine *et al.* (2001) differentiate among individuals in terms of their latent abilities. These studies are closely related to Miyagiwa’s model of scale economies in education (Miyagiwa, 1991). Apart from differences in innate abilities, individuals are assumed to be the same. This means they have the same preferences and access to the same technologies. The latent ability of an individual is given by  $a_i$ . The ability parameter ranges between  $a_0$  and  $a_1$ , and its distribution,  $f(a)$ , is assumed to be independent of the abilities of parents (Figure 6.1). Although the distribution of abilities in the general population is depicted as following a normal distribution in the figure below, studies often make the simplifying assumption of a uniform distribution in which each ability category consists of an equal number of individuals. Mountford differs slightly from Miyagiwa by looking at the *share* of skilled individuals in the population,  $s$ , rather than their absolute number,  $L_s$ . The distribution is normalized such that  $\int_{a_0}^{a_1} f(a) da = 1$  and  $0 < s < 1$ .

Mountford considers individuals who live for three periods. In the first period of life, each individual decides whether to invest in education. Education has a fixed cost,  $c_{educ}$ , which is the same for everyone. Since individuals do not have any private resources, such as personal savings and family bequests, they must borrow from the capital market to finance their investment in education at an interest rate  $r$ . Individuals can work only in the second period of life and they must also repay their debts in this period. Consumption takes place only in the third period when individuals retire. An individual with an ability level of

$\bar{a}$  will invest in schooling only when the skilled wage rate,  $w_s$ , is greater than the sum of the unskilled wage rate,  $w_u$ , and the total cost of education,  $c_{educ}(1 + r)$ , in the second period:

$$w_s(\bar{a}) > w_u + c_{educ}(1 + r)$$

The determination of the skilled wage and unskilled wage levels are similar to that in Miyagiwa's model. Individuals who possess a level of ability that is greater than some threshold ability level,  $a^*$ , will choose to invest in education. This threshold level is set by the relative returns to education for each ability level in relation to the returns from participating as an unskilled worker in the labor market in the second period of life.

The studies of Mountford (1997), Vidal (1998) and Beine, Docquier and Rappoport (2001) reach qualitatively similar results. All share the idea of agglomeration economies in which there is a productivity externality associated with the number of educated individuals in the economy.

#### *Policy Implications of the Beneficial Brain Drain Models*

A crucial feature of these models is that the ability of an individual determines whether he/she will devote any time to education, since higher levels of ability will provide higher returns to education in terms of future income levels. In all models, wage (or more generally welfare) differentials provide the motive for migration from the small, open developing economy to the advanced economies.

The human capital-inducing effect of a positive probability of migration implies that a policy of allowing migration outflows to take place will be beneficial from the developing country's perspective. If, however, as the models above show, there are no restrictions to emigration, then everyone would leave with detrimental consequences for the source country economy. The study by Stark and Wang (1999, 2002a) shows that given the positive incentive to accumulate human capital under the possibility of migration, the developing economy can find an optimal restrictive emigration policy that allows some individuals to leave and others to remain behind with a greater amount of human capital, which would not be possible under a strictly restrictive policy. They, in fact, argue that an optimal emigration policy could even replace education subsidies as a way of inducing further human capital accumulation.

## 2.4 Concluding Remarks

The “brain gain” models suggest that allowing skilled emigration to take place can be “good” for the source country economy because it will increase the overall incentive to invest in schooling. These models, however, do not consider the important role of motivation on the productivity of individuals. The failure to emigrate will undoubtedly lead to frustration among individuals if the value they saw in the extra education they received (beyond that they would have chosen to achieve within a closed economy setting) was merely as a means of leaving the country for “greener pastures”. Given the disappointment in not reaching their goal of finding overseas employment, these individuals are unlikely to be productive in their current jobs and are likely to engage in job search activities in order to find the “next opportunity” for overseas employment. This will, of course, be at the expense of giving full attention to their current jobs in their native countries. Thus, reaching a higher educational attainment level by itself is not sufficient to guarantee higher productivity levels and growth levels for developing countries.

In general, the brain gain studies focus on increases in the average schooling level as a means of promoting economic growth, which will occur through an increase in the private demand for schooling. It is presumed that this increased private demand can be met adequately with the current level of resources and infrastructure available to the developing country. The reality in developing countries is that educational resources and opportunities are both limited and unequally dispersed over the population. Lack of private demand for schooling is a mistaken presumption of these models. As the experiences of India and Turkey clearly show, there is a very high demand for education, which the existing education system is unable to satisfy. Overseas study helps to relieve this pressure, although there is no guarantee that students will return once they complete their studies.

A serious omission of the “new growth” models considered is the lack of attention given to demographic factors, which are important in a developing country context. For the sake of simplicity, it is usually assumed that there is no population growth, and when there are groups of workers differentiated by education or skill levels, they are assumed to be of equal size. Connecting the schooling attainment of individuals directly with their abilities—and nothing else—fails to recognize the significance of unequal opportunities in the determination of who proceeds to the upper levels of the education system. Empirical evidence strongly suggests that family wealth and parental schooling levels are significant



determinants of the level of schooling attainment of individuals (in addition to ability) (see Ermisch and Francesconi, 2001; Tansel, 2002). The degree of intergenerational social mobility has important implications for whether the poorer households and their descendents are increasingly marginalized in the development process. An important issue is to determine what the effect of a brain drain (the emigration of the most educated segment of society) will be on social mobility and thus on the distribution of income between wealthy and poor households. To address this, a model with more realistic assumptions about demographic conditions and the behavior of households endowed with differing initial income levels is required. Future research on this is warranted.

The brain drain models abstract from financial markets and thus do not consider the possible effects of differences in saving behavior among different groups of households (e.g. wealthy households vs. poor households). While the consumption, saving and bequest decisions of households with different wealth endowments have been modeled within an overlapping generations context, the OLG models that examine the consequences of brain drain for LDC economies have so far sidestepped this important issue. Many studies focus on the growth effects of migration and ignore distributional issues, which are as important as efficiency considerations within a developing economy context.

Another important shortcoming of the models examined is the full employment framework they use. Bhagwati and others have examined the possibility of unemployment within a static context. The dynamic, business cycle effects on the brain drain are yet to be studied in detail within an overlapping generations framework. Perhaps of broader significance from the LDC perspective is the real effects of financial crises brought about by adherence to a strict program of liberalization advocated by international agencies. The hasty liberalization of capital markets in some developing countries, for example, has increased their vulnerability to global economic fluctuations. The economic crises of recent experience have affected not only the unskilled labor force, but skilled workers as well. It may be said that the instability of liberalizing economies, with frequent episodes of “financial crises”, leads to great uncertainties with respect to production and employment within these economies. This, in turn, sets the broader macroeconomic context to which skilled migrants respond.

The next chapter examines the economic theories of skilled migration that take human capital theory as their basis, and which aim to explain why a wage differential exists between the sending and receiving countries.





## CHAPTER 3

### THEORETICAL MODELS OF THE BRAIN DRAIN

#### 3.1. Introduction

While much theoretical work has been done to model the *effects* of skilled migration on the economies of both the source and host countries, theoretical models of the brain drain are comparatively fewer. Chapter Two provided a synopsis of the theoretical literature on the effects of the brain drain. The present chapter turns to theoretical models that attempt to explain why skilled migration occurs. In economic models of the brain drain, income differentials between the receiving and sending regions provide the main motivation for aggregate skilled labor movements. One explanation for this wage differential focuses on the complementarity between physical capital and human capital, and on differences in the physical capital stock levels in the host and source countries. Complementarity implies that skilled workers will be more productive and thus receive higher pay in locations that are more abundant in physical capital. This promise of a higher wage level, in turn, results in the migration of skilled workers to more developed countries and regions. The implication for policy is relatively simple: developing countries can attract and keep skilled individuals by augmenting their physical capital bases through physical capital accumulation.

Other explanations for the wage differential between developed and developing countries may be found in the more recent skilled migration or “brain drain” literature. The initial focus of the chapter is on economic theories of skilled migration in which wage differentials play a prominent role in the decision to emigrate. These theories are based on the human capital approach, which is presented in section 3.2. Section 3.3 summarizes the economic theories based on this approach that aim to explain why skilled individuals choose to migrate or fail to return to their home countries after a period of study abroad.

The chapter ends with a brief look at some alternative theories of migration that may also have pertinence for skilled migrants.

### 3.2 Human Capital Theory of Migration

In many economic theories of internal and international migration, the decision to migrate from one location to another is believed to be made on the basis of whether the move will bring net economic benefits to the potential emigrant. Formal models formulate the net economic gain from migration in terms of the difference between the present values of the income streams from working in the destination location compared to the original location. Relocation and “psychic” costs such as the cost of adjusting to a new environment and being away from family and friends are subtracted from the wage differential to arrive at the net gain. Specifically, the net gain from international relocation may be written as:

$$\text{Net Gain from Migrating} = \sum_{t=1}^T \frac{w_t^F - w_t^H}{(1+r)^{t-1}} - C \quad (3.1)$$

where  $w^F$  and  $w^H$  are the wages for a given skill level in the host country, denoted by  $F$ , and the source country, denoted by  $H$ . The rate at which the future is discounted is given by  $r$ ,  $C$  represents the total of monetary expenses (e.g., travel and relocation costs) and non-monetary “psychic” costs of migration, and  $T$  is the period of retirement. Migration takes place only when this net gain is positive (Sjaastad, 1962).

This view of the individual as a rational decision-maker is also called the “human capital” approach since each individual decides on the best location—the location that will bring the highest returns—given her investment in education, health and skills.

### 3.3. Theoretical Models of the Brain Drain based on Human Capital Theory

Early studies conducted in the 1960s and 1970s focused on the consequences of brain drain for the countries involved. The analysis of skilled migration outcomes was based on the view that brain drain is the response of skilled individuals to wage differentials in different locations, and that these differentials are the result of productivity differences between countries. Productivity differentials, in turn, arose from the differences in the physical capital stock base of the sending and receiving countries. The relative

abundance of physical capital in advanced countries increased the productivity of skilled labor because of the assumption of complementarity between skilled labor and physical capital. The current section provides a detailed review of various studies that give alternative explanations of how the wage differential, the primary motivator for “brain drain”, occurs. In these models, the decision to emigrate is based on a comparison of the wage offered in the destination country ( $w^F$ ) to the wage offered in the country of origin ( $w^H$ ). The superscripts  $H$  and  $F$  denote the home (source) and foreign (destination) countries respectively. Depending on the exposition, the decision rule for emigration may take either the form

$$k \cdot w^F \geq w^H \quad 0 < k < 1 \quad (3.1a)$$

where  $k$  is a discount factor applied to the foreign wage to reflect lifestyle and cultural preferences, or the following form

$$w^F - c_{mig} \geq w^H \quad (3.1b)$$

where  $c_{mig}$  is the initial cost of migration that includes both monetary and “psychic” of moving. A common feature of the studies is the positive link between the productivity of workers and the wages offered by firms. The studies differ mainly in explaining how the productivity differences occur and how they are reflected in the wage level. Table 3.1 summarizes the emigration decision rule for each model as a guide to the detailed analysis of each model provided in subsequent sections.

Section 3.2.1 presents the Kwok-Leland (1982) model in which wage differentials are based not on country differences in physical capital, but on individual differences in talent or ability. In their study, the phenomenon of student non-return is explained by information asymmetry between host and source country employers concerning the true “talent” of students studying abroad. The informational advantage of host country employers allows them to offer students wages that are commensurate with their skills, while source country employers can only offer a wage that equals the average productivity of returning students. This wage gap results in the best students remaining abroad and the less productive students returning home.

Table 3.1. Theoretical Models of the Brain Drain

| Study              | Emigration Decision                              | $w^F$                             | $w^H$                             |
|--------------------|--------------------------------------------------|-----------------------------------|-----------------------------------|
| Kwok-Leland (1982) | $k \cdot w^F(a_i) \geq w^H(a_R)$                 | $MP(a_i)$                         | $AP^R(a_R)$                       |
| Miyagiwa (1991)    | $w^F(a_i, L_s^F) - c_{mig} \geq w^H(a_i, L_s^H)$ | $h(L_s^F) a_i$                    | $h(L_s^H) a_i$                    |
| Chen-Su (1995)     | $w^F(a_i^F, K^F) - c_{mig} \geq w^H(a_i^H, K^H)$ | $\alpha K^F a_i(a^e, \sigma K^F)$ | $\alpha K^H a_i(a^e, \sigma K^H)$ |
| Epstein (2002)     | $w^F(M_t) - c_{mig}(M_{t-1}) \geq w^H(M_t)$      | $w^F(M_t)$                        | $w^H(M_t)$                        |

$w^F$  = wage offered by employers in foreign country

$w^H$  = wage offered by employers in the home country

$k$  = a fraction reflecting possible disutility from working outside home country

$a_i$  = ability (skill) level possessed by individual  $i$

$a_R$  = average ability (skill) level of returning individuals

$MP$  = marginal productivity of workers

$AP^R$  = average productivity of students who have returned to work in the home country

$c_{mig}$  = monetary and non-monetary “psychic” costs associated with emigration

$L_s^F$  = number of skilled individuals in the foreign country

$L_s^H$  = number of skilled individuals in the home country

$h(\cdot)$  = positive externality from the agglomeration of skilled individuals,  $h'(L_s) > 0$ .

$a^e$  = on-the-job skill accumulation by individual through own effort

$\sigma K$  = capital-dependent on-the-job skill accumulation

$M$  = number of migrants in new location

Positive externalities from the agglomeration of human capital in the host country provides a further explanation for the existence of wage differentials. Section 3.2.2 examines the model proposed by Miyagiwa (1991) in which increasing returns to scale in higher education is given as a cause of brain drain. Chen and Su (1995) extend the “human capital agglomeration model” in an attempt to explain student non-return based on the argument that on-the-job training received abroad, after completion of studies in the foreign country, increases the productivity of individuals working abroad and amplifies wage differentials between the foreign and domestic countries. Section 3.2.3 provides details of Chen and Su’s model of on-the-job training as a cause of brain drain. Wong (1995)

incorporates learning-by-doing into a model of brain drain. His model is considered in section 3.2.4.

In section 3.2.5, network externalities are considered as a possible cause of brain drain. The migration chain model underlines the importance of migration networks in perpetuating subsequent migration. In migration chain models, while migrants still respond to wage differentials in different locations, the positive externalities created by migrant networks in a particular location may be the deciding factor in choosing a migration destination. Helmenstein and Yegorov (2000) model the dynamics of migration flows within a stochastic two-country framework comprising the host and source countries in which such “chain effects” are important. Section 3.2.5 also looks at “herd” models of migration, which provide another explanation of why “ethnic” or “migrant clustering” may occur. Some non-economic considerations, such as psychological factors and foreign language instruction, are discussed briefly in section 3.2.6. A common feature of the models presented in the latter sections of Chapter 3 is their focus on the endogeneity of emigration cost rather than differences in wage and productivity levels in the host and source countries.

### **3.2.1. Information Asymmetry as a Cause of Brain Drain**

One explanation of the brain drain, which focuses on student non-return, relies on the assumption of asymmetric information on the part of employers in the host and source labor markets<sup>1</sup>. The Kwok-Leland model (1982) was constructed to explain why many Taiwanese students have chosen not to return to Taiwan after finishing their studies in the United States, given that labor markets in Taiwan appear to be competitive in terms of employment opportunities and income levels. Unlike the traditional wage differential explanation, with its emphasis on physical capital differences in the source and host countries, the Kwok-Leland model highlights differences in individual talent or skills as measured by the productivity of individuals. The brain drain occurs because individual differences in ability are best assessed by employers of the host country, who are then able to give the appropriate compensation for the level of productivity they observe.

---

<sup>1</sup> This explanation of the brain drain draws on the work of Akerlof (1970) who theorized that imperfect information plays an important role in market outcomes.

Kwok and Leland (1982) hypothesize that host country employers have greater knowledge about the true skills of the students who study in their country than source country employers. The informational advantage of host country employers is the result of several factors. Host country employers have: 1) greater familiarity with the academic system of their own country and the output of this system; 2) more experience in hiring both domestic and foreign graduates from universities in their country; and 3) a system of hiring that makes use of in-depth interviews that allows them to gain further information about job candidates. This information allows host country employers to offer wages to foreign students that reflect their true productivities, whereas source country employers, lacking this knowledge, can only offer a wage rate that reflects the average productivity of returning students.

The following equation represents the general condition for returning. It states that in order for students to return home after their studies are completed, their home country must offer a wage rate,  $w^H$ , that is greater than or equal to a some fraction ( $k$ ) of the wage rate offered by host country employers,  $w^F$ .

$$w^H \geq k \cdot w^F \quad (3.2)$$

The fraction  $k$  reflects the tendency for individuals to have a stronger preference for working in their home countries. In the Kwok-Leland model, the wage offered by the host country is equal to the true productivity of workers. In other words, an individual  $i$  with ability  $a_i$  will receive a wage of  $w_i^F = MP_i = MP(a_i)$  in the host country, where  $MP$  denotes marginal productivity. Ability ranges from  $a_0$  to  $a_1$  ( $a \in [a_0, a_1]$ ) and is distributed over the population according to the distribution function  $f(a)$ . There is a continuum of productivities associated with continuum of ability levels. In the host or foreign country, workers are offered a range of wages equal to their abilities and productivity levels. The source or home country, on the other hand, is unable to differentiate between more productive and less productive workers among the returning students and offers each returning student (based on previous experience with returnees) a wage,  $w^H$ , that is equal to the average productivity ( $AP$ ) of all returning students,  $AP^R$ , where  $R$  indicates "returning" students. In other words, due to the information asymmetry, all students are offered the same wage rate by the home country regardless of their ability level. The general return condition (3.2) may be rewritten in terms of these assumptions for individual  $i$  as follows



$$AP^R = \frac{\int_R a \cdot f(a) da}{\int_R f(a) da} \geq k \cdot MP(a_i) (= k \cdot w^R) \quad (3.3)$$

where  $\int_R$  integrates over the set of productivities associated with returning students. In the average productivity expression above, the numerator equals the total *productivity* of the returning students, and the denominator shows the total *number* of returning students. A student with an ability or productivity level that is greater than the average productivity of returning students will choose to stay in the host country since she will receive a higher wage. Conversely, students with productivities that are lower than the average will choose to return because they will earn a higher wage in their home country. Therefore, an important consequence of this model is that “bright” students will choose not to return while the “mediocre” students will choose to<sup>2</sup>.

One of the implications of the Kwok-Leland model of information asymmetry is that brain drain can occur even when students prefer to work in their home country and income differentials at home are favorable for given productivity levels. The problem is that firms in the country of origin cannot assess individual productivities effectively. The Kwok-Leland framework of asymmetric information for explaining the migration of skilled workers has been criticized on the grounds that employers with imperfect information will eventually learn the true productivities of returning students (Chen and Su, 1995). The information asymmetry, therefore, should not be expected to persist in subsequent periods.

Lien (1987a) extends the Kwok-Leland model by introducing the possibility of signaling. Although source country employers may not have information about the true abilities or productivities of returning students, quality signals such as the ranking of the university from which the student graduates may give them an idea about the abilities of returning students. In Lien (1987b), the migration of skilled individuals is modeled as the outcome of a multi-stage decision process. The stages considered are as follows: 1) Students in developing countries decide whether to go abroad and pursue advanced level

---

<sup>2</sup> Katz and Stark (1984) show using the Kwok-Leland model that it is also possible for *less* skilled workers to emigrate when the information asymmetry works in the opposite direction. When the host country employers have less information about the true skills of the immigrants to their country they will offer wages based on the average productivity of these immigrants. Thus, students with higher-than-average productivities will choose to stay in the home country because they will be offered a better wage while students with lower-than-average productivity levels will choose to emigrate.



studies; 2) students who go abroad to study and successfully complete the doctoral program, must decide whether to immediately return to their home countries or whether to work abroad for a period; and finally 3) those who decide to take jobs in their country of study, must decide whether to continue working abroad or return home. As in the previous models, students are differentiated by ability and the asymmetric information setup in favor of employers in the foreign country is kept in this multi-stage decision process. Thus, Lien's study offers a greater degree of sophistication in modeling information asymmetries while, at the same time, maintaining the main outcomes of the Kwok-Leland model.

### 3.2.2. Increasing Returns to Scale in Advanced Education

Recent studies have emphasized the importance of education and skills for economic growth and development. Some of these studies place particular importance on the positive externalities from advanced education (see, for example, Jaffe, 1989). The idea is that a greater concentration of individuals with advanced degrees within a geographical area increases the productivity of similar individuals in the area and can lead to significant spillover effects in surrounding regions as well. The marginal productivity increase is the result of the harmonizing of knowledge that is endowed separately in each individual with the knowledge of others in the group. Physical proximity increases the sharing of ideas and induces greater cooperation and collaboration on projects. This is the positive, scale effect of education on productivity and aggregate output. Miyagiwa (1991) formally introduces the scale effect in advanced education into a model of the brain drain. In his model, increasing returns to advanced education is given as an explanation of skilled migration. The greater concentration of skilled individuals in developed areas tend to attract skilled individuals from developing areas because of the positive scale effect of advanced education, which increases the productivity and incomes of the skilled individuals.

Miyagiwa's model shares some similarities with the asymmetric information models of section 3.2.1. Individuals are heterogeneous in that they differ in their endowment of "ability" or "talent". Ability is denoted by  $a$  and can take on any value in the interval  $a_0$  and  $a_1$ . Whereas the Kwok-Leland model looks at the migration decisions of students holding advanced overseas degrees, Miyagiwa also models the education decision of individuals. If individuals choose not to invest in advanced education, they work as unskilled workers and receive a wage,  $w_u$ , which is the same for all unskilled individuals

regardless of their level of ability. Those who invest in education work as skilled workers and earn a wage that equals their productivity. Since more “talented” individuals are more productive, they receive a higher wage than less “able” or “talented” individuals. The return to higher education is given by the following relationship which links the productivity of individuals with their ability and the scale effect in advanced education. The wage of an educated individual with ability level  $\bar{a}$  is

$$w_s(\bar{a}) = MP(\bar{a}) = h(L_s) \cdot \bar{a} \quad (3.4)$$

where  $w_s$  refers to the wage received by skilled individuals (those who invest in advanced education),  $L_s$  is the number of skilled workers in the economy, and  $h(\cdot)$  represents the positive externality from the agglomeration of skilled individuals, such that  $h'(s) = \partial h(L_s) / \partial L_s > 0$ .

Each individual initially decides whether to invest in advanced education by comparing the net returns from receiving advanced education to the returns from working as an unskilled worker. Advanced education has a fixed cost<sup>3</sup>,  $c_{educ}$ , which is the same for all individuals regardless of ability. Therefore, an individual with ability  $\bar{a}$  will choose to invest in advanced education only if  $w_s(\bar{a}) - c_{educ} > w_u$ . Given this condition, there is an ability level,  $a^*$ , for which the net return to advanced education is equal to the unskilled wage rate. Those with an ability level that is higher than this threshold ability level will choose to invest in advanced education. The total labor force,  $L$ , is the sum of skilled workers,  $L_s = \int_{a^*}^{\bar{a}} f(a) da$  and unskilled workers,  $L_u = \int_{a_0}^{a^*} f(a) da$ , as determined implicitly by the threshold ability level  $a^*$ .

After the education investment decision is made, individuals acquiring advanced education must decide whether to work in their home country or to emigrate and work in a foreign country. In the model, the source (home) and host (foreign) countries are similar in many respects, including the distribution of ability in the general population. The main difference between the two countries is assumed to be population size; the host country has a greater population than the source country ( $N^F > N^H$ ). This size difference, given identical distributions in ability, implies that a greater number of individuals in the workforce will

---

<sup>3</sup> This cost probably refers to the direct, out-of-pocket expenses such as tuition, books, travel and board.

receive advanced education in the host country ( $L_s^F > L_s^H$ ). The scale effect of advanced education, therefore, works in favor of the host country [ $h(L_s^F) > h(L_s^H)$  since  $h'(L_s) > 0$ ]. As a result, the return to advanced education is greater at each ability level in the host country:  $w^F = h(L_s^F) \cdot a > w^H = h(L_s^H) \cdot a$ . This, in turn, means that the threshold ability level for receiving advanced education is also lower ( $\alpha^{F*} < \alpha^{H*}$ ), which serves to reinforce the scale effect. That is, the greater return to advanced education induces previously uneducated individuals to invest in advanced education.

The host and source countries in Miyagiwa's study are the United States and Taiwan respectively, which makes the difference in population size a valid assumption. In the case of India or China, however, two countries with very large populations, the current model would predict wrongly that these countries would attract rather than lose individuals with advanced education through emigration. To make the model work for countries with relatively large populations and substantial skilled migration, an explanation based on differences in the cost of education or the returns to education is suggested (Miyagiwa, 1991: footnote 14, p. 748). If the cost of education,  $c_{educ}$ , in the country of origin is sufficiently high to increase the minimum (threshold) ability level for investing in education, then the number of skilled workers will be lower compared to the destination country even if population size is greater.

The "cost of education" explanation maintains the assumption that the education decision is determined by ability. This implies that the "most able" will also be the ones who can afford to invest in education. This is obviously unrealistic if different income groups have the same ability distribution as the population at large (notwithstanding the possible existence of 'free' public education, which is generally inadequate in reaching targeted groups in both developed and developing countries). Empirical studies have shown that household income and parental education levels are important in determining the sorting of individuals into educational classes. Lower household income levels and lower levels of parental education affect educational attainment negatively. If an "unequal opportunities in education" perspective is adopted, Miyagiwa's model can more easily be reconciled in terms of the Chinese or Indian experiences.

To summarize, in Miyagiwa's model greater population size in the host country produces a greater number of individuals with advanced education. The scale advantage in advanced education results in a wage differential between the host and source countries in

favor of the host country. This wage differential motivates skilled emigration abroad. An individual will migrate if the wage offered in the foreign country net of the cost of migration is greater than the wage offered in the home country. For an individual with an ability level of  $\bar{a}$ , the emigration decision may be written

$$w^F(\bar{a}) - c_{mig} \geq w^H(\bar{a})$$

$$h(L_s^F) \cdot \bar{a} - c_{mig} \geq h(L_s^H) \cdot \bar{a} \quad (3.5)$$

where  $c_{mig}$  is the cost of migration, assumed to be the same for every individual.

The focus of Miyagiwa's model is on the emigration of individuals who receive their advanced education in the home country, whereas the Kwok-Leland model is a model of student non-return. The effect of scale economies in education on migration has been incorporated into a model of economic growth by Mountford (1997), who shows the possibility that brain drain can have positive consequences for the source economy through its effect on the average level of human capital formation. Mountford's model, which is very similar to Miyagiwa's, was examined in the latter part of Chapter Two.

### 3.2.3. On-the-Job Training as a Cause of Brain Drain

Chen and Su (1995) offer an explanation of student non-return based on the argument that on-the-job training received abroad complements the education completed in the foreign country and increases the productivity of individuals with advanced overseas degrees working in the foreign country. This, in turn, magnifies the wage differentials between the foreign and domestic countries, and increases the opportunity cost of returning to the home country. In their model, the motivation behind the decision to stay is, again, the promise of a greater future income stream in the foreign country arising from higher wage levels<sup>4</sup>.

---

<sup>4</sup> The wage differential, in the form of expected income streams over the period of the student's work life, may be expressed as follows:  $\int_0^T w^F e^{-rt} dt - \int_0^T w^H e^{-rt} dt = (w^F - w^H)(1 - e^{-rT})/r > 0$ , where  $r$  is the discount rate and  $t = 0, \dots, T$  is the work horizon facing the student. The discussion of the Chen and Su model is simplified by ignoring the time dimension; this simplification does not lead to any loss in the implications or understanding of the model.

In the traditional analysis, the marginal productivity of skills, whether obtained through the education system or on-the-job training, depends on physical capital differences between the home and source countries. The complementarity between the stock of physical capital and skills implies that the marginal productivity and wages of skilled individuals will be greater in the country with a greater physical capital base. Chen and Su also incorporate this idea into their model, except that they refer to a broader social stock of capital, which is the sum of both physical and human capital. The wage received by an individual completing advanced studies is dependent on three factors: the social stock of capital ( $K$ ), the chosen profession of the individual, and the individual's skill level ( $a$ ). The expected wage levels for an individual with ability  $\bar{a}$  in the foreign and home countries are expressed in multiplicative fashion as  $w^F = \alpha K^F \bar{a}$  and  $w^H = \alpha K^H \bar{a}$ , respectively, where  $\alpha$  is a positive parameter that varies with profession. By assumption, the social stock of capital is greater in the foreign country than in the home country ( $K^F > K^H$ ). This is the only source of difference between the source and host countries. The greater stock of social capital increases the returns to skills because of the complementarity between capital and skills. Thus, the emigration decision for an individual with ability  $\bar{a}$  is the following:

$$\begin{aligned} w^F(\bar{a}) - c_{mig} &\geq w^H(\bar{a}) \\ \alpha K^F \bar{a} - c_{mig} &\geq \alpha K^H \bar{a} \end{aligned} \quad (3.6)$$

Equating the above condition and solving for  $a$  gives the threshold level of ability (skills) for emigration to take place:  $a^* = c_{mig} / \alpha(K^F - K^H)$ . If the level of skills acquired by the student at the end of her studies is less than  $a^*$ , then she will return. The ability parameter has a distribution  $f(a)$  and a cumulative distribution  $F(a) = \int f(a) da = 1$ . The probability of non-return (stay), then, may be expressed as  $\text{Prob}(\text{Stay}) = 1 - F(a^*)$ . It is easy to show that  $\partial \text{Prob}(\text{Stay}) / \partial K^* > 0$  and  $\partial \text{Prob}(\text{Stay}) / \partial K < 0$ .<sup>5</sup> This indicates that an increase in the social capital of the foreign country increases the probability of non-return, while an increase in the social capital of the home country lowers this probability.

The capital stock argument by itself, however, does not explain why student non-return is a more prevalent form of brain drain. To explain this, Chen and Su decompose the

<sup>5</sup>  $\partial \text{Prob}(\text{Stay}) / \partial K^F = -(\partial F / \partial a^*)(\partial a^* / \partial K^F) = -f(a^*)(-c_{mig} / \alpha(K^F - K^H)) > 0$  and  $\partial \text{Prob}(\text{Stay}) / \partial K^H = -(\partial F / \partial a^*)(\partial a^* / \partial K^H) = -f(a^*)(c_{mig} / \alpha(K^F - K^H)) < 0$

skills acquired through on-the-job training after graduation into capital-dependent and non-capital-dependent components. Students will possess a skill level of  $a_0$  after completing their formal education. They are able to increase their skills beyond this base level when they enter the workforce and receive on-the-job training. The maximum amount of skills that an individual with advanced schooling can accumulate through on-the-job training is the sum of the skills that can be obtained by the individual's own effort ( $a^e$ ) and the skills that are dependent on the existing social capital in the country of work. The maximum skill levels that can be achieved through on-the-job training in the foreign and domestic countries are given by

$$a_{max}^F = a^e + \sigma K^F \quad \text{and}$$

$$a_{max}^H = a^e + \sigma K^H \quad \sigma > 0$$

where  $a^e$  is the non-capital-dependent component of skill accumulation and  $\sigma K^F$  ( $\sigma K^H$ ) represents the capital-dependent component. Chen and Su show that the probability of staying in the foreign country increases with the relative importance of the capital-dependent component (i.e., as  $\sigma$  increases), given that  $K^F$  is greater than  $K^H$ .

Chen and Su argue that to the extent that education received formally complements training, this complementarity will be greater for individuals who receive training in the same country as they receive their advanced education. Accordingly, the marginal productivity of on-the-job training received in foreign firms is greater for those educated in the foreign country than for those educated in their native countries. Those who receive advanced foreign degrees and stay on to receive on-the-job training, therefore, have a lower incentive for returning to their native countries. Some implications arising from this model are 1) superior students stay in the foreign country while inferior students return, as was the case in the Kwok-Leland model; 2) the number of returning overseas students will be lower in disciplines where on-the-job training is important in gaining specialized skills.



### 3.2.4. Incorporating Learning-by-Doing into a Theory of Brain Drain

In Arrow's classic article (1962), knowledge acquired through learning is the product of experience, which is termed "learning by doing". Empirical studies of the determinants of aggregate production have shown that only a small part of total output production can be explained by capital and labor inputs alone<sup>6</sup>, and a very large part can be ascribed to an undetermined residual, which has been called "technological advance". One of the contributions of Arrow's paper is to describe how an endogenous theory of technical change or the advance of knowledge based on learning-by-doing (experience through production) can be incorporated into an aggregate model of economic growth. Since experience is gained by producing, learning-by-doing is constructed as a function of the total or cumulative output produced<sup>7</sup>.

Wong (1995) incorporates the learning-by-doing framework into an analysis of labor migration. He constructs a two-period overlapping generations model to explain how young workers decide on whether to stay in the home country or emigrate. In the model, Wong defines brain drain as "working at home when young and working abroad when old", which he distinguishes from "permanent immigration" or "working abroad when both young and old". To simplify the analysis, it is assumed that wage rates are stationary over time. In other words, a wage differential in the first period will continue in the second period. Wong's model does not explicitly explain why the wage differential exists.

The main results of Wong's model are the following. In the initial period, if both the foreign wage and the foreign output levels are greater than the domestic levels of wages and output, a worker has a double incentive to emigrate: one stemming from the wage differential in favor of the foreign country, the other because the worker will gain greater work experience (implied by the higher output level) than he would in the domestic country. The greater work experience increases the worker's productivity and the wage she will earn in the next period. Accordingly, the worker will emigrate in the first period and remain in the foreign country in the second period since wage levels remain higher than the domestic levels. In the case where foreign wages are higher but foreign output is lower than the domestic levels in the initial period, the worker will choose to work in the domestic

---

<sup>6</sup> The most famous study is the pioneer work of Solow (1957) who estimated an aggregate production function for the United States.

<sup>7</sup> Arrow (1962) uses cumulative gross investment as an index of experience.



country in order to increase her marginal productivity by gaining work experience. This experience she gains in the first period allows her to earn a greater wage in the next period based on her experience. She will choose to emigrate in the second period because foreign wage levels will be higher.

### **3.2.5. Migration Chains and Herd Effects**

In the chain model of migration, migrants are not a homogeneous group, but differ based on the time of their arrival to the destination country. Two groups, “single” and “chain”<sup>8</sup> migrants, are defined to distinguish between migrants who arrive initially and migrants who arrive later. The initial or single migrants are motivated to migrate mainly as a result of ‘push’ factors originating from their home country (such as poor economic or social conditions), while chain migrants migrate because of the ‘pull’ of fellow countrymen in the foreign country.

Chain migrants enjoy certain advantages that single migrants do not. These advantages include information exchanges with the settled population in the destination country about labor market conditions, housing and other relevant information. They may also be able to keep lodging costs down by sharing accommodations with their fellow nationals. These network benefits reduce the overall cost of migration for the chain migrant, with the implication that chain migrants will choose a settlement location not only on the basis of the wages offered in the location, but also on the existence of a supportive network (Helmenstein and Yegorov, 2000).

Helmenstein and Yegorov (2000) use the chain migration concept to construct a stochastic dynamic model that explains how migration from a source to a foreign country may accelerate following a small initial inflow of immigrants. While single migrants start a chain reaction of subsequent migration, it is found that the volume of the chain migration is sensitive to the phase of the business cycle in the host country. It is assumed that each migrant residing in the host country exerts some constant capacity to “pull” a certain number of migrants per period. In recessionary periods, since the initial inflow of migrants is small, the capacity to “pull” new migrants is lesser, which serves to dampen the multiplier effect on chain migration. The wage elasticity of the demand for labor, which is

---

<sup>8</sup> The chain migration concept is based on the earlier studies by MacDonald and MacDonald (1964) and Gurak and Caces (1992).

higher during periods of recession, is therefore important in determining the outcomes of the Helmenstein-Yegorov model. However, they make no distinction between skilled and unskilled migrants and their model ignores the fact that in general a lower elasticity of demand exists for skilled labor.

Other studies that look at migration networks include Bauer, Epstein and Gang (2000, 2002a). Their work has been important in showing that network-externality effects are not linear, but follow an inverse U shape: increasing initially then declining. In explaining Mexican migration to the United States, Bauer *et al.* use both aggregate (share of total Mexican community) and village-specific (share of village-specific Mexican community) measures of migration networks to explain how migrants choose migration destinations. Their study, based on data from the Mexican Migration Project, shows that an inverse U shape exists for the effect of the share of the Mexican community in the US location on the probability of choosing that location. This means that initially immigrants are attracted to locations with a large Mexican community, but as the size of this community increases the probability of choosing the location declines. Wage decreases from increased competition and native population objections to a large ethnic community have been given as possible explanations for this outcome.

Bauer *et al.* (2002a) also believe that village networks / ties may be important in choosing a migration destination. In other words, migrants coming from a certain locality / village in Mexico would choose locations in the United States in which a high concentration of their fellow villagers existed. They show empirically that the effect of village networks on location decisions also follows an inverse U shape, although this effect is less pronounced than for the total Mexican community share in US destination variable.

In the same study, an alternative explanation of “immigrant clustering” is given: that of “herd behavior” based on Banerjee (1992) and Epstein (2002). The assumption behind the theory of “herd behavior” is that although some locations offer better conditions than other locations, the knowledge about which location is the best is limited or unknown to the potential emigrant. The emigrant has imperfect private information about each destination. Based on this private information, the emigrant may feel that some locations are better than other locations. On the other hand, the potential emigrant may observe that many people with similar attributes to him/her have been choosing a location that had not seemed to have been the best location among the alternative locations according to the

private information. An emigrant that follows “herd behavior” disregards the private information and chooses the location that everyone else is choosing based on the belief that his/her private information is incomplete and that others must have better information. Bauer *et al.* (2002a) have tested the herd theory empirically using the same Mexican dataset<sup>9</sup> and have shown that herd effects also exert a significant influence on the location decision of Mexican migrants.

While the migration externalities (chain) and herd models of migration do not distinguish between different types of migrants (e.g., skilled vs. unskilled migrants), the reasons they put forth in explaining migration in general based on ethnic or cultural networks or links may also be useful in motivating the causes behind skilled migration. The theory of network externalities may be adapted to the student and professional migrants’ situations. The technological advances in communications, especially within the past decade, have made internet networks possible. Groups with similar interests come together in these networks to share information and solve problems. There are both general and discipline-specific alumni networks that bring together university graduates. The existence of geographic-based alumni networks for universities such as Middle East Technical University and İstanbul Technical University work in the same way as the migrant networks discussed above in creating externalities for those living abroad and for potential migrants that take part in these networks. Joining the network provides many benefits to the participant. Some examples include the sharing of information on visa-related issues, foreign job openings, choosing the best university or least costly location for study abroad. The existence of fellow countrymen helps lower “psychic” costs in a particular location and facilitates the process of adaptation to a new environment.

### 3.4 Other Considerations

In this section, non-economic factors that affect skilled migration are lumped together into the category labeled “other considerations”. These considerations often refer to psychological, social or institutional factors that either ease or impede the transition to a new culture or society and affect the decision to migrate.

---

<sup>9</sup> In their study, network effects are captured by the stocks of migrants from the same country in a particular migration location at the time of the migration decision, while herd effects are proxied by the flows of emigrants to a location in the year before a person migrates.

### *The Effects of Foreign Language Instruction.*

Foreign language instruction in schools in Turkey has been suggested as an important catalyst for the brain drain (Kaya, 2002). Since language acquisition is more difficult later in life, students exposed to a foreign language early on in their education will experience less difficulty in adjusting to a foreign-language environment. This has the effect of lowering the non-pecuniary cost of migration. Language ability will also improve the chances of being accepted as an immigrant in the host country and increase the potential earnings of accepted immigrants.

### *Psychological and Sociological Factors.*

Many of the previous models have emphasized the economic aspects of the decision to migrate. Psychological factors may be as important as or more important than economic factors in some cases. In sociological studies of the brain drain, for example, it has been shown that the degree of “normlessness”, “powerlessness” and “anomie” felt by individuals can be important psychological factors determining whether individuals return to their home countries. These psychological attributes are discussed in Hekmati (1973: 27). Powerlessness and normlessness are described as two attributes of “alienation”. Powerlessness refers to the lack of control or mastery that an individual may feel over political and social events, while normlessness refers to the “expectancy of the necessity of deviant behavior in attaining of economic and political goals”. Anomie, on the other hand, refers to “an individual’s perception of his society and his place in it”. High levels of anomie and alienation felt in the home country by migrants may partially explain why they do not return. There is evidence that psychological factors are important in adapting to a new environment.

### *Constraints to individual decision-making: the family and social context.*

Another micro-level approach, dubbed the “new economics of migration”, extends the view of the rational individual by placing the micro decision-making process within a broader social or “family” context (see Stark and Bloom, 1985; Vogler and Rotte, 2000). The motive for individual migration becomes more than the desire to increase personal welfare, but the desire to improve the well-being of the household to which the individual belongs by reducing the labor market risks for the emigrant’s family as a whole. For example, individual migration may be supported financially by the emigrant’s family, and the emigrant, in turn, is expected to support his household by sending back remittances.

There is empirical evidence in support for a “family investment model” of migration, in which families pool risks by diversifying their labor across borders.

Another focus of the new economics of migration is on the relative income position of an emigrant in terms of a reference group in the host country. In this case absolute income differentials are irrelevant, and individuals or households make their decisions based on their “relative deprivation” levels. As the empirical study on Turkish students and professionals presented in the next two chapters will show, families and social networks consisting of friends and acquaintances are important influences on the decisions to study and to work abroad.

*The role of institutions: screening.*

Commander, Kangasniemi and Winters (2002) emphasize the screening element in the policies that take place at the national level and at the firm level. In the United States, for example, preferential visas are issued to potential migrants working in priority areas. Many countries also have or are in the process of adopting similar migration policies. The issuing of work permits in the US requires sponsorship from a firm. Above average living and working conditions make advanced countries attractive locations for both skilled and unskilled individuals. This allows developed countries to use immigration restrictions as a policy tool to select immigrants based on their qualities. The use of selective immigration policies in favor of skilled migrants has become an increasingly important strategy both in the United States and in other Western countries as a way to meet the growing demand for skilled workers. The need for technology workers has intensified over the years in knowledge-based countries, such as the United States. Much of this demand is concentrated in “industrial districts” or “competence blocs”<sup>10</sup>, such as the Silicon Valley in California. The growing reliance of U.S. high-technology firms on skilled foreign workers is corroborated by the introduction of the “Brain Act” in the U.S. Congress in August 1999<sup>11</sup>. This bill was introduced in order to extend 5-year work visas to foreigners who are recent

---

<sup>10</sup> The term “industrial district” was used by Marshall to denote a geographic area in which the activities of actors within this region as a whole bring about increases in total factor productivity, whereas the activities of individuals or single firms alone suffer from diminishing returns. Thus, the existence of a network of firms functioning together creates positive externalities for the individual firm. Eliasson has developed this idea by introducing “competence bloc” theory. A competence bloc is “the configuration of actors that together initiates and stimulates the growth of an industry” (Eliasson, 2000: 220).

<sup>11</sup> Information accessed from the website: <http://www.techlawjournal.com/cong106/h1b/Default.htm>.



graduates from U.S. universities in the fields of science, math, engineering, and computer science, in order to compensate for shortages in high technology manpower in these areas.

### **3.6. Concluding Remarks**

Various theories have been proposed to explain the phenomenon of “brain drain”. These theories center on the assumption that wage differentials provide the primary motivation for the migration of skilled workers to more developed countries. Higher wages abroad attract educated individuals from all over the world much like higher rates of return to physical capital (higher interest rates) attract inflows of capital. The traditional (neoclassical) explanation for these wage differentials is the existence of differences in the stocks of physical capital between the source and host countries. Since developed countries have higher physical capital stocks than developing countries, the productivity and wages of skilled workers are higher in the more advanced economies as a result of the complementarity between physical and human capital.

Alternative theories of the wage differential between developing and developed countries are found in the more recent literature. The Kwok-Leland model of asymmetric information, for example, was constructed to explain skilled migration for a very specific circumstance: the incidence of non-return among Taiwanese students completing their studies in the United States. This phenomenon could not be explained by traditional arguments since the Taiwanese economy is viewed to be competitive in many respects with the United States economy. Kwok and Leland proposed informational asymmetries between domestic and host employers as a possible explanation for the emigration of Taiwanese students. They argued that host firms have an advantage over home firms in terms of their knowledge about the true productivities of students completing their studies in the host country, and are, therefore, able to give appropriate compensation. Home countries, on the other hand, would only be willing to offer a wage based on the average productivity of returning students. This model was criticized on the ground that information asymmetries can only be temporary, since home country employees would eventually discover the true productivities of returning students and compensate them accordingly.

The second model considered in the chapter is based on the idea of increasing returns to advanced education or “agglomeration economies”. The basic idea behind the agglomeration externalities argument is that the concentration of individuals—professionals

with similar interests—in the same area increases the productivity of professional work. Consequently, professionals and scientists in less developed countries, facing limited opportunities in their native countries to interact with colleagues who have similar interests and research agendas, choose to move to countries where they can do so. As more and more individuals who specialize in the same area get together, this creates further incentive for others to do the same. This may be viewed as an extension of the traditional argument in which skilled migration is the result of differences in the physical capital base of the source and destination countries to include social (or human) capital stocks. Wong's (1995) model of brain drain based on learning-by-doing interprets the greater output level in the host country as representing a cumulative base of experience. Foreign workers choosing to stay in the host country are able to take advantage of the greater base of experience and increase their productivities from learning-by-doing.

Chen and Su (1995) have extended Miyagiwa's agglomeration economies argument to account for why student non-return is a more prevalent form of brain drain. Cross-country differences in the stock of capital (human and physical) may serve to explain why a wage differential exists between the host and source countries. However, it does not explain why the failure of foreign-educated students to return to their countries of origin is more prevalent than the migration of professionals who are educated in the home country. To explain this, they propose a model in which training received on the job is specific to the social stock of capital of a country. This training, however, is more productive when it is obtained in the country where the advanced education is received. It is, therefore, argued that on-the-job training received abroad after the completion of academic studies complements the education received in the foreign country and increases marginal productivities and wages.

Theories that endogenize the cost of migration were also considered in the chapter. Migrant networks reduce both the pecuniary and non-pecuniary costs associated with the initial move. Herd behaviour, on the other hand, arises as a result of uncertainty. Although the theories of migrant networks and herd behavior are more generalized theories that do not distinguish between skilled and unskilled migrants, they can be easily adapted into a theory of skilled migration. The last section considered other non-economic factors that may be important in the decision to migrate, such as language ability and psychological



factors. Difficulties in adapting to new circumstances may also be thought of being part of the “psychic” costs of migration.

In the next chapter, background information on labor market conditions in Turkey as well as a brief outline of Turkey’s experience with skilled migration is provided. From this analysis, it appears that institutional, demographic and political factors are as prominent in determining labor mobility patterns as purely economic reasons. In fact, each set of factors are related and should be considered together to provide an understanding of why skilled migration from Turkey takes place. The theories of on-the-job training (or specialized training) and learning-by-doing are tested empirically in the econometric study of the Turkish brain drain presented in Chapter Seven.



## **CHAPTER 4**

### **LABOR MARKET CONDITIONS IN TURKEY AND TURKEY'S EXPERIENCE WITH SKILLED MIGRATION**

#### **4.1 Introduction**

Migration, both internal and across borders, is nothing new for Turkey. A significant amount of rural-to-urban migration continues to take place within Turkey's borders, and is driven in large part by the greater employment and educational opportunities available for families in urban areas. Paralleling this, a significant number of highly educated individuals from Turkey have chosen to take advantage of overseas employment opportunities. A significant number of them have also gone through a period of training and education in their country of destination, reflecting in part the lack of opportunities for specialized study within the higher education system in Turkey. The focus of the current chapter is on labor market conditions and the higher education system in Turkey, which will provide the background for the exploratory and empirical study of return intentions presented in the latter part of the thesis.

Some of the factors that have been cited as important for skilled migration include political instability, lower salaries and lack of employment opportunities in the home country, as well as a preference to live abroad. In addition to these factors, several other features of Turkey's political economy are considered to be important in explaining the Turkish brain drain. These include the lack of a national research and development strategy, distortions in the education system and foreign language instruction in schools, all of which have important labor market consequences (Kaya, 2002). Turkey's first "brain drain" wave began in the 1960s, with doctors and engineers among the first group of emigrants. During that period, Europe was the most popular destination for Turkish professionals and academicians (Kaya, 2002). Political instability and crisis, followed by the military coup in 1960 are believed to have instigated this initial exodus of highly skilled individuals. In

recent years, attention has shifted to young university graduates who are seriously contemplating starting their careers abroad as a result of the current economic crisis. Postgraduate studies overseas provide the first step for many in fulfilling this goal. Another serious problem is that of non-returning government-sponsored research assistants who have been sent abroad as an investment toward filling academic positions in the expanding Turkish higher education system.

The brain drain issue has received considerable attention from the Turkish media as a serious economic and social problem, particularly in the aftermath of the economic crises of November 2000 and February 2001. In the earlier 1994 crisis, Turkey's GNP had declined by 6.1 percent. Although this was a record contraction at the time, the economy recovered quickly in the following year and recorded a positive growth rate of 8.0 percent. The 2001 economic crisis, however, was much more severe and GNP contracted by 9.4 percent, which is the worst growth performance in the history of the Turkish Republic<sup>1</sup>. The recent crisis has been both prolonged and widespread in its repercussions compared to the previous crises, affecting also university graduates on a much wider scale (Işığçok, 2002). Even graduates of the prestigious universities in Turkey, who usually face better than average prospects in the labor market, were affected. The perception of the brain drain as a serious problem has increased following each crisis, and has also attracted the attention of national authorities. In 2000, the Turkish government decided to form a joint task force of experts from the Turkish Atomic Energy Agency, the Turkish Academy of Sciences (TÜBA) and the Scientific and Technical Research Council (TÜBİTAK), in order to investigate Turkey's brain drain problem (*Cumhuriyet Gazetesi*, 2000).

The chapter begins with a background on the economic and social conditions prevailing in Turkey, and thus presents a setting within which to evaluate the migration decisions of skilled individuals from Turkey. Section 4.2 reviews the conditions within the higher education system in Turkey that may have promoted the exodus of tertiary level students and exacerbated Turkey's brain drain problem.

---

<sup>1</sup> Figures were obtained from the State Institute of Statistics website: <http://www.die.gov.tr/ieyd/milhes/page27.html>. Görün (1996) also indicates that in economic downturns university graduates increasingly replace the positions that were previously filled by high school graduates, and this is said to lead to deskilling of the work force with university education. The tertiary level graduates who work below their appropriate skill level is also seen as an important problem.

## 4.2 Supply and Demand in Higher Education

The higher education system may be thought of as the intermediary that produces individuals with special skills and proficiencies that form the human capital required in producing a more sophisticated range of final products. While there is considerable demand pressure on the Turkish higher education system, improvements on the supply side have been slow to take place.

Empirical studies indicate that investment in higher education, compared to the other schooling levels, earns a very high private rate of return for both men and women in Turkey (Dayıoğlu and Kasnakoğlu, 1997; Tansel, 1994, 1999). Furthermore, these studies also point to significant regional differentials in the rates of return to education at all levels. While university education provides a high private rate of return in all regions, both developed and underdeveloped, the highest returns are, not surprisingly, found in industrialized districts where the three metropolises, İstanbul, Ankara and İzmir serve as centers of attraction. The regional disparities in the private gains from education as well as the greater educational opportunities have created a massive rural-to-urban exodus. This has, in turn, exacerbated the regional disparities within Turkey, creating squatter settlements with high levels of poverty. While unskilled workers show a high degree of mobility within the domestic economy, highly educated workers show a high degree of international mobility. The uneven development of the Turkish economy with disparities at many levels including education, wages, and employment has led to both unskilled internal migration and brain drain to other countries.

Economic development and rapid population growth have increased enrolments at the primary and secondary levels of schooling, which, in turn, has generated a growing social demand for higher education. According to a recent Higher Education Council report, the high schools in Turkey, which currently take three years to complete, do not provide adequate labor market preparation for their students<sup>2</sup>. The report indicates that “the

---

<sup>2</sup> Indeed, there is informal evidence that suggests high school education is also inadequate in preparing students for university education. To improve their chances of getting into a quality university, many urban high school students go to after-school and week-end private tutorial schools that have sprung up to profit from the enormous competition created by the nation-wide placement exam. It may be reasonable to suggest that, ironically, the formal secondary education system has been overshadowed by the preparations for the university placement exam. A graduate from an Ankara high school, for example, admitted that students in their final year of high school spend most of their in-class time solving exam questions, and that “teachers pretty much stay out of the way

main reason for the demographic pressures exerted on the Turkish tertiary system is the fact that high school graduates who are unable to get into college or university lack the knowledge and skills necessary to earn a livelihood” (YÖK, 2001: 30). The lack of in-firm training programs on a wide scale is also believed to aggravate this problem. As a result, university education is seen as an important means for training students and imparting the skills that are critical for securing jobs.

In response to demand pressures, the number of universities in Turkey increased from a total of eight prior to 1970 to seventy-one at the beginning of 1998. The expansion of public and private universities is continuing at a rapid pace today. The Higher Education Law (*Yüksek Öğretim Kanunu*), enacted in 1981, brought about a major reorganization of the higher education system in Turkey. In 1982, with the establishment of the new constitution, the Council for Higher Education (*Yüksek Öğretim Kurulu* – YÖK from henceforth) was created to plan, coordinate and oversee many of the important activities of the higher education system within the provisions of the higher education law. This was an important step toward the creation of a centralized and unified higher education system that at the same time entailed a compromise in autonomy for individual universities.

The new 1982 constitution also included a provision that allowed non-profit foundations to establish higher education institutions. This officially marked the beginning of the private or “foundation” university system in Turkey<sup>3</sup>. The first private university, Bilkent, was formed soon after in 1984 and started accepting students in 1986. Since then, following the enactment of the Foundation University Law<sup>4</sup> (*Vakıf Üniversiteleri Yönetmeliği*) in 1991, which clarified the conditions under which foundation universities could be formed and managed, 23 new private universities have been created. The newly established private university system in Turkey has succeeded in attracting talented foreign and Turkish academicians from abroad by offering competitive wages and state-of-the-art equipment and facilities. On the other hand, private universities charge tuition fees that are

---

because they know that getting into university is important to us.” See also Tansel and Bircan (2002) for an analysis of private tutoring and the demand for education in Turkey.

<sup>3</sup> Previous attempts, during the late 1960s and into the 1970s, at forming private universities to meet the growing demand for higher education were thwarted on the ground that they were unconstitutional, and the existing for-profit private higher education institutions were absorbed into the state university system.

<sup>4</sup> Law No. 3785 passed in 1992.

generally out of the income range of a majority of Turkish families, although they provide scholarships to exceptional candidates scoring high on the national placement exam. Enrolments at the private universities are lower than for the state universities partly because these universities promise a lower student to teacher ratio, but more importantly because families find the tuition and education costs prohibitive. Thus, while private universities have partially reversed the academic brain drain to other countries, they have not eased the demand pressures on the higher education system. Relatively few students are able to take advantage of the opportunities provided by the private universities in Turkey. Those who can afford the high tuition fees come from a higher socioeconomic group, and this serves to aggravate the existing problem of unequal opportunities in education.

The number of state universities has also increased dramatically over the years. While there were only eight state universities prior to 1970, this number reached 53 by the year 2000, compared to 21 for the private universities. State universities are free of tuition by law, although students must still pay a mandatory “contribution fee” at the start of each term, which is much lower than the tuition in private universities. For this reason, a majority of students enroll in state university programs. State universities, therefore, carry an essential part of the responsibility of providing post-secondary education to a broader group of students. The distance education program offered by Anadolu University since 1982, consisting of both 2-year technical college and 4-year university programs, has become an important means for absorbing some of the demand for higher education, accounting for 30 percent of total enrolments (YÖK, 2001). This unique distance education program has been called the “largest university on Earth” by the World Bank since nearly half a million students are enrolled in this program from different parts of Turkey as well as from different countries (MacWilliams, 2000).

Despite the rapid increase in the number of both private and public universities and the removal of quota restrictions in distance education programs, only a third of all candidates taking the entrance exam in 2001 could be placed in a higher education institution, including distance education. A significant number of those who are placed in higher education programs do not enroll. Many students, for example, who qualify for the distance education program choose not to enroll and instead wait to take the exam the following year in order to be placed in a regular university program. Similarly, those who do not qualify for the more prestigious universities or their desired programs also wait



before enrolling. Ministry of Education statistics indicate that only about a third of all students taking the university placement exam are final year high school students; many others take the exam several times in order to be placed in their desired program or school.

There are significant disparities in the quality of higher education institutions as well. The sharp rise in the number of higher education institutions after 1980 has sparked the quantity-quality debate in higher education. It is claimed that the quantitative expansion of universities has occurred at the expense of quality, which is measured in part by indicators such as student-teacher ratios, and the physical resources devoted to teaching and research (Şenses, 1994). The public and private resources devoted to higher education have not kept up with the expansion in enrolments, institutions and programs, and there appears to be chronic understaffing in terms of student-teacher ratios, especially for the state universities (Dündar and Lewis, 1999). Academic staff at state universities also receive salaries that are far below those of the private universities. Like the wages of other civil servants in Turkey, the salaries of academicians in state universities are set by legislation and they have not kept up with inflation. The February 2001 economic crisis has made the situation worse by more than halving the value of the academic salaries at the state universities. There is indication that moonlighting and extra teaching activities to supplement incomes are becoming more prevalent (*Cumhuriyet Gazetesi*, 2001). Such a trend will undoubtedly have dire consequences for research-related activities, and inevitably lead to the loss of some the best researchers to private and overseas universities.

The quality gap, both perceived and real, at the university level also has important consequences for university graduates entering the labor force in Turkey. The quantitative expansion of universities, with little regard for quality, has yielded graduates with diplomas that appear to have little value in the Turkish labor market. For example, the most lucrative jobs in the labor market are offered to the graduates of a small number of universities with well-established reputations<sup>5</sup>. The “signal” value of obtaining a diploma from one of these institutions, therefore, creates immense competition among high school students for getting acceptance to the more prestigious universities. It is also interesting to note that almost all

---

<sup>5</sup> A cursory look at the job openings in the classified section of the major Turkish newspapers reveals that for many top-level firms, there is a strong preference for graduates of established universities, and in particular, those that produce candidates who are fluent in at least one of the major foreign languages, with English topping the list. Even when the ads do not specifically mention any universities by name, many are given in English or German which strongly favours candidates with a foreign language education background.

of the private universities, most of which have been formed after 1995, have adopted English as the language of instruction in order to attract students, because the job market strongly favors candidates with fluency in at least one major foreign language.

### **4.3 A Closer Look at Non-Returning Students**

Demand pressures have led to an increase in the number of students who are studying abroad with their own means (private students) or on foreign scholarships. A majority of these students are pursuing undergraduate studies. Some are recruited by prestigious foreign universities, while others choose foreign study after failing to be placed in a program in a national university. There are also those who do not want to go through the stress of taking the very competitive nation-wide university placement exam. Another important reason for wanting to study at a foreign university is the belief that it will provide better quality education. Section 4.3.1 takes a close look at private students studying abroad. In response to the pressures on the higher education system in Turkey outlined in the previous section, the Ministry of Education and the Higher Education Council increased the numbers of scholarships for post-graduate studies abroad. These scholarships hold the condition that scholarship recipients return and fill positions in the newly established state universities. Section 4.3.2 shows that non-returning scholarship recipients have become a concern for the education authorities.

#### **4.3.1 Private Students**

According to Ministry of Education statistics, a total of 21,570 Turkish students were studying abroad with their own means in mid-2001. Two-thirds of these students chose universities in Western Europe and North America, while a significant proportion (22 percent) also chose the Turkic republics in Central Asia as study locations. The majority of private students are pursuing undergraduate studies and nearly 90 percent of them are male. This gender gap also persists at the postgraduate levels of study, being slightly higher in the technical fields in comparison to the social sciences. Figure 4.1 below provides the figures for the number of private students studying abroad in 2000 by program of study and gender.

Part of the explanation for the great number of students in overseas undergraduate programs can be traced back to the inability of the higher education system in Turkey to absorb the demand for education at the university level. Demographic factors, including a

high population growth rate and a high percentage of the young in the total population, have led to both an expansion in demand for schooling and an increase in the Turkish labor force. Labor force participation rates, however, have not kept pace with population growth, showing instead a decline over the years. This is attributed partially to the “discouraged worker effect” from a lack of employment generation despite a high growth rate compared to OECD levels, except during the crisis periods, (Şenses, 1994; Tansel 2002b). The return rate of private students is not known. However, it is expected that non-return will be more prevalent in the absence of a “moral contract” to break as in the case of national scholarship recipients.

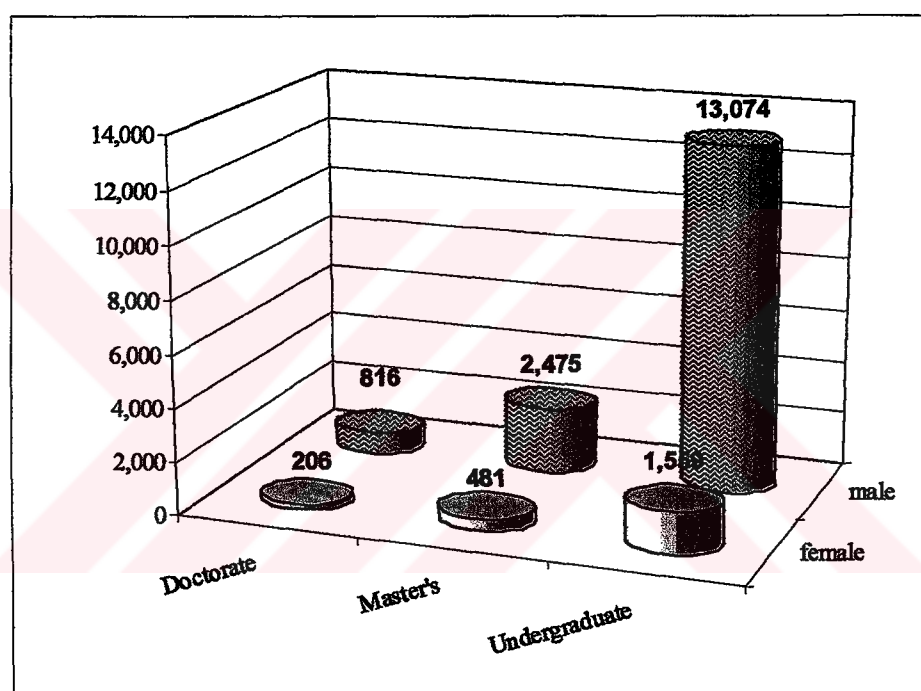


Figure 4.1 Private Overseas Students in 2000, by Program of Study and Gender

Source: SIS (2002: 171), Table 105.

#### 4.3.2 Government-Sponsored Students

In addition to private students, there are several thousand government-sponsored students who are studying abroad, most of them at the postgraduate level as part of the goal of training academicians to fill positions in state universities. The great majority (90 percent) of the government-sponsored students are studying in the United States and Great Britain. Law 1416 (Law Regarding Students to be Sent to Foreign Countries), enacted in

1929, provided many students with the opportunity to study abroad on a scholarship provided by the National Education Ministry (*Millî Eğitim Bakanlığı - MEB*). The original aim of these scholarships was to train civil servants to fill positions in the growing public sector of the newly formed Turkish Republic. With the expansion of the higher education system, the emphasis shifted to the creation of a cadre of foreign-educated academicians to staff the newly-established universities in Turkey and to thus enrich the educational standards of these universities. The number of government-sponsored students for the period 1963-1998 is given in Figure 4.2 and includes all levels of study, undergraduate and graduate. In October 2002, the number of students sponsored by the government was 720<sup>6</sup>, a majority of whom were pursuing doctorate level studies (77.2%).

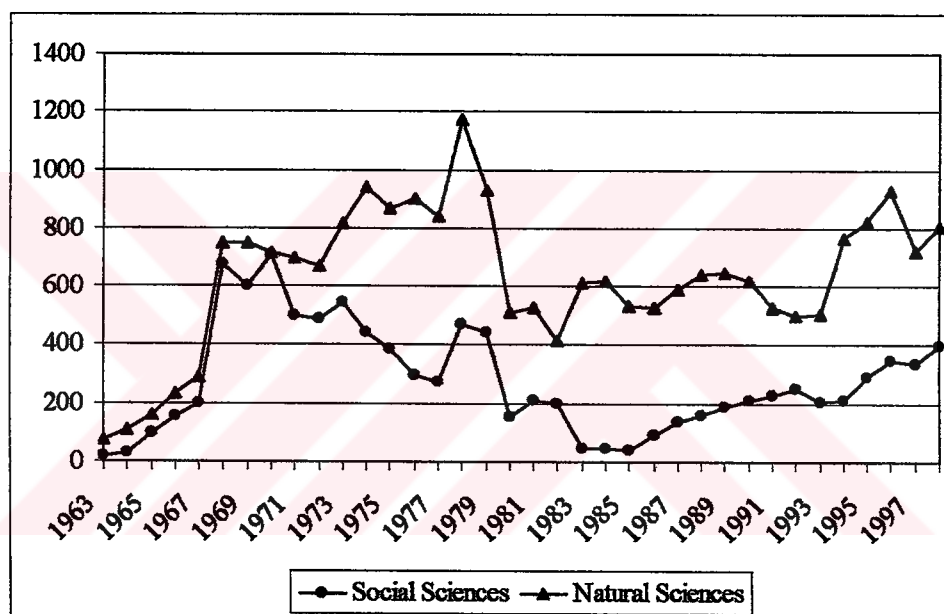


Figure 4.2 Government-Sponsored Students, 1963-1998

Source: Various issues of the *Statistical Yearbook of Turkey*.

Note: Includes students sponsored by various Ministries and other Government Institutions.

In 1987, the Higher Education Council (YÖK) also began awarding scholarships to university graduates for postgraduate studies abroad. The YÖK scholarships share the same purpose as the Ministry of Education scholarships, which is to supply the Turkish higher education system with qualified academic staff. These scholarships also provide foreign study opportunities for students who would otherwise not have been able to finance the expenses involved in overseas education, provided that they meet at least the minimum

<sup>6</sup>Figures are from *MEB Sayısal Veriler 2003-2004*, available at the MEB website.

criteria specified in the terms of these scholarships. The number of research assistants sent abroad on scholarships awarded by the Higher Education Council (YÖK) is given in Figure 4.3. YÖK awarded the greatest number of scholarships in 1993, but this number declined sharply after 1993 as a result of a change in policy to award fewer scholarships under more stringent requirement in order to increase the quality of recipients (YÖK, 2003).

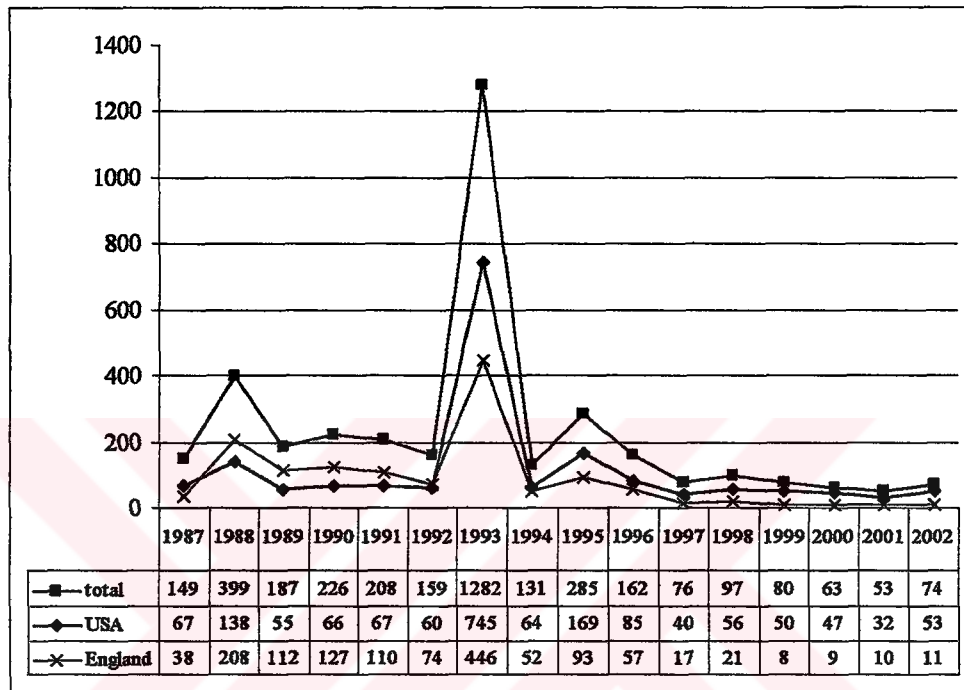


Figure 4.3 Number of Research Assistants Sent Abroad on YÖK Scholarships

Source: YÖK (2003).

Both the MEB and YÖK scholarships are given in return for compulsory academic service in the universities of Turkey. This generally means that for every year of study abroad, the scholarship recipient must spend two years working in a pre-chosen university in Turkey when they complete their studies. Since most of the scholarships are given for doctoral level studies, the amount of the academic service amounts to eight years on the average. Students who fail to comply with the terms of the scholarship must pay back the value of their scholarship plus interest. Between 1987 and 2002, a total of 3631 research assistants were sent abroad on YÖK scholarships to pursue graduate level education (see Table 4.1 below). Nearly 90 percent were sent to the United States (49.2 percent) and England (38.4 percent), with the remaining dispersed over twenty five countries (YÖK, 2003). In 2002, 762 YÖK scholarship recipients were continuing with their studies abroad.

Table 4.1 YÖK Scholarship Recipients by Status, 2002

| 1987-2002                         | Number | %     |
|-----------------------------------|--------|-------|
| Scholarships awarded              | 3631   | 100.0 |
| Students:                         |        |       |
| Continuing their Education Abroad | 762    | 21.0  |
| Returning with a PhD              | 1667   | 45.9  |
| Returning with a Master's Degree  | 375    | 10.3  |
| Returning without a diploma       | 351    | 9.7   |
| Non-returning students            | 473    | 13.0  |

Source: YÖK (2003).

Despite the good intentions behind these scholarships, there is indication that they may not be fulfilling their purpose, at least to the extent that they had been envisioned. According to the 2003 report by YÖK, 473 of the total of research assistants sent abroad to study since 1987 have not returned to Turkey. While some scholarship recipients have officially resigned from their position of research assistant, others have been considered as "resigned" for not complying with the terms set out in the scholarship or ending their communication with the Higher Education Council. There is indication of high dissatisfaction among scholarship recipients with regard to the terms of the scholarship, the bureaucratic processes they have had to face, and the general inflexibility shown for special or changing circumstances of the recipients. There is also indication of some abuse of the state scholarships by a number of recipients who view these scholarships primarily as a stepping stone for taking advantage of overseas opportunities that they otherwise could not have afforded. Some of these students opt to repay the value of the scholarship after earning money abroad instead of fulfilling the compulsory academic service requirement. The YÖK scholarship program has had a 58% success rate<sup>7</sup> so far in terms of fulfilling its stated purpose of producing PhD recipients with foreign degrees who return and take academic positions in Turkish universities.

<sup>7</sup> Those continuing with their overseas studies are excluded from the calculation ( $1667 \div 2869 \times 100$ ).



#### **4.4 Output of the Higher Education System: Stock of Graduates**

Turkey as a middle-income developing country does not experience the same degree of difficulty in producing a university-educated population as some of the least developed countries, which lag further behind in terms of the number of teachers, institutions and educational infrastructure. Figures 4.4 and 4.5 present the number and percentage of graduates respectively from Turkish universities by major discipline<sup>8</sup> for the three decades: 1970s, 1980s and 1990s. Education science had the greatest share of graduates in the 1970s, followed by the social sciences, engineering and medicine. The 1980s witnessed a substantial rise in graduates from the social sciences at the expense of education, and modest increases were seen in the shares of the remaining disciplines with the exception of the share of law school graduates, which declined. Education's share continued to decline in the 1990s, while the share of social sciences increased to more than a third of the total number of graduates.

Within the social sciences, half of all graduates have graduated from programs in the economic and administrative sciences. The rise of the private banking sector in the 1990s created many employment opportunities for social science graduates, which may explain the striking increase in enrolments and in the number of graduates within the discipline. The economic crises took many of these opportunities away, however, and left numerous university graduates unemployed. One of the effects was to increase the number of applications for graduate level study at Turkish universities and overseas.

The State Planning Organization (SPO) has made supply-demand projections in the Eighth Five-Year Development Plan for education and health personnel as well as other occupations (see Table 4.2). In the health sector, the projected shortfall in supply is greatest for the nursing profession; this is followed by doctors. The low share of graduates from the health sciences indicates that the projected shortage may become a reality unless measures are taken to increase the incentive to enroll in health programs. The contention of the beneficial brain drain models is that the possibility of emigration increases an individual's desire to invest in tertiary education. The less developed country benefits since not all of the university graduates will be admitted as immigrants due to restrictions or quotas imposed by foreign countries. If individuals do indeed base their education decisions on

---

<sup>8</sup> Classifications are based on UNESCO's International Standard Classification of Education (ISCED). Medicine also includes nursing and other health services.

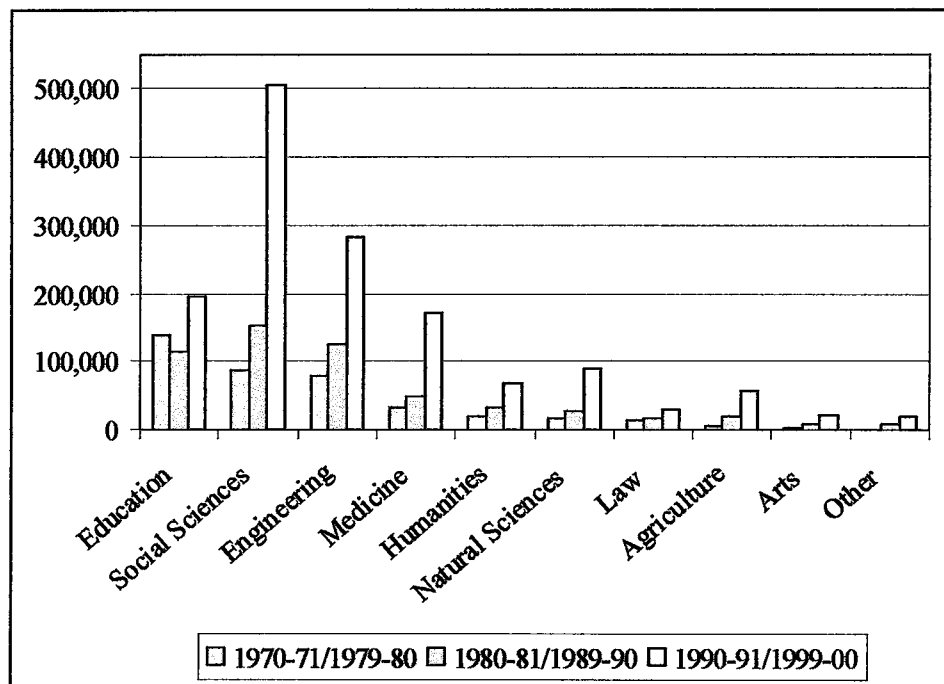


Figure 4.4 Graduates from Universities in Turkey, by Discipline 1970-1999

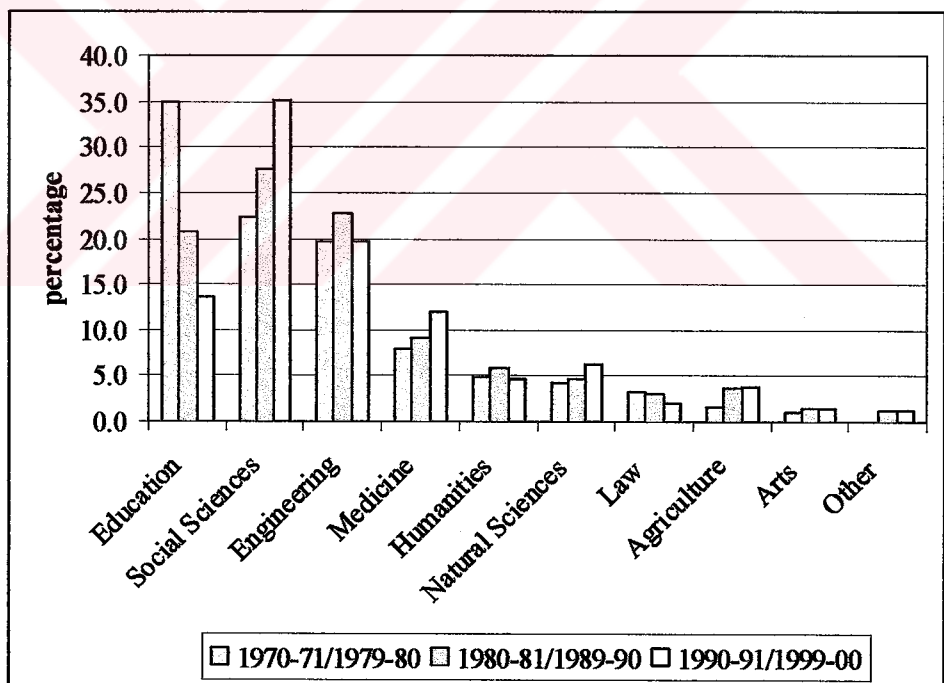


Figure 4.5 Graduates from Universities in Turkey, by Discipline 1970-1999 (%)

Source: SIS, various issues of the *Statistical Yearbook of Turkey*.

Note: The Natural Sciences category includes Mathematics and Computer Science.

possibilities at home *and* abroad, then they must also base their choice of occupation on the same criteria. This means that the “beneficial brain drain” models have ignored the potential effect of emigration on career choice when making their prediction that home countries will benefit from emigration. It is possible that students will choose study programs that are in high demand in developed countries so as to increase their chance of being accepted as immigrants. The potential for emigration can therefore alter the incentive structure for choosing study programs.

**Table 4.2 Demand and Supply Projections for Selected Occupations, 2005 ('000)**

| Occupation                            | Supply | Demand | Projected Shortfall in Supply |
|---------------------------------------|--------|--------|-------------------------------|
| <i>Education</i>                      |        |        |                               |
| Primary School Teachers               | 394.8  | 413.0  | 18.2                          |
| Secondary School Teachers             | 210.1  | 180.0  | -30.1                         |
| Higher Education – Academic Personnel | 85.0   | 119.5  | 37.5                          |
| <i>Health</i>                         |        |        |                               |
| Doctors                               | 89.0   | 121.7  | 32.7                          |
| Dentists                              | 16.0   | 28.3   | 12.3                          |
| Pharmacists                           | 21.3   | 26.2   | 4.9                           |
| Nurses                                | 77.1   | 212.8  | 135.7                         |

*Source: SPO (2000) Eighth Five-Year Development Plan.*

#### **4.5 Can Turkey Afford to Ignore Skilled Emigration?**

One of the views on the brain drain is that it ceases to be a problem when countries develop. This suggests that a positive development path is a given for developing countries. Figure 4.6 demonstrates the striking differences in educational attainment among industrialized and less developed countries. The United States has the highest level of average educational attainment over the period 1960-1999. This is followed by Japan and Taiwan, and then by China, Turkey, India and Pakistan. These countries all have significant numbers of students and academic staff in United States universities (see *Open Doors*).

While Turkey has made progress in development over time, her position in education with respect to other countries has marginally improved, if at all. Figure 4.7 below shows the difference in the average years of schooling between Turkey and the United States,

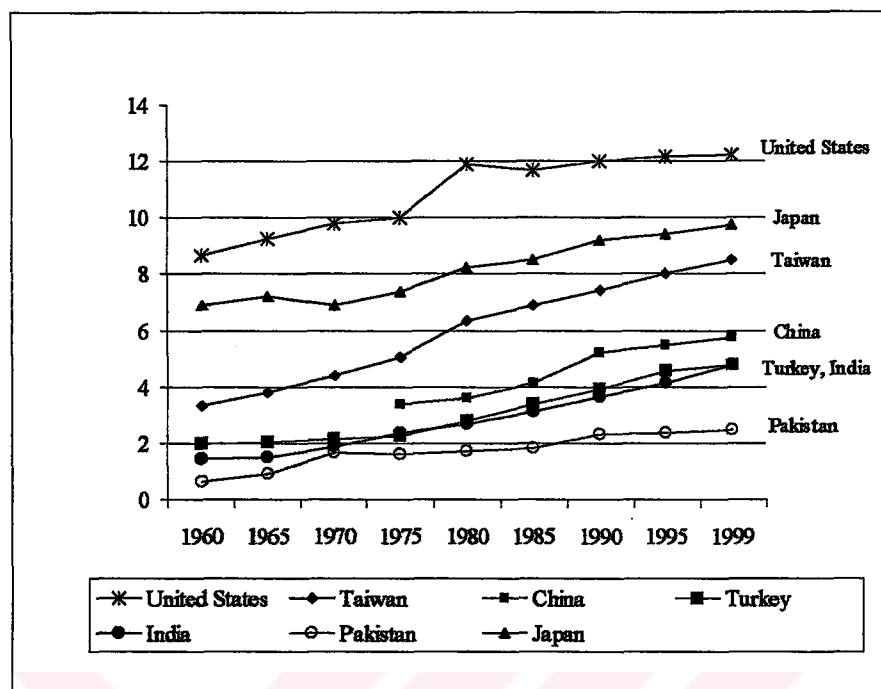


Figure 4.6 Mean Years of Schooling for Selected Countries, 1960-1999

Source: Barro and Lee (2000) education dataset.

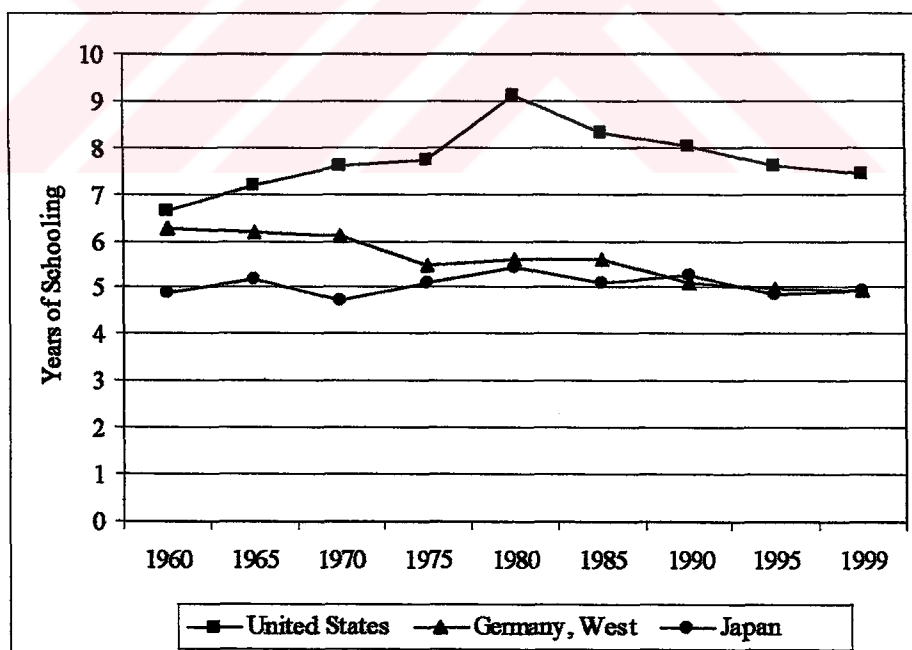


Figure 4.7 Difference in Mean Years of Schooling between Turkey and Selected Countries, 1960-1999.

Source: Barro and Lee (2000) education dataset.

Japan and West Germany. In the thirty years spanning the period 1960-1999, the difference between Turkey and Japan has remained steady at five years of schooling. The greatest difference in the average years of schooling is with the United States at around seven years. For the same period, there appears to be a worsening in Turkey's position vis-à-vis the United States. The only improvement appears to be with that of West Germany, and that is partially a consequence of West Germany's unification with East Germany and the resulting influx of less educated individuals.

Table 4.3 School Expectancy\* in 2000 for Selected Countries

|                | All Levels | Primary and<br>lower secondary<br>education | Upper<br>secondary<br>education | Tertiary<br>education |
|----------------|------------|---------------------------------------------|---------------------------------|-----------------------|
| United Kingdom | 18.9       | 8.9                                         | 7.4                             | 2.5                   |
| Germany        | 17.2       | 10.1                                        | 3.0                             | 2.0                   |
| United States  | 16.7       | 9.4                                         | 2.6                             | 3.4                   |
| Argentina (1)  | 16.4       | 10.6                                        | 2.1                             | 2.7                   |
| Brazil (1)     | 15.7       | 10.9                                        | 2.6                             | 0.9                   |
| Turkey         | 10.1       | 7.5                                         | 1.7                             | 0.8                   |
| China          | 10.1       | 8.5                                         | 1.2                             | 0.4                   |

Source: OECD *Education at a Glance 2002*, Table C1.1 ([www.oecd.org](http://www.oecd.org)).

\*Expected Years of Schooling for a 5-year-old Under Current Conditions.

(1) Reference year is 1999.

Table 4.3 shows the school expectancy for a five-year-old under current conditions. These figures are for the year 2000 and are taken from the OECD publication *Education at a Glance 2002*. A five-year old in Turkey can expect to receive a total 10 years of schooling, which is below the secondary level. The expected level of schooling at the primary and lower secondary education levels is only 7.5 years, which is below Turkey's current goal of universal primary level education. The figures for China are similar. In the industrialized countries, a five-year-old can expect to receive over 16 years of schooling. The United States has the highest expected number of years of schooling at the tertiary level at 3.4 years, while in Turkey a five-year-old can only expect to receive less than a year of tertiary education. Given this bleak outlook, the migration of tertiary-educated individuals carries added significance.

Turning our attention to the health sector, it would appear that Turkey has made some progress here. The numbers of physicians and nurses per population have risen considerably since the forming of the Republic (see Figures 4.8 and 4.9). While this may seem impressive, when these figures are compared to those for other OECD countries, a significant gap remains between Turkey and the OECD average. Figure 4.10 gives the practicing physicians per 1000 population for Turkey and selected countries for the years 1960 and 1998. Turkey's ranking among the OECD countries in terms of the number of physicians has remained the same. It should also be kept in mind that these aggregate figures mask serious regional differentials within Turkey, where the southeast provinces face a serious shortage of qualified personnel in health and education. The return of educated individuals, therefore, does not necessarily imply a quick solution for these internal disparities.

#### **4.6 Concluding Remarks**

The overview of recent labor market conditions and the higher education system in Turkey, provided in the current chapter, sets the macroeconomic context for the study of return intentions of overseas professions and students from Turkey. Turkey's recent experience with economic crises has created great uncertainty for both the unskilled and skilled workforce. One of the characteristics of the current spell of economic instability is the high rate of unemployment among the university educated. It is expected that economic conditions will be a prominent factor in the return decision of overseas professionals and students from Turkey. The next three chapters are devoted to the presentation of the empirical investigation of return intentions based on a survey of over 2000 Turkish students and professionals residing overseas. Chapter Five gives details of the survey methodology, including survey design and strategies employed to collect data for the exploratory and empirical study. Chapter Six provides the preliminary survey results, while Chapter Seven presents the econometric analysis of the determinants of return intentions.



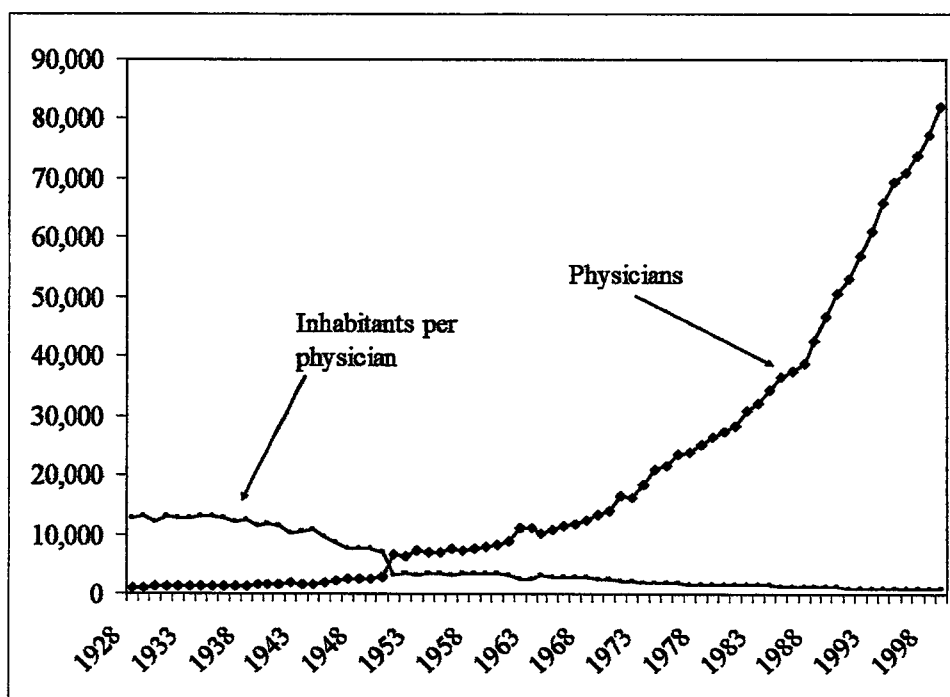


Figure 4.8 Stock of Physicians and Inhabitants per Physician in Turkey, 1928-99

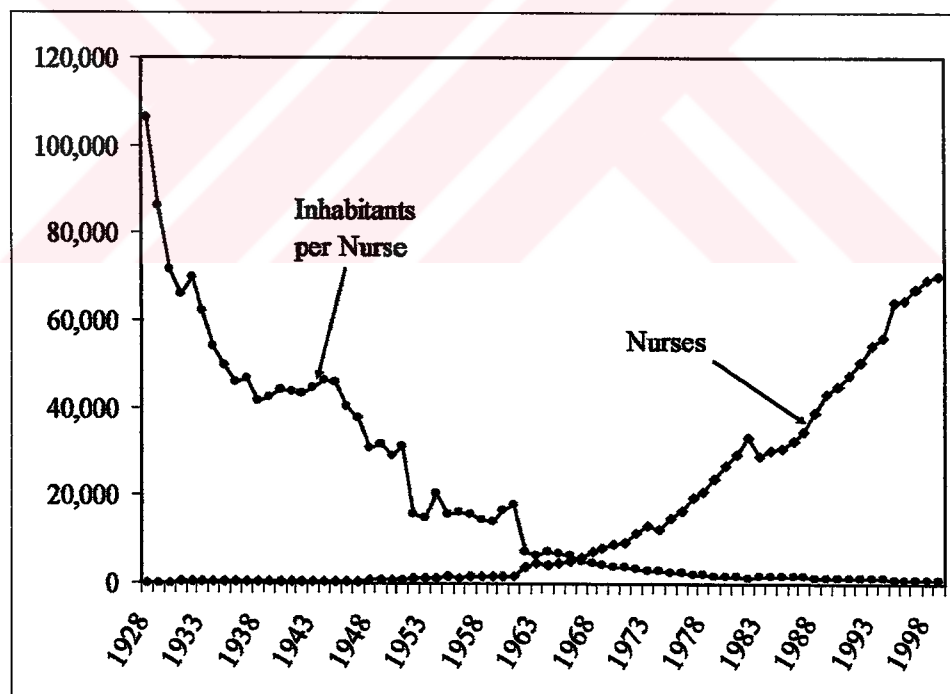


Figure 4.9 Stock of Nurses and Inhabitants per Nurse in Turkey, 1928-99

Source: SIS (1996); SIS (2002).

Note: Totals include practitioners, specialists and assistant physicians.

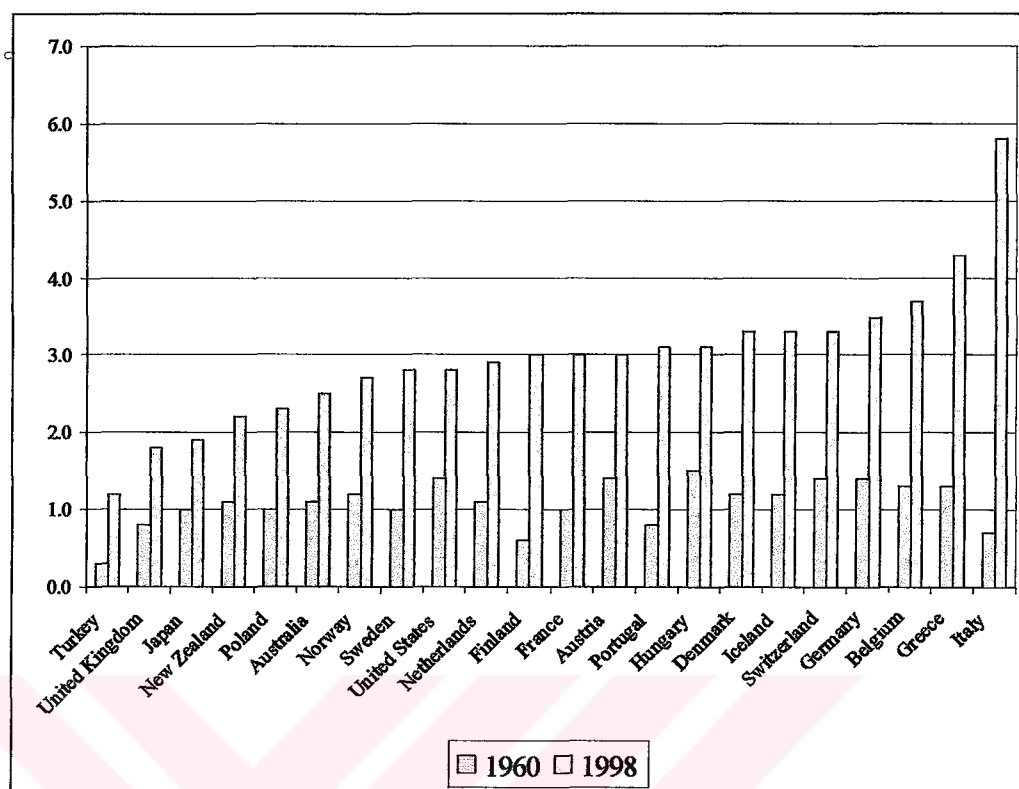


**Figure 4.10 Practicing Physicians per 1000 Population for Selected OECD Countries**

*Source: OECD Health Data, 2002 ([www.oecd.org](http://www.oecd.org)).*

## **CHAPTER 5**

### **SURVEY METHODOLOGY**

#### **5.1. Introduction**

Chapter Three reviewed some of the theoretical explanations for why skilled migration occurs, including possible reasons for the phenomenon of student non-return. In Chapter Four, institutional, demographic and political factors were considered in seeking to understand the reasons behind overseas study and the migration of professionals from Turkey. A purpose of this thesis is to determine to what extent some of the models of brain drain set out in Chapter Three hold for the population of Turkish professionals and students currently working and studying abroad. With this aim, an Internet-based survey was conducted to collect data on the return intentions of Turkish students and professionals residing abroad. Data collection took place in the first half of 2002 and over 2000 responses were received from the targeted groups of Turkish students and professionals residing in various countries. The purpose of this chapter is to present a brief review of previous studies relating to the determinants of skilled migration, and to provide a detailed discussion of the survey methodology used in the current study.

A variety of empirical studies on the brain drain have been carried out, usually benefiting from data drawn from custom designed surveys. Section 5.2 reviews some of the empirical work investigating the reasons for skilled migration in various countries and regions. The sample of studies reviewed display great diversity in terms of targeted populations (student non-return vs. professional migration), time period, survey strategies and methodologies, and in terms of their research focus (economic, sociological, or psychological), which makes comparisons difficult. The vast array of studies and each study's particular perspective serve to highlight the complexity of the factors involved in the decision to migrate. Many studies make use of "push-pull analysis" to delineate the set of factors important in making the mobility decision.

Section 5.3 gives a detailed discussion of the survey methodology used in obtaining data for the empirical analysis of the Turkish brain drain presented in Chapter Six and Chapter Seven, including the choice of target populations, data collection procedures, questionnaire design and survey implementation. The chapter concludes with a discussion of the limitations of the survey and possible improvements in survey design, as well as a discussion of other data sources that may be considered in future studies relating to skilled labor mobility.

## **5.2. Review of Some Empirical Studies of the ‘Brain Drain’**

Chapter Three presented a discussion of some of the economic theories of the brain drain, including theories based on asymmetric information, increasing returns to advanced education, and on complementarities between education and training received abroad, all of which have their basis in human capital theory. Empirical studies of the human capital theory of migration are relatively few owing to a lack of reliable data at both the aggregate and micro levels. Data collection procedures for recording migration and its breakdown into skilled or unskilled categories show great variation across countries.

The existing empirical studies, for the most part, have relied on data obtained from questionnaire responses or face-to-face interviews to collect information on return intentions and various factors believed to be important in the decision to return or stay overseas. Some of these include studies on the Asian engineering brain drain (Niland, 1970), studies on China (Kao and Lee, 1973; Zweig and Changgui, 1995), and on Latin America (Cortés, 1980). Studies focusing on the Turkish brain drain include Oğuzkan (1971, 1975) and Kurtuluş (1999). Oğuzkan’s study is based on a survey conducted in 1969 of 150 respondents holding a doctorate degree and working abroad. The study by Kurtuluş looks at the responses of 90 students studying in the United States in 1991.

While the studies cited above have relied on primary data collection through questionnaires or interviews, one notable exception is the study by Huang (1988), which is an empirical analysis of foreign student brain drain to the United States using data on 25 countries, including Turkey. The data used in Huang’s study was compiled mainly from statistical documents published by various US and international agencies. As an immigrant country, the United States possesses a comprehensive collection of records on foreign students, foreign scholars and immigrants by different criteria. In his study, Huang tries to

explain why there is so much cross-country variation in the non-return rates of foreign students studying in the United States. His dependent variable is the number of adjustments made from an F-1 student visa to immigrant status in each year for the period 1962-1976. These adjustments represent the non-return rate of foreign students. One of the important findings of his study is that although income differentials are found to be statistically significant in the econometric analysis, professional opportunities in the United States as well as the social and political progress of the home country appear to be no less significant in determining return rates. These results suggest that narrowing the wage differential alone will not be sufficient to persuade students to return home.

Kao and Lee (1973) investigate the Chinese brain drain to the United States. Their sample consists of scholars from mainland China and Taiwan. The variable of interest is the “propensity to stay in the United States”, which is measured by a preference scale ranging from 0 to 9. Their study confirms the importance of income, lifestyle preferences, political freedom and the “lack of fair competition in Taiwan” in the propensity to stay in the United States. A greater inclination to stay was found among scholars from mainland China compared to scholars from Taiwan, which was as expected given the differences in political freedom between mainland China and Taiwan.

An important characteristic of Taiwan is that it is competitive in many respects with the economies of the more advanced countries. Despite the higher rate of return for Taiwanese scholars compared to the mainland Chinese in the Kao-Lee study, Taiwan still loses a segment of its skilled workforce, mainly in the form of student non-return, to the United States and elsewhere. Chen and Su (1995) have proposed an explanation of why this is so. Their model of on-the-job training as a cause of brain drain was discussed in detail in Chapter Three. To reiterate, the argument is that advanced education and on-the-job training received in the same country are complementary to each other in capital-intensive occupations, such as science and engineering. Taiwanese students with advanced degrees in these fields from overseas universities will be more productive and receive higher wages if they remain in the country in which they received their education. Chen and Su attempt to test this empirically with data from Japan. They analyze the likelihood that Taiwanese students will remain in Japan after completing their studies there. However, they fail to find significant differences in the “stay” inclination for students graduating from the so-called “capital-intensive” fields of study.

Kao and Lee have also looked at differences in return inclinations across disciplines and obtained similar results. Their expectation was to find a greater propensity to stay among Chinese scholars in the natural sciences compared to those in the humanities or social and behavioral sciences. They suggest that to the extent that differences in stay / return inclinations across disciplines is the result of income differentials in these fields, including the income variable in the regression analysis controls for this and makes the field dummy variables statistically insignificant.

Zweig and Changgui (1995) provide a more recent study of the Chinese brain drain. Their analysis incorporates both bivariate and multivariate techniques (multivariate logistic regression) to investigate the return intentions of Chinese scholars and students in the United States. Several important findings emerge from their study, one of which is that a very high percentage of those interviewed are from a very high socio-economic background. More than half of interviewees were the children of intellectuals and an important proportion of them came from the "middle-level cadres", which suggested "unequal access to channels out of China." Another important result was that previous intentions about returning held significant predictive power over current intentions. Political instability and economic conditions were equally important in return considerations, while family considerations also played a prominent role. Zweig and Channgui found women to be more reticent about returning than men, and they attributed this to the relative lack of opportunities for personnel development in China. A thorough review of previous studies on the Chinese brain drain can also be found in their study.

Another study (Niland, 1970) investigates the engineering brain drain to the United States from five Asian countries: India, China, Korea, Japan and Thailand. The focus is on the determinants of student non-return for graduate students studying in various engineering fields in the United States. Niland divides the respondents into four mobility groups in terms of their work plans after completing their studies. The first group consists of those who plan to return home immediately after completing their studies. The remaining mobility groups consist of respondents who intend to work in the United States for a certain period of time: up to eighteen months for the second group, up to five years for the third groups and longer than five years for the fourth group. Based on this distinction, there appear to be important differences in the reasons for wanting to work in the United States across the three mobility groups and among the countries under study. Lifestyle preferences



hold the greatest significance for those planning a long period of stay in the United States, while the savings motive appears to be important for those who intend a medium length of stay. Niland also points to significant differences in the determinants of brain drain across countries, and makes the recommendation that policies to curb brain drain should be tailored to each country.

Hekmati (1973) presents the findings from a survey applied to students from five developing countries, including Turkey. His study focuses on sociological factors rather than the economic reasons of migration. A survey conducted in mid-1998 as part of the South African Migration Project (SAMP), looks at the emigration potential of skilled South Africans. This study reveals that South Africa is in danger of losing a significant portion of its skilled population, both black and white, to countries such as the United States, Canada, UK, Australia and New Zealand. More than two thirds of the sample of 725 South Africans interviewed in a telephone survey have revealed that they were thinking about leaving South Africa for better conditions abroad including greater safety, better services, more favorable tax conditions, and lower cost of living (SAMP, 2000).

Oğuzkan (1971) has conducted a survey of Turkish professionals working outside Turkey and does a qualitative analysis of the causes of the migration of Turkish scholars and high skill workers to the rest of the world. The current study on the return intentions of Turkish professionals and students residing abroad is based on a survey conducted in the first half of 2002. This survey serves to update and extend the previous studies of the Turkish brain drain by Oğuzkan (1971) and Kurtuluş (1999), and uses the push-pull perspective which is common among mobility studies. Details of the survey methodology are given in the next section.

Table 5.1 A Sample of Previous Brain Drain Studies

| Study                            | Data Source                                                 | Destination Country | Population under Investigation                                                                                                                                                                                                                                                                    | Observations in Sample           | Period of Study |
|----------------------------------|-------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------|
| <b>Niland (1970)</b>             | mail-out questionnaire                                      | United States       | graduate students in engineering from India, China, Japan, Korea and Thailand                                                                                                                                                                                                                     | 447 individuals                  | 1968            |
| <b>Oğuzkan (1971)</b>            | mail-out questionnaire                                      | OECD Countries      | Turkish professionals holding doctorate degrees and working abroad                                                                                                                                                                                                                                | 150 individuals                  | 1968            |
| <b>Kao and Lee (1973)</b>        | mail-out questionnaire                                      | United States       | Chinese Scholars and Scientists from Taiwan and mainland China possessing PhD degrees                                                                                                                                                                                                             | 372 individuals                  | 1969            |
| <b>Chen and Sue (1995)</b>       | Rotary Club records                                         | Japan               | Taiwanese students who received scholarships from the Yoneyama Rotary Club of Japan during the course of their studies                                                                                                                                                                            | 776 individuals                  | 1962-1988       |
| <b>Zweig and Changgui (1995)</b> | face-to-face interviews                                     | United States       | Chinese students, scholars and former students in workforce                                                                                                                                                                                                                                       | 273 individuals                  | 1993            |
| <b>Kurtuluş (1999)</b>           | questionnaire                                               | United States       | Turkish students studying in the United States                                                                                                                                                                                                                                                    | 90 individuals                   | 1991            |
| <b>Lucas (1975)</b>              | US Dept. of Labor / INS; United Nations                     | United States       | applications by male candidates for labor certificates in the US divided by the male labor force in the country of origin                                                                                                                                                                         | 103 countries (both DC and LDCs) | 1973            |
| <b>Huang (1988)</b>              | various statistical documents from the US and other sources | United States       | Students switching from F-1 student visa to immigrant status (Australia, Egypt, France, Greece, W. Germany, Hong Kong, Indonesia, India, Ireland, Iran, Iraq, Israel, Italy, Jordan, Japan, Korea, Lebanon, Netherlands, Philippines, Spain, Sweden, Switzerland, Turkey, Taiwan, United Kingdom) | 375 (25 countries × 15years)     | 1962-1976       |

### **5.3. Survey Design and Methodology**

Advances in communication technology and the rapid spread of computer use especially among the young and educated populations around the world during the past decade have expanded the techniques and strategies available for data collection. While Internet-based surveys employing web technologies and e-mail communication are relatively new tools in the study of various behavioral phenomena, these types of surveys have become increasingly commonplace. The new technology has considerably eased the process of collecting responses, thus shortening the time frame for implementing previously time consuming and costly survey studies. The current study is also based on an Internet survey, designed for the purpose of collecting data on the return intentions of Turkish students and professionals. The details of the survey methodology, including the selection of the target populations, the sampling strategy used and questionnaire design followed by a discussion of survey implementation, are presented in this section.

#### **5.3.1 The Survey Population Defined**

In this sub-section, a working definition of brain drain is presented for the purposes of the survey study and the empirical analysis presented in subsequent chapters. The term “brain drain” was initially coined by the British Royal Society in the 1950s to refer to skilled Britons migrating to United States and Canada (Cervantes and Guellec, 2002). This term is also used today to describe skilled individuals who leave their native lands to seek better prospects elsewhere, but relates more to the skilled emigration from the developing countries to the developed countries. More recently, student non-return has become recognized as an increasingly important form of brain drain. “Student non-return” involves individuals who go abroad to complete higher level studies and do not return to their home countries after receiving their degrees.

However, it is often not clear what the term “skilled migration” refers to, as evidenced by the wide variance in the definitions used in different studies. In many migration studies, the educational attainment of migrants is taken to be an indicator of skills, and “brain drain” usually refers to migrants with at least a tertiary (university) level degree. This is, in general, done as a matter of convenience. Data on other activities that contribute to the skills or productivity of individuals, such as learning-by-doing and on-the-job training are not available across countries. For the purpose of making international

comparisons of skilled immigration to destination countries, therefore, the educational attainment levels of migrants are used to measure losses in human capital.

Studies that focus exclusively on university educated migrants are also likely to ignore the effects of a loss in “entrepreneurial capital”. Since entrepreneurs in developing countries have varying educational backgrounds, those with less than a university education will be left out of the analysis of skilled migration when this refers only to those with a university education. This entrepreneurial base, regardless of the educational attainment of the emigrating entrepreneurs, may be crucial to the economic development of a country. The South African Migration Project (SAMP, 2000), for example, includes businessmen and businesswomen in their definition of the skilled population in South Africa, since they are a crucial element of the South African economy.

In order for the migration of skilled individuals to be considered “brain drain”, some investment must have been made by the home country in the education or skill formation of the individuals involved. This investment need not be confined to public funds since private indigenous funding of education and skills is also an investment made by domestic agents within the home economy. Thus, no distinction should be made between public and privately funded educational endeavors overseas. Students studying abroad using their own means (e.g. family savings) should be treated the same as students who are sent abroad for further studies on national scholarships in terms of the possible losses incurred by the domestic economy if they do not return (e.g. the externalities they bring).

In this study, two separate but related populations are targeted. The first group consists of students at the undergraduate or graduate level currently studying at higher education institutions outside Turkey. The second group consists of individuals who have earned at least a bachelor’s degree and are currently working abroad. In the second group, a significant number have earned their highest degree in the country they are currently working, and may be viewed as being part of the phenomenon of student non-return. The remaining have left Turkey to work abroad after completing their highest degree from a Turkish university. The individuals in this group who intend to settle permanently in another country form part of the brain drain in the traditional sense. Also, a broad view of “skilled migration” is adopted in terms of including students who have completed high school in Turkey and are pursuing undergraduate studies abroad.

These two populations – students studying abroad and individuals who have earned at least a bachelor’s degree – are chosen to constitute the pool of highly skilled individuals abroad. It was believed to be appropriate to apply a separate survey to these two groups.

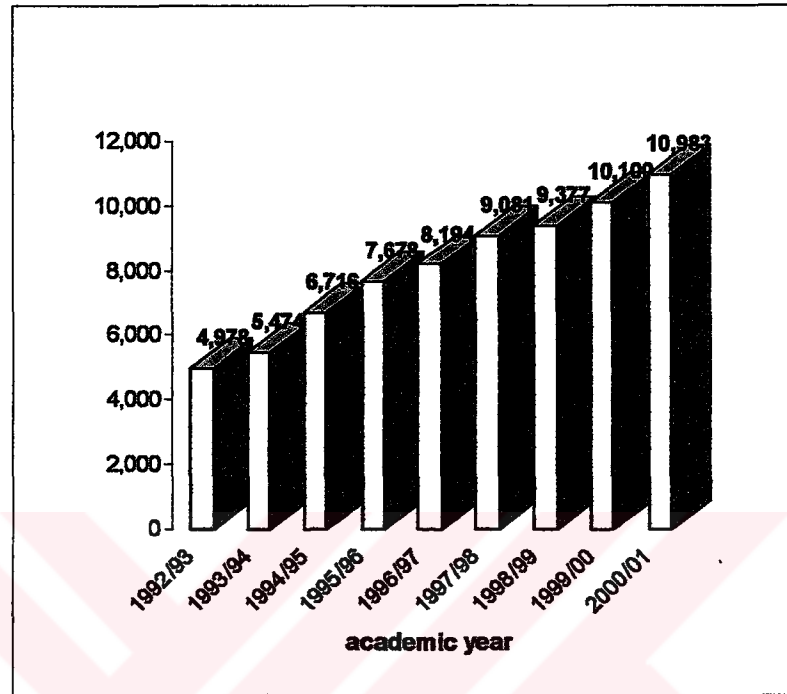


Figure 5.1 Turkish Student Enrollments at US Universities

Source: *Open Doors*, IIE (various years, 2001).

Uncovering the population of all skilled individuals abroad as defined above is not an easy task, since many host countries do not publish data that distinguishes between skilled and unskilled emigrants. Since the precise population of skilled emigrants abroad is unknown, determining an appropriate sample size at the outset for all of the groups concerned proves not to be feasible. According to informal sources, an estimated 30,000 to 40,000 Turkish students are believed to be studying in various higher education institutions in Germany, which makes Germany the single most important destination country for Turkish students. The numbers in other Western European countries are unknown. The most extensive dataset on foreign students and foreign scholars is found for the United States in the annual publication of the Institute of International Education (IIE), *Open Doors*. Turkish student enrolments at US universities has more than doubled in less than a decade, reaching nearly 11,000 in the academic year 2000-2001 (see Figure 5.1). In the 1997-1998 academic year, more than a quarter of Turkish students were studying business

(27%), followed by engineering (23%), social science (10%), and math/computer science (7%)<sup>1</sup>.

### 5.3.2. Sampling and Distribution Strategies

Construction of the Sampling Frame. Given the difficulties in determining the actual size and location of the two groups targeted for the survey study, the initial part of the sampling strategy involved compiling a list of the names and e-mail addresses of potential participants that would serve as the sampling frame. Undergraduate students from the Middle East Technical University were employed to help carry out the search for individuals who fit the definition of the targeted populations. A considerable amount of time was allotted to the construction of the list of potential survey candidates.

The e-mail addresses and names of Turkish professionals, scientists and students were collected from various sources. An extensive internet search was undertaken to obtain the e-mail addresses of Turkish academicians. The EDUCAUSE directory of higher education<sup>2</sup> provides a list of American universities and colleges based on the Carnegie classification. The web sites of the academic departments of all faculties as well as all affiliated research centers for various universities and colleges present on this list were searched. A similar web search for names was also done for Canadian universities, and to a lesser extent universities in the UK. Time and resource limitations prevented a full search of the all of the universities listed. The information obtained through the above channels was supplemented by various other sources.

While contact information for academicians was obtained from a search of staff directories and department websites, it was somewhat more difficult to gather information for Turkish workers in the overseas non-academic private sector. Some could be reached from alumni listings and directories published in the websites of Turkish universities. Overseas Turkish professionals associations, such as the Society of Turkish American Architects, Engineers and Scientists, were also very helpful in reaching a portion of the targeted population.

---

<sup>1</sup> Figures are obtained from *Open Doors Profiles Survey*, which covers more than half (51%) of Turkish Students studying in the United States for the 1997-1998 academic year.

<sup>2</sup> Found on the web site: <http://www.educause.edu/asp/dheo/carnegies.asp>



As mentioned, another important source of brain drain candidates for the survey was the alumni pages of Turkish universities where these were available. The BURCIN (Boğaziçi University–Robert College) Database, for example, provided an additional 133 individuals. Several departments at Boğaziçi University maintain their own alumni lists on the web: The Department of Computer Engineering provided a partial list of graduates from the class of 1986 through 1999<sup>3</sup>. An important problem with obtaining e-mail addresses through these channels was that these pages were often outdated and many of these addresses turned out to be invalid. However, once the names of former graduates were reached through the channels mentioned, a search for their e-mail addresses could be made from the internet search engines. Similarly, the e-mail addresses of students studying abroad were also collected from the directories of universities and research centers located in the United States, Canada, England and Australia, and the alumni pages of universities in Turkey.

The collection of potential participant names and contact information depended to a great extent on the existence and accessibility of student and personnel directories at institutions of higher learning and research centers, the existence of accessible and up-to-date alumni directories of Turkish universities, and the help of various Turkish associations abroad. Unfortunately, the reliance on internet search procedures in the construction of a list of potential participants has inevitably set limitations on who could be reached. For example, individuals who were not members of any overseas Turkish associations, nor listed in any directories, and without e-mail address information (especially older participants) cannot be said to be adequately represented. Another limitation is that the search for survey participants concentrated on universities and associations in North America and England; time considerations did not permit expanding the search to other important destination countries, such as Germany in the case of students and the Middle East for skilled workers. The construction of a list of candidates, given the limited time frame for conducting the survey, could not be expected to be exhaustive and uncover each possible survey candidate.

*Sampling and Distribution Strategies.* Since the size and distribution of the populations are not known with certainty, the probability that a given respondent will be picked as part of the sample is also unknown. A nonprobability sampling method known as

---

<sup>3</sup> Found on the web site: <http://www.cmpe.boun.edu.tr/~alimoglu/cmpeaddr.html>.

*snowball sampling* was chosen as an appropriate strategy to adopt (Rea and Parker, 1997). Snowball sampling is also called “referral sampling” since it involves asking the initial group of contacts on the list to assist in reaching other potential participants who are in the targeted population. This strategy has the advantage of allowing a great number of respondents to be reached in a relatively short period of time.

An e-mail cover letter was sent to potential respondents discovered through the search process described above. The cover letter was used to introduce and explain the purpose of the study, and contained a link to the web address of the survey page. The potential respondents were invited to participate in the study and to forward the cover e-mail letter to colleagues and friends who they believed would fit the targeted survey population. The cover e-mail letter is provided in Appendix C, Section C.1.

Turkish student associations in the US, UK and Canada were also contacted in order to help in the distribution of the initial e-mail message containing a link to the survey website. The students from the targeted group who were contacted during the initial search process were asked to distribute the cover email letter to their friends and acquaintances who met the survey criteria. The distribution of the cover letter began in the middle of December, 2001 and was ended in summer 2002. The address of the web page containing the survey form was sent to the e-mail addresses of potential respondents. Turkish student associations in the US, UK and Canada were also contacted in order to help with the distribution of the cover e-mail containing a link to the survey website. The data collection process began in mid-December 2001 and ended in Summer 2002.

Referral sampling is a fast and efficient, but potentially biased, means of reaching the targeted populations. As mentioned, the “snowball effect” was an important method for reaching potential participants. As an example, the METU Alumni North America discussion group consisted of over 600 members at the time of the mail-out. A large number of responses were obtained from this group within a short period of time.

The data collection procedures and the sampling strategy used suggest the possibility that non-participants may differ systematically from participants in terms of their characteristics and in their return intentions. For this reason, the survey results cannot be used to generalize to the targeted population or universe as defined in Section 5.3.1. Nevertheless, a good participation rate was reached with the strategy employed. The

combination of internet search and “snowball” or referral sampling resulted in a total of 1170 responses from Turkish students studying abroad, and 1282 responses from Turkish professionals working abroad. After eliminating responses from non-target populations and incomplete answers<sup>4</sup>, the number of valid responses totaled 1103 for the student survey, and 1238 for the survey of Turkish professionals. The list collected from the present study can be used as part of longer term research agenda to study the Turkish brain drain and overall mobility of skilled individuals from Turkey.

### 5.3.3 Questionnaire Design

A web-based survey was thought to be an appropriate method for gathering responses since familiarity with computers and computer-based survey technologies would be more widespread for the targeted groups of university students and university-educated professionals. Greater acquaintance with and access to computers may differ from discipline to discipline in the targeted group. For example, students and workers in computer-related fields may have an advantage over other fields, such as the humanities, in participating in a web-based survey. Nevertheless, for the period that the survey was conducted it is reasonable to presume that the use of these technologies had become quite widespread over all disciplines. The complete web version of the survey was hosted on the Middle East Technical University server. The use of an academic domain address possibly helped to increase the confidence of participants and convince them that of the “legitimacy” of the survey study.

Figures 5.2a-b, 5.3, 5.4 and 5.5 below provide illustrations of the cover page and sample pages from the web survey. The cover page provided links to two separate questionnaires: the Turkish Student Survey Form, in English and Turkish, and the Turkish Professionals Survey Form, in English and Turkish (Figure 5.2a-b). The respondent could choose to answer either the English or Turkish version of the appropriate form. All of the survey questions appeared on a single web page and respondents were asked to scroll down to reveal more questions as they filled out the form. At the end of the questionnaire, respondents were asked to send the completed form by clicking on the submit button

---

<sup>4</sup> Non-target populations included respondents from the Turkish Republic of Northern Cyprus and second-generation citizens of Turkish origin. Incomplete responses were eliminated on the basis of the extent of incompleteness (e.g. if a majority of the questions were left unanswered or if important portions of the survey were not filled out).

(Figure 5.5). If the respondent provided a valid e-mail address, a courtesy e-mail reply was automatically sent to his/her e-mail address (Appendix C, Section C.2). Clicking on the submit button also redirected the respondent to the “thank you” page (Figure 5.6).

The questionnaires were structured as a set of close-ended questions with an optional open-ended question at the end that respondents could fill in as they liked with comments about the survey questions or the topic of Turkey’s brain drain in general. The survey consisted of several broad question groups that included sections on demographic information, educational background, work-related information (job search and career-related intentions for students), as well as a section on return intentions and the related “push” and “pull” factors that might be important in the decision to stay overseas. The full set of questions for both surveys is provided in Appendix C (Sections C.3 and C.4). Figures 5.3-5.5, which relate to the student survey, give an idea about the appearance of the web forms and the division of the survey into groups and sets of related questions. To ease readability and eye-strain, non-imposing pastel colors were used in the background and to separate blocks of questions. Blue was used to indicate section headings and alternating shades of pink were used to separate each question. One respondent indicated, however, that the lavender patterned background made the survey appear longer than it was and suggested that solid coloring be used instead.

#### 5.3.4 Survey Implementation: Some *Caveats*

The following points should be kept in mind when interpreting the survey results.

1) *Self-selectivity*: There may be *self-selection bias* since many respondents volunteered their responses without being prompted. Many responses were obtained through the “snowball effect”: those solicited for their participation were asked to forward the e-mail message containing the survey cover letter and instructions to those who they knew to be eligible for participation in the study. On the positive side, this increased the number of responses received. This problem was overcome to some extent for students and academicians at higher education institutions since extensive web surveys were carried out to find student and academician names and e-mails.

2) While the survey was presented in two languages (English and Turkish), there is the possibility that the interpretation of the questions may differ based on the choice of

language. There were several reasons for including the language option. One was a technical reason. Limited international character support in older internet browsers would make the survey difficult to read in Turkish and discourage individuals from responding. The English language alternative was included to circumvent this problem. Since the study focused primarily on North America—the United States and Canada—(but allowed for responses from other countries), it was believed that many respondents would choose to fill the survey in English, especially if they had been residing for some time outside Turkey in an English-speaking environment.

3) Some expressed reservations about participating in the survey because participation entailed disclosing private information, including e-mail addresses. “Network” effects, similar to those mentioned in Chapter Three, appear to be influential in determining the participation of those who were contacted. Those who responded positively to the survey, in terms of thinking that it was important and worthwhile to do, influenced others in their network to also participate despite their individual reservations. On the other hand, some groups (networks) collectively chose not to respond after consulting with each other and deciding, for example, that the risk of transferring private information over the internet was too great. This was revealed by some of the respondents through their e-mail communication. A “contagion effect”, therefore, appears to have worked in determining both participation and non-participation.

#### **5.4 Concluding Remarks**

Improvements can be made to the design of the survey instrument in order to increase the response rate, eliminate mistakes in data processing and improve the content to ease data analysis and the relevance for policy analysis. The use of a single web page for the full survey, for example, resulted in several technical difficulties. The first of these was that the respondent had to scroll down the page to proceed with the survey. Since the survey was rather long, scrolling also increased the possibility of questions being skipped. This produced more “non-responses” than would have been the case if, instead of scrolling down, the respondent could have simply gone on to a new section of the questionnaire by submitting her answers to the previous section. One disadvantage of this alternative strategy is that it requires frequent interactions with the server and may exacerbate server traffic. Another difficulty experienced with the single page option was that during periods



of heavy METU server traffic, some respondents complained of not being able to download the complete web page, which of course meant not being able to submit their answers by clicking on the submit button located at the bottom of the page.

Another possible improvement that can be made in the survey design is to provide a means for saving answered questions for future reference so that, if they need to, respondents can complete survey at a more appropriate time, instead of filling out the survey all in one shot. Errors in filling out the form may also be reduced by allowing respondents to save and review their responses before submitting the form. In terms of alleviating fears about sending private information over the internet, a further improvement in survey design would be to provide password entry to the survey form. The password would be unique to each participant and be provided in the cover e-mail. This would not only prevent respondents from submitting private information over the internet, but allow the investigators to identify legitimate participants.

As summarized in Chapter Three, many different factors have been provided as explanations of skilled migration or student non-return, where each explanation addresses a different aspect of the brain drain phenomenon. Specific questions on on-the-job training and formal specialized training were asked in the professionals questionnaire in order to test whether the Chen-Su model had some validity for skilled individuals from Turkey. However, the sole purpose of the survey was not only to test these theories, but also to provide an exploratory analysis of the determinants of return intentions. The next chapter provides a summary of the qualitative characteristics of the respondents as well as exploratory data analysis of the determinants of return intentions using categorical data techniques.





ORTADOĞU TEKNİK ÜNİVERSİTESİ / MIDDLE EAST TECHNICAL UNIVERSITY  
İktisat Bölümü / Department of Economics

## TURKISH BRAIN DRAIN SURVEY

Thank you for helping with our survey on the determinants of the Turkish "brain drain". Some believe that brain drain is a serious problem that is damaging the Turkish economy; others believe that there are positive gains not only for those who leave but also to the Turkish economy that should not be overlooked.

By taking part in this survey you will be helping us to shed light on this important issue. All information you provide will be treated as confidential and used only for research or statistical purposes, and your identity will not be revealed in any way. Should you encounter any difficulties in responding please email us at [survey@metu.edu.tr](mailto:survey@metu.edu.tr).

To proceed with the survey in English please click on the appropriate link below.

A. I am an undergraduate or graduate (bachelor's / master's / Ph.D. / postdoc) student studying abroad. (research and teaching assistants are included in this category).

B. I work outside Turkey and have at least a Bachelor's degree. (academics -including visiting scholars-, professionals and other full-time workers).

TÜRKÇE devam etmek için lütfen [burayı](#) tıklayınız.

Eğer Türkçe karakterler düzgün çıkmıyorsa 'Reload' ya da 'Refresh' düğmesine basınız.

Contact: [survey@metu.edu.tr](mailto:survey@metu.edu.tr)  
Prof Dr. Ayşıl Tansel, METU FEAS Dept. of Economics  
Research Assistant Nil Demet Güngör, METU FEAS Dept. of Economics

Figure 5.2a Homepage of the Brain Drain Survey (English Version)



ORTADOĞU TEKNİK ÜNİVERSİTESİ / MIDDLE EAST TECHNICAL UNIVERSITY  
İktisat Bölümü / Department of Economics

## TÜRK BEYİN GÖÇÜ ANKETİ

Türkiye'den "beyin göçü"nü nelerden dolayı araştırarak anketimize yardım ettiğiniz için teşekkür ederiz. Bazı çevreler beyin göçünün ciddi boyutlara ulaştığını düşünüyor ve Türk ekonomisini zedelediği görüşündeler; bazıları ise yurtdışında çalışmanın hem gidene hem de Türk ekonomisine gözdardı edilmemesi gereken artılar getirdiğini düşünmektedir.

Anketimize katılarak bu önemli konuda bilgi edinmemizi sağlamış olacaksınız. Vereceğiniz tüm bilgiler sadece araştırma amacıyla kullanılacaktır ve kimliğiniz kesinlikle gizli tutulacaktır. Eğer anketi cevaplarırken herhangi bir sorunla karşılaşarsanız bize [survey@metu.edu.tr](mailto:survey@metu.edu.tr) adresinden ulaşabilirsiniz.

Ankete Türkçe devam etmek için aşağıdakilerden size uyan seçeneğin üzerine tıklayınız.

A. Yurtdışında bulunan lisans, master, doktora veya doktora üstü (postdoc) öğrencisiyim. (Araştırma görevlileri bu sınıfa dahil edilmektedir).

B. Yurtdışında çalışıyorum ve (en az) lisans derecesine sahibim. (Akademiye girenler ('visiting scholars' dahil), profesyoneller ve diğer tam zamanlı meslek sahipleri).

Please click [here](#) to proceed in ENGLISH.

İletişim: [survey@metu.edu.tr](mailto:survey@metu.edu.tr)  
Prof Dr. Ayşıl Tansel, ODTÜ İİBF İktisat Bölümü  
Araş.Gör. Nil Demet Güngör, ODTÜ İİBF İktisat Bölümü

Figure 5.2b Homepage of the Brain Drain Survey (Turkish Version)

---

## Turkish Brain Drain Student Survey

---

1) Please write your name and e-mail address in the boxes provided below. This information is for our record-keeping only; it will not be used in our study, and it will not be disclosed in any way to other parties. The information you provide will be used for research or statistical purposes only.

2) Please read and answer carefully. The survey will take approximately 15-20 minutes. It may take less time since not all of the questions will apply, and you will be able to skip those that are not relevant to you.

3) To advance down please click on the downward pointing arrow located in the lower left-hand corner of your browser.

Thank you again for taking the time to participate in our study.

NAME, SURNAME:

E-MAIL ADDRESS:

### GENERAL INFORMATION

#### 1. Personal Information: Please indicate your

a) Gender: ☒ Female ☐ Male

Figure 5.3 Turkish Brain Drain Student Survey Sample Web Page – Top

## EDUCATIONAL INFORMATION

4. a) What is the highest degree you hold?

—click here—

b) In which country did you receive your highest degree?

- ☐ Australia
- ☐ Canada
- ☐ England
- ☐ New Zealand
- ☐ United States
- ☐ Turkey
- ☒ other, please specify:

c) What is the highest degree that you plan to receive?

—click here—

5. a) Which high school (lycée) did you graduate from?

*Please indicate the **name** of the high school and its **location**.*

NAME:

LOCATION:

b) What was the *language of instruction* of the

i. science courses at your high school (lycée)?

Figure 5.4 Turkish Brain Drain Student Survey Sample Web Page – Middle

just right

**40. Please write down any comments you would like to add about this survey in the text box below. We would greatly appreciate receiving your input.**

Please write your comments here.

---

**Thank you for taking part in our survey!  
To send the completed form please click on the "SUBMIT" button below.**

**SUBMIT**

---



Contact: [survey@metu.edu.tr](mailto:survey@metu.edu.tr)  
Prof Dr. Aysit Tansel, METU FEAS Dept. of Economics  
Research Assistant Nil Demet G ng r, METU FEAS Dept. of Economics

Figure 5.5 Turkish Brain Drain Student Survey Sample Web Page – End

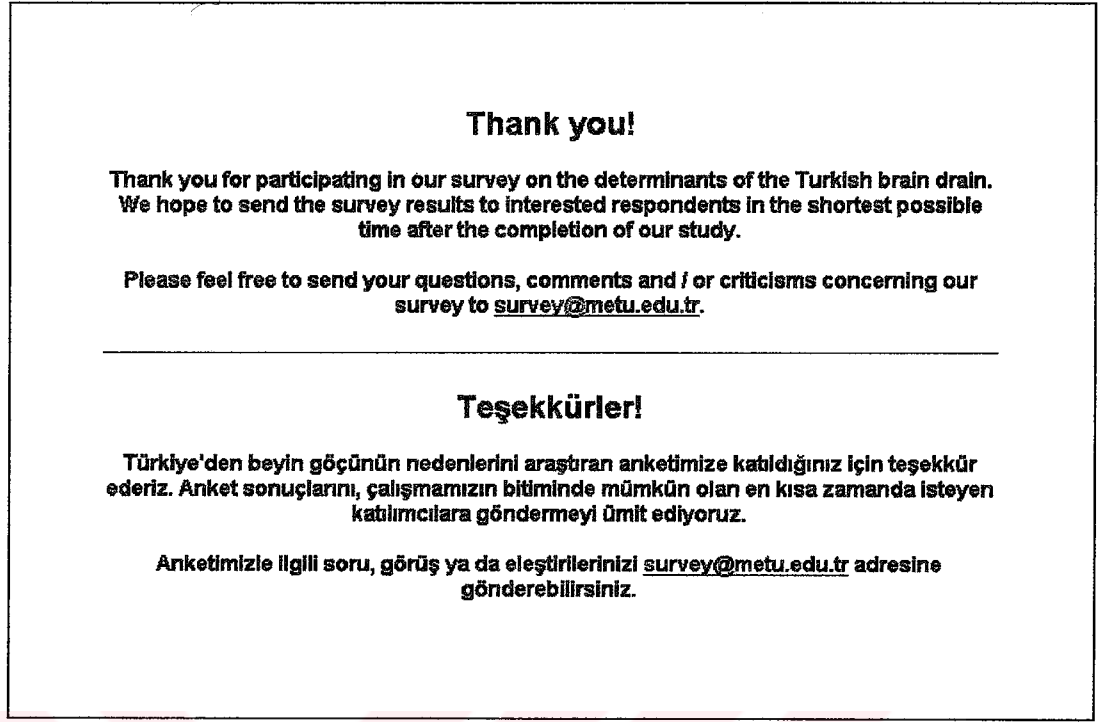


Figure 5.6 “Thank You!” Page

## **CHAPTER 6**

### **SURVEY RESULTS AND PRELIMINARY DATA ANALYSIS**

#### **6.1 Introduction**

Chapter Six presents the survey results and provides a preliminary, exploratory analysis of the data. Given the characteristics of the two survey groups, the sample may not be truly representative of the total population of overseas Turkish students and professionals abroad for the period of the survey. However, the volume and diversity of the responses received have been tremendously important for gaining insight into why Turkish students studying abroad and Turkish professionals working outside Turkey are not returning. The results indicate that family considerations play a prominent role in shaping return intentions for the two groups, while there is some variation in the reasons for going overseas and in the relative importance given to various push and pull factors.

Section 6.2 provides a summary of the characteristics of respondents and compares the response patterns of participants in the student and professionals surveys. Sections 6.3 and 6.4 give separate, more detailed analyses of respondents taking part in the student and professionals surveys respectively, which serves as a guide to interpreting the results of the empirical investigation on return intentions presented in Chapter Seven. Simple bivariate analysis is used to identify significant relationships among the background characteristics of respondents and return intentions. The relationships that are found to be significant through this analysis form the set of regressors in the empirical model of return intentions.

#### **6.2 Respondent Profiles**

In this section, the characteristics of respondents are compared under various headings. These include: demographic characteristics, such as age, gender and marital status; educational background; parental education levels; country of residence; stay



duration; initial reasons for going abroad; initial and current intentions about returning to Turkey; family support; general assessments about various aspects of life in current country of residence versus in Turkey; and the respondents' evaluations of various push and pull factors that may affect their decision to return or stay.

#### **6.2.1 Age, Gender and Marital Status**

The respondents are predominantly male, although the share of females is greater for the student survey (38.7 versus 28.2 percent). The student survey comprises a younger group of individuals, and this may explain the greater number of female respondents. Traditionally, educational and migration opportunities have been greater for men than for women. These prospects are slowly changing as reflected in generational differences in the educational and career opportunities available for women in Turkey. Women currently have greater options for pursuing overseas studies and overseas careers than they had previously. The fact that female respondents in the professionals survey are, on average, younger than their male counterparts also appears to corroborate this (Table A.1, Appendix A).

Nearly three-quarters of student respondents are single compared to only two-fifths in the professionals survey (Table A.2, Appendix A). This is to be expected given the younger profile of the student respondents. Of those who are married in the professionals sample, more than a quarter are married to a foreign spouse suggesting that family considerations may play a prominent role in their return intentions.

#### **6.2.2 Stay Duration and Country of Residence**

Slightly more than half of females (55 percent) in the professionals survey have stayed in their current country of residence for five years or less, while the same share for males is only 43 percent (Table A.3, Appendix A). A third of respondents for the total professionals group have a stay duration of between 6 and 15 years. The sample is therefore tilted toward those with shorter stays. In the student group, there is no significant difference in the duration of stay among males and females, the majority having a stay duration of between 3 and 4 years.

The majority of survey respondents are residing in North America. This is due to the considerable amount of effort spent in collecting e-mail addresses from the United States

and Canada (Table A.4, Appendix A). A greater range of countries is represented in the professionals survey, including countries in Europe, Asia, Africa and Australia, which may reflect the possibility that overseas study options are more limited than international work opportunities. However, the sample is not a true reflection of the actual number of Turkish students studying at foreign universities. Germany is by far the largest recipient of students from Turkey with an estimated number ranging between 30,000 and 40,000; Germany is, therefore, severely under-represented. Recent years have also shown an increase in enrollments at universities in nearby countries, such as Bulgaria and the Turkic Republics in Central Asia. Again these countries are not represented given the focus on North America in the data collection period.

### **6.2.3 Parental Education Levels and Parental Occupations**

Parental educational attainment levels are used as the main indicators of socio-economic status. Tables 6.1 and 6.2 present the breakdown of parental educational attainment levels by gender and survey type. Respondents' parents are, in general, highly educated; two-fifths of mothers and more than two-thirds of fathers in the two groups hold a tertiary level degree, which provides confirmation for the existence of unequal opportunities in education. The average years of schooling for Turkey's 25 years of age and older population in 2000 was 5.7 years<sup>1</sup>, which corresponds to a little above the primary level of schooling. From this, it appears that existing opportunities in education, both in Turkey and abroad, are concentrated at higher socioeconomic levels.

The figures in Table 6.1 and Table 6.2 also reveal that the parents of female respondents tend to be more educated than those of male respondents. While half of all mothers of female students hold a tertiary level degree, the same is true for only two-fifths of the mothers of male students. Similarly, while three-quarters of the fathers of female students have a higher education degree, a little less than two-thirds of the fathers of male students hold the same. These figures are slightly lower for the professionals group, but show the same tendency: the parents of female respondents have greater educational attainments than the parents of male respondents. This result is to be expected, since as Tansel (2002a) has verified empirically, a stronger relationship exists between a girl's education and her parents' education than for a boy's and his parents' in Turkey. In general,

---

<sup>1</sup> Calculated from SIS (2003), Table 3.9, p. 51.

sons tend to be encouraged more than daughters to pursue educational opportunities or goals, but this difference lessens as the socioeconomic position of the family increases. Thus, it is expected that girls with more educated parents will be given more encouragement to pursue higher education and for overseas studies.

Table 6.1 Respondents by Father's Educational Attainment Level (%)

| Education Level             | Total | Students                 |        | Professionals             |        |
|-----------------------------|-------|--------------------------|--------|---------------------------|--------|
|                             |       | Male                     | Female | Male                      | Female |
| Below primary               | 2.6   | 2.7                      | 2.6    | 3.2                       | 0.6    |
| Primary                     | 11.1  | 14.7                     | 7.6    | 11.7                      | 7.4    |
| Middle                      | 4.5   | 3.9                      | 3.3    | 5.4                       | 5.3    |
| High                        | 13.6  | 13.0                     | 11.6   | 15.0                      | 13.9   |
| Tertiary                    | 68.0  | 65.7                     | 75.0   | 64.5                      | 72.6   |
| <i>Bachelors</i>            | 42.7  | 42.0                     | 48.8   | 42.4                      | 37.5   |
| <i>Masters</i>              | 14.0  | 13.9                     | 14.2   | 11.9                      | 19.5   |
| <i>Doctorate</i>            | 11.3  | 9.8                      | 12.0   | 10.2                      | 15.6   |
| Not known                   | 0.1   | ...                      | ...    | 0.2                       | 0.3    |
| <i>n</i> (missing excluded) | 2265  | 662                      | 424    | 840                       | 339    |
| Nonresponses                | 62    | 14                       | 3      | 39                        | 6      |
| Test of Independence        |       | $\chi^2(6) = 15.59^{**}$ |        | $\chi^2(7) = 28.48^{***}$ |        |

Notes: \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$ ; Cell percentages sum to 100 across columns.

Table 6.2 Respondents by Mother's Educational Attainment Level (%)

| Education Level             | Total | Students                  |        | Professionals             |        |
|-----------------------------|-------|---------------------------|--------|---------------------------|--------|
|                             |       | Male                      | Female | Male                      | Female |
| Below primary               | 8.3   | 10.3                      | 3.8    | 10.6                      | 4.7    |
| Primary                     | 17.3  | 19.2                      | 13.7   | 19.2                      | 13.6   |
| Middle                      | 7.3   | 5.7                       | 6.1    | 9.6                       | 6.5    |
| High                        | 26.4  | 24.1                      | 25.4   | 27.0                      | 30.4   |
| Tertiary                    | 40.6  | 40.7                      | 51.1   | 33.5                      | 44.8   |
| <i>Bachelors</i>            | 30.7  | 29.9                      | 38.4   | 27.0                      | 30.4   |
| <i>Masters</i>              | 5.9   | 6.0                       | 8.2    | 4.2                       | 7.4    |
| <i>Doctorate</i>            | 4.0   | 4.8                       | 4.5    | 2.7                       | 4.7    |
| Not known                   | 0.0   | ...                       | ...    | 0.1                       | 0.0    |
| <i>n</i> (missing excluded) | 2276  | 668                       | 425    | 844                       | 339    |
| Nonresponses                | 51    | 8                         | 2      | 35                        | 6      |
| Test of Independence        |       | $\chi^2(6) = 26.80^{***}$ |        | $\chi^2(7) = 28.70^{***}$ |        |

Notes: \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$ ; Cell percentages sum to 100 across columns.

The breakdown of parents' occupations for each of the groups, students and professionals, also confirms the above findings (Table A.5 and Table A.6, Appendix A). Half of all fathers are in the "scientific, technical and related" professions, where 16 percent fall into the "architects, engineers and related professionals" category and 11 percent are "legal, business or public service professionals". On the other hand, half of all mothers are

homemakers, and a little over a third are in the “scientific, technical and related” professions. There are fewer engineers and architects and a greater proportion of health professionals and teachers, at all levels, among the mothers of respondents reflecting differences in both career opportunities and preferences. In 2000, the share of the scientific, technical and related workers in the economically active population in Turkey was 7.5 percent for males and 6.9 percent for females. The same figures for the respondents’ parents are well above the average for Turkey: 50.4 percent for fathers and 34.8 percent for mothers.

#### **6.2.4 Bachelor’s Degree Institutions and Fields of Study**

Since many of the students responding to the survey are postgraduate students, a majority of them hold a bachelor’s degree. In both the students and professionals groups, about a third of respondents are graduates of Middle East Technical University (METU)<sup>2</sup>. This is followed by universities such as Boğaziçi, Bilkent, İstanbul Technical, İstanbul, Ankara and Hacettepe Universities (Figures 6.1 and 6.2; see Table A.8, Appendix A for the full list). These universities count among the more prestigious higher education institutions in Turkey. The higher share of graduates from universities that have English language instruction, such as METU, Boğaziçi and Bilkent, is perhaps not surprising since previous exposure to a foreign language makes the transition to a foreign country easier. Foreign language instruction starting from high school and sometimes even earlier in Turkey is considered be an important catalyst in facilitating adaptation to a new environment and thus non-return. Indeed, more than half of all respondents in the two groups have graduated from high schools with foreign language instruction (Table A.7, Appendix A). The remaining respondents are graduates of other universities in Turkey and various universities abroad, each of which constitutes less than three percent of the share of graduates. It is important to note that an important share of respondents hold a foreign undergraduate degree (11.5 percent for professionals and 3.6 percent for students, not including those currently in an undergraduate program), indicating early exposure to a new environment.

---

<sup>2</sup> The relatively higher share of METU graduates in the total raises the question of whether there may be a response bias because of the survey’s affiliation with Middle East Technical University.

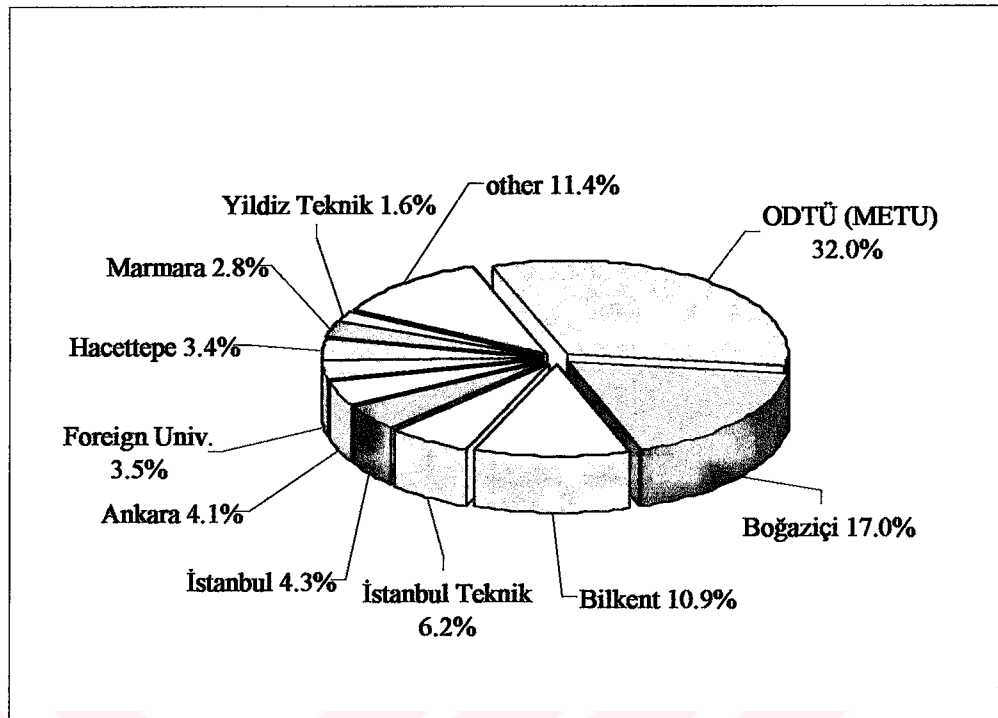


**Figure 6.1 Bachelor's Degree Institution of Turkish Students Abroad ( $n = 967$ )**

*Notes:* The total number of bachelor's degree holders is 993; There are 26 missing responses.

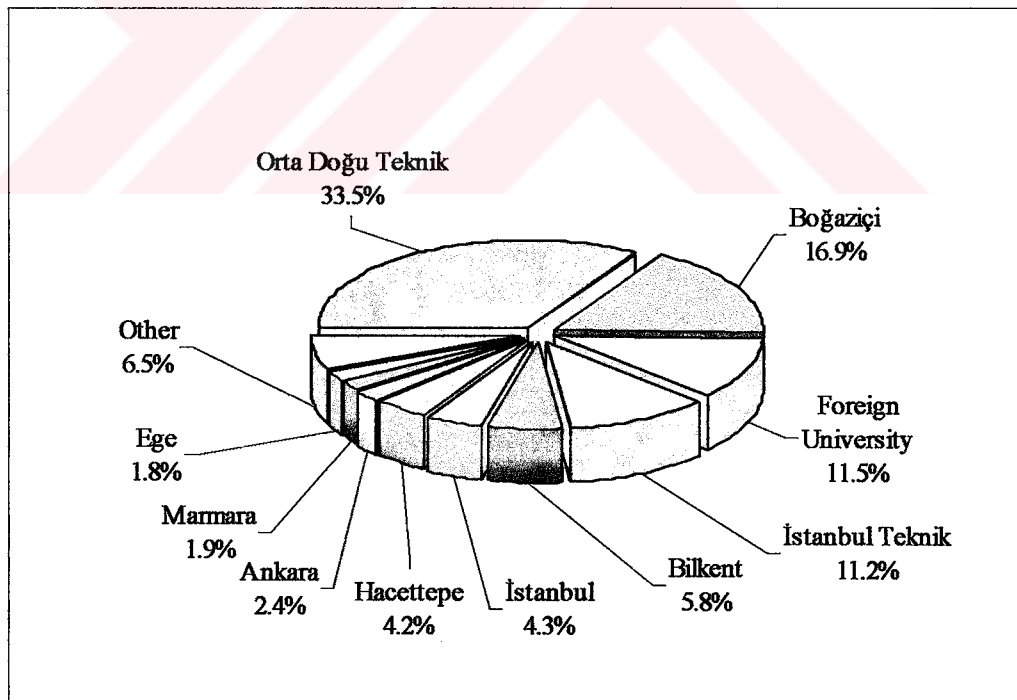


**Figure 6.2 Bachelor's Degree Institution of Turkish Workforce Abroad ( $n = 1223$ )**

*Note:* There is one missing response.

The clear majority in both groups hold an undergraduate degree in engineering and technical sciences (Detailed undergraduate fields are listed in Appendix A, Tables A.9 and A.10). This share is significantly higher for male respondents than for females (62 percent versus 35 for student respondents, and 71 percent versus 44 for professionals). The greater share of engineering and related sciences majors in the professionals survey may be due to the greater demand for technical manpower in the United States and worldwide. The economic and administrative sciences discipline comprises the next highest category of majors for both groups. The share of females in this category in comparison to the other categories is significantly higher in both survey groups (Table 6.3).

**Table 6.3 Bachelor's Degree Disciplines by Survey Group and Gender (%)**

| Bachelor's Degree Discipline             | <i>Students</i>           |      |        | <i>Professionals</i>       |        |
|------------------------------------------|---------------------------|------|--------|----------------------------|--------|
|                                          | Total                     | Male | Female | Male                       | Female |
| Architecture and Urban Planning .....    | 2.5                       | 1.0  | 2.6    | 2.4                        | 5.5    |
| Economic and Administrative Sciences .   | 17.6                      | 13.6 | 25.5   | 13.2                       | 27.0   |
| Educational Sciences .....               | 3.4                       | 4.9  | 8.1    | 0.6                        | 3.2    |
| Engineering and Technical Sciences ..... | 57.9                      | 61.9 | 34.9   | 70.9                       | 43.8   |
| Language and Literature .....            | 1.0                       | 1.2  | 2.1    | 0.2                        | 1.7    |
| Math and Natural Sciences .....          | 9.2                       | 12.2 | 14.1   | 5.6                        | 7.8    |
| Medical and Health Sciences .....        | 3.7                       | 2.5  | 3.4    | 4.9                        | 3.2    |
| Social Sciences .....                    | 4.2                       | 2.5  | 8.6    | 2.2                        | 7.3    |
| Arts .....                               | 0.4                       | 0.3  | 0.8    | 0.1                        | 0.6    |
| <i>n</i> (valid responses)               | 2206                      | 598  | 384    | 879                        | 345    |
| Nonresponses                             | 11                        | 7    | 4      | 0                          | 0      |
| Test of Independence                     | $\chi^2(8) = 80.37^{***}$ |      |        | $\chi^2(8) = 108.97^{***}$ |        |

Notes: \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$ ; Cell percentages sum to 100 across columns; Missing responses are not reflected in the percentages.

### 6.2.5 Reasons for Going Overseas

Respondents were asked to choose, from a pre-determined list, a set of factors that were important for their initial decision to study or work overseas. There were significant differences among students and professionals in their reasons for the initial decision to go abroad (Table 6.4). For both groups, foreign education is associated with greater prestige and opportunities, and is in itself an important motivation. For professionals, the prestige or opportunities associated with acquiring foreign education ties with the need for change as the most often marked reason for going abroad (43 percent). Lifestyle and family factors appear to carry somewhat greater importance for professionals relative to students. Among students, factors related to the study program, facilities and research opportunities, and the



desire to improve language skills appear to be of greater relevance. Surprisingly perhaps—given the bleak employment outlook in Turkey for the tertiary-educated workforce following the economic crises—“not being able to find a job in Turkey” was chosen by less than 10 percent of respondents in each group as their reason for going abroad, although the proportion of students for which unemployment played an important role in leaving Turkey is significantly greater than that of professionals. This is probably, in part, a reflection of the unemployment problem facing recent university graduates in Turkey.

**Table 6.4 Reasons for Going Abroad by Survey Type (%)**

| Reason                                                    | Professionals<br>(n = 1210) | Students<br>(n = 1102) | $\chi^2(1)$ |     |
|-----------------------------------------------------------|-----------------------------|------------------------|-------------|-----|
| Learn language, improve language skills                   | 18.2                        | 26.4                   | 22.66       | *** |
| Need change, experience new culture                       | 43.4                        | 48.4                   | 5.76        | **  |
| Job requirement in Turkey                                 | 21.7                        | 40.3                   | 93.54       | *** |
| Could not find employment in Turkey                       | 5.2                         | 7.6                    | 5.65        | **  |
| No program in specialization in Turkey                    | 9.8                         | 16.8                   | 24.42       | *** |
| Insufficient facilities, equipment for research in Turkey | 26.2                        | 44.0                   | 80.77       | *** |
| Prestige and advantages of study abroad                   | 43.3                        | 70.9                   | 178.26      | *** |
| Lifestyle preference                                      | 33.5                        | 23.9                   | 25.90       | *** |
| To be with spouse, family                                 | 13.1                        | 7.9                    | 16.69       | *** |
| Provide better environment for children                   | 17.8                        | 7.5                    | 53.83       | *** |
| Get away from political environment                       | 31.2                        | 25.8                   | 8.44        | *** |
| Other                                                     | 24.6                        | 12.7                   | 52.76       | *** |

Notes: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010; Cell percentages reflect the number of positive responses for each item out of the total number of valid/nonmissing responses (n).

**Table 6.5 Reasons for Going Abroad by Gender (%)**

| Reason                                                    | Females<br>(n = 770) | Males<br>(n = 1542) | $\chi^2(1)$ |     |
|-----------------------------------------------------------|----------------------|---------------------|-------------|-----|
| Learn language, improve language skills                   | 19.1                 | 23.6                | 6.08        | **  |
| Need change, experience new culture                       | 46.9                 | 45.2                | 0.59        |     |
| Job requirement in Turkey                                 | 31.3                 | 30.2                | 0.28        |     |
| Could not find employment in Turkey                       | 6.4                  | 6.4                 | 0.00        |     |
| No program in specialization in Turkey                    | 13.9                 | 12.8                | 0.56        |     |
| Insufficient facilities, equipment for research in Turkey | 30.5                 | 36.8                | 8.86        | *** |
| Prestige and advantages of study abroad                   | 58.4                 | 55.5                | 1.87        |     |
| Lifestyle preference                                      | 29.1                 | 28.8                | 0.02        |     |
| To be with spouse, family                                 | 19.1                 | 6.4                 | 86.72       | *** |
| Provide better environment for children                   | 8.4                  | 15.1                | 20.34       | *** |
| Get away from political environment                       | 19.9                 | 33.0                | 43.39       | *** |
| Other                                                     | 17.1                 | 19.8                | 2.33        |     |

Notes: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010; Cell percentages reflect the number of positive responses for each item out of the total number of valid/nonmissing responses (n).

Table 6.5 presents the gender differences in the initial reasons for going abroad. In general, males and females have responded similarly to this question. More than half of all respondents, both male and female, have marked “the prestige and advantages of overseas study” as an important reason for going abroad. Both groups have also chosen “the need for change”, “requirement in Turkey” and “lifestyle preference” in nearly equal proportions as important reasons for going abroad. There are several factors that appear to be significantly different among males and females. A greater proportion of female participants are influenced by family constraints: “being with or near their families” was an important reason for one-fifth of female participants. For male participants, on the other hand, learning a new language, the lack of facilities and resources for research in Turkey, the desire to provide a better environment for children, and political considerations were chosen more often as reasons for going abroad.

Respondents in each survey were also asked to choose the *most important* reason for their initial decision to pursue international education or employment opportunities (see Figure 6.3 and Figure 6.4). Taking advantage of educational opportunities was selected as the most important reason by many respondents, because many believe that international study programs offer higher quality education in their chosen field of study compared to universities in Turkey. Thus, one-sixth of professionals and one-fourth of students chose “the prestige and advantages associated with study abroad” as the most important reason for going abroad.

For professionals, this was followed by “other” reasons, the need for change, lifestyle preference, and the lack of facilities and necessary equipment for carrying out research in Turkey (Figure 6.3); For students, insufficient facilities, overseas experience being a job requirement in Turkey, the need for a change, the lack of an academic program in the respondent’s specialization, and lifestyle preference were the next most popular “most important reasons” (Figure 6.4).

Some of the participants did not feel that the categories presented to them adequately represented their reasons for going, and a substantial number of respondents in both survey groups chose the “other” category (13 percent of professionals and 5 percent of students). The “other” reasons included: gaining international work experience / global business vision; being part of an inter-company transfer; being invited by the foreign country employer; being frustrated with corruption in Turkey and wanting to be part of a more

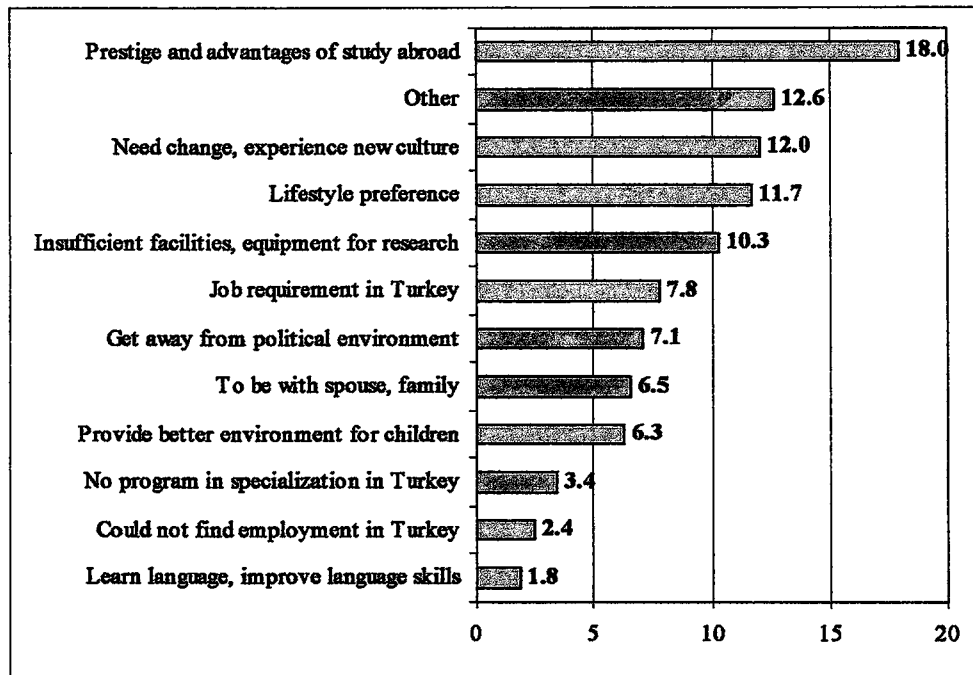


**Figure 6.3 Most Important Reason for Going Abroad, Professionals (%)**

*Notes:* Respondents were asked to choose the most important factor. There are 28 nonresponses; ( $n = 1196$ ).

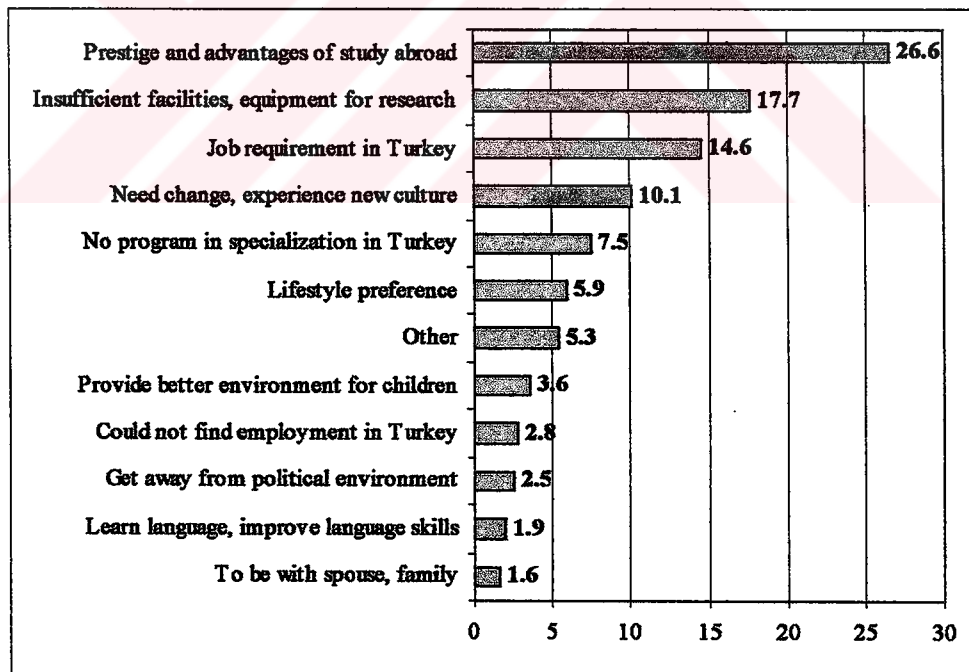


**Figure 6.4 Most Important Reason for Going Abroad, Students (%)**

*Notes:* Respondents were asked to choose the most important factor; There are 17 nonresponses; ( $n = 1086$ ).

professional work environment; to postpone / delay / shorten the military service obligation; to get an “acceptable” doctorate; the belief that little value is placed on science / technology / knowledge / academics in Turkey; to be able to use the latest technology not available in Europe; disagreements, etc. with the Higher Education Council in Turkey; to work with and learn from the best in their chosen field of specialization; more opportunities for international recognition and mobility, higher quality undergraduate and post-graduate education; political and social disorder in Turkey prior to 1980; and wanting to be in an economically stable country. While some of these reasons are similar in spirit to the categories presented in the survey, they provide somewhat more detailed explanations for why participants have chosen to go abroad. Below is a sample of some of the explanations in the participants’ own words:

At the university I worked in Turkey, research opportunities and support were very insufficient, and the overall atmosphere was negative for scholarly activities.

[I left because of the] lack of organization and planning in Turkey, having to struggle with daily things, lack of trust in people and institutions, [and] lack of optimism for the future in Turkey.

It was difficult to get an academic job in Turkey, so I decided to study in the US.

METU [Middle East Technical University] would not let me teach as Assistant Professor and wanted me to do a second dissertation for Associate.

Bogazici [University] requires a PhD from abroad to employ as an assistant professor.

At the time I wanted to be a professor at Bogazici University and thought that I needed a PhD from the USA for that.

Working environment in Turkey is simply not professional, and very political.

[I left in order] to stay on the technical track (it’s impossible to work as an engineer and survive in Turkey).

I had no career prospects in Turkey’s bleak technology sector.

Most of the faculty had left Turkey due to [the] political atmosphere at the time, leaving no qualified professors in the universities to advance my studies.

[I wanted to use] my existing skills more efficiently, [and be] able to use my creativity.

Some participants also viewed overseas experience as a personal challenge to grow as individuals in the absence of “a family support structure”, and some as a way to discover their “professional abilities and limitations, in a high paced, competitive, international environment.” For respondents of the student survey, the opportunity to receive better

quality education and to get away from the stress of preparing for the nationwide university placement exam (ÖSS) also figure in as important reasons. It is worth noting that many respondents believe that they will have better employment opportunities in Turkey in terms of both workplace quality and better positions if they acquire overseas study and work experience.

*Reasons for going abroad by study program:* For students, the reasons for going abroad may differ according to the academic program of study (Table 6.6). Lifestyle factors and the prestige of study abroad are important for a greater proportion of students in bachelor's and master's degree programs, while, not surprisingly, a significantly greater proportion of PhD students and postdoctoral fellows have marked the lack of a program in their specialization, and the lack of resources for research in Turkey as important reasons for going abroad. For students pursuing a master's degree, the need for change, fulfilling a job requirement in Turkey, learning a new language and the inability to find employment were marked proportionally more as important factors.

Table 6.6 Reasons for Going Abroad by Program of Study, Students (%)

| Reason                                                    | Bachelors<br>(n = 119) | Masters<br>(n = 303) | PhD<br>(n = 625) | Postdoc<br>(n = 55) | $\chi^2(3)$ |
|-----------------------------------------------------------|------------------------|----------------------|------------------|---------------------|-------------|
| Learn language, improve language skills                   | 26.1                   | 36.3                 | 22.2             | 20.0                | 22.02 ***   |
| Need change, experience new culture                       | 47.9                   | 56.4                 | 46.7             | 23.6                | 22.06 ***   |
| Job requirement in Turkey                                 | 30.3                   | 47.5                 | 39.0             | 36.4                | 12.33 ***   |
| Could not find employment in Turkey                       | 5.0                    | 12.5                 | 5.4              | 10.9                | 16.61 ***   |
| No program in specialization in Turkey                    | 9.2                    | 13.2                 | 19.5             | 21.8                | 11.97 ***   |
| Insufficient facilities, equipment for research in Turkey | 30.3                   | 23.8                 | 54.4             | 67.3                | 99.01 ***   |
| Prestige and advantages of study abroad                   | 76.5                   | 74.3                 | 69.3             | 58.2                | 8.55 **     |
| Lifestyle preference                                      | 35.3                   | 26.4                 | 21.1             | 16.4                | 13.92 ***   |
| To be with spouse, family                                 | 6.7                    | 12.2                 | 6.2              | 5.5                 | 10.79 **    |
| Provide better environment for children                   | 6.7                    | 7.9                  | 7.2              | 10.9                | 1.18        |
| Get away from political environment                       | 24.4                   | 26.7                 | 25.0             | 32.7                | 1.87        |
| Other                                                     | 20.2                   | 11.9                 | 11.7             | 12.7                | 6.75 *      |

Notes: \*\*\*p < 0.001, \*\*p < 0.005, \*p < 0.010; There is one missing response; Cell percentages reflect the number of positive responses for each item out of the total number of valid/nonmissing responses (n).

Table 6.7a below presents the factors chosen as the *most important* reasons for going abroad, broken down by academic program. Close to half of those enrolled in a bachelor's program abroad indicate that the most important reason for their decision to study in a

foreign country is “prestige or better quality education”. This is followed by “lifestyle preference” and “other factors”. At the master’s level, close to a third of respondents indicate that “prestige and better quality education” is the most important factor in their decision to pursue a degree abroad, followed by “requirement in Turkey”, and the “need for change / learn a new culture”. On the other hand, a good proportion of PhD students and postdoctoral scholars have chosen the lack of facilities and resources necessary for research in their field of specialization as the most important reason.

**Table 6.7a Top Reasons for Going Abroad by Academic Program, Students**

| <b>Program Type</b>                                       | <b>%</b> |
|-----------------------------------------------------------|----------|
| <b><i>bachelors (n = 118)</i></b>                         |          |
| Prestige and advantages of study abroad                   | 44.9     |
| Lifestyle preference                                      | 10.2     |
| Other                                                     | 8.5      |
| <b><i>masters (n = 300)</i></b>                           |          |
| Prestige and advantages of study abroad                   | 29.7     |
| Job requirement in Turkey                                 | 14.7     |
| Need change, experience new culture                       | 12.3     |
| <b><i>doctorate (n = 614)</i></b>                         |          |
| Insufficient facilities, equipment for research in Turkey | 24.1     |
| Prestige and advantages of study abroad                   | 23.5     |
| Job requirement in Turkey                                 | 16.3     |
| <b><i>postdoc (n = 54)</i></b>                            |          |
| Insufficient facilities, equipment for research in Turkey | 37.0     |
| Job requirement in Turkey                                 | 14.8     |
| No program in specialization in Turkey                    | 9.3      |

*Notes:* 1086 out of 1103 participants responded to this question; *n* is the number of valid responses.

The top three reasons for going abroad for professionals are listed in Table 6.7b according to the highest degree completed. Although there is substantial variation among the respondents in their reasons for going abroad, the top three reasons nevertheless account for about half of all respondents in each category. The need for change and lifestyle factors are given greater importance by bachelor’s and master’s degree holders, while those with doctorate degrees give importance to research-related factors. These findings indicate that the initial purpose or factors that are important for deciding to study or work overseas differ according to level of specialization in higher education and in terms of gender. Female respondents are more constrained by family considerations, while bachelor’s and master’s degree holders are motivated to a greater degree by lifestyle preferences.



Table 6.7b Top Reasons for Going Abroad by Highest Degree, Professionals

| Highest Degree                                            | %    |
|-----------------------------------------------------------|------|
| <i><b>bachelors (n = 266)</b></i>                         |      |
| Need change, experience new culture                       | 20.7 |
| Lifestyle preference                                      | 13.9 |
| Other                                                     | 10.9 |
| <i><b>masters (n = 489)</b></i>                           |      |
| Prestige and advantages of study abroad                   | 21.3 |
| Need change, experience new culture                       | 13.3 |
| Lifestyle preference                                      | 12.9 |
| <i><b>doctorate (n = 441)</b></i>                         |      |
| Prestige and advantages of study abroad                   | 19.3 |
| Insufficient facilities, equipment for research in Turkey | 18.6 |
| Other                                                     | 15.2 |

Notes: 1196 out of 1224 participants responded to this question; *n* is the number of valid responses.

#### 6.2.6 Family Support

Two-thirds of respondents have indicated that their families were “very supportive” in the initial decision to study abroad, while less than 10 percent indicated that they were “not very supportive” or “not at all supportive” (Table 6.8). This proportion is higher for the student group than for professionals, possibly reflecting generational decisions in family support. When asked whether their family would support them in the decision to settle permanently outside Turkey, less than a third indicated that their family “would definitely support” them, while one quarter of respondents believed that they “would most likely support” them. This indicates that more than half of the respondents think that their family would “definitely” or “most likely” support their decision to settle abroad, while only 20 percent indicate that their family “would not be very supportive” or “would actively discourage them”. While family support is lower for the decision to settle permanently outside Turkey compared to that for the decision to study abroad, it is still quite high. This may be a reflection of the current economic circumstances in Turkey and parents’ desire for their children to have a “better future”.

Table 6.8 Family Support for the Decision to Study or Work Overseas and for Settling Abroad Permanently (%)

| <i>Support for the Decision<br/>to Study or Work Overseas</i> | Total | Survey Type               |          | Gender             |        |
|---------------------------------------------------------------|-------|---------------------------|----------|--------------------|--------|
|                                                               |       | Professionals             | Students | Male               | Female |
| Not at all supportive                                         | 2.2   | 3.3                       | 1.0      | 2.1                | 2.4    |
| Not very supportive                                           | 5.8   | 7.3                       | 4.1      | 5.8                | 5.6    |
| Somewhat supportive                                           | 24.9  | 29.6                      | 19.8     | 25.5               | 23.8   |
| Very supportive                                               | 67.1  | 59.8                      | 75.1     | 66.6               | 68.2   |
| <i>n</i> (valid responses)                                    | 2260  | 1176                      | 1084     | 1508               | 752    |
| Nonresponses                                                  | 67    | 48                        | 19       | 47                 | 20     |
| Test of independence                                          |       | $\chi^2(3) = 65.15^{***}$ |          | $\chi^2(3) = 0.98$ |        |
| <i>Support for Settling<br/>Abroad Permanently</i>            | Total | Survey Type               |          | Gender             |        |
|                                                               |       | Professionals             | Students | Male               | Female |
| Discourage                                                    | 6.6   | 6.3                       | 6.9      | 6.7                | 6.3    |
| Not very supportive                                           | 12.4  | 11.1                      | 13.8     | 12.7               | 11.8   |
| Somewhat supportive                                           | 24.7  | 27.2                      | 22.0     | 23.7               | 26.6   |
| Most likely support                                           | 24.9  | 23.6                      | 26.2     | 24.9               | 24.9   |
| Definitely support                                            | 28.3  | 29.5                      | 27.0     | 28.3               | 28.2   |
| Not sure                                                      | 3.2   | 2.3                       | 4.1      | 3.7                | 2.3    |
| <i>n</i> (valid responses)                                    | 2247  | 1160                      | 1087     | 1499               | 748    |
| Nonresponses                                                  | 80    | 64                        | 16       | 56                 | 24     |
| Test of independence                                          |       | $\chi^2(5) = 18.18^{**}$  |          | $\chi^2(5) = 5.31$ |        |

Notes: \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$ ; Cell percentages sum to 100 across columns. Missing responses are not reflected in the percentages.

### 6.2.7 Initial and Current Return Intentions

Initial return intentions at the outset of the stay in a foreign country may have some explanatory power for the subsequent decision to migrate or return. The combined results for the two groups are given in Table 6.9. Half of all respondents have indicated that their initial intention was to return. Only about one-tenth have indicated they left Turkey without the intention of returning, while an important proportion (more than one-third) was undecided about whether to return. There is no significant difference in initial return intentions between professionals and students, or between males and females.

The categories for current return intentions differ slightly for students compared to professionals. About a quarter of the respondents taking part in the professionals survey have indicated that they have definite return intentions, while slightly more than a third are less certain about returning. Another third indicate that it is unlikely for them to return, while about 7 percent say they will definitely *not* return. For students, there is a greater

tendency to indicate return intentions and a smaller proportion of student respondents have strong non-return inclinations compared to professionals.

Table 6.9 Initial Return Intentions (%)

| Initial Intentions   | Professionals<br>(n = 1224) | Students<br>(n = 1103) | Male<br>(n = 1555) | Female<br>(n = 772) |
|----------------------|-----------------------------|------------------------|--------------------|---------------------|
| Return               | 51.6                        | 53.0                   | 51.6               | 53.5                |
| Stay                 | 12.0                        | 9.4                    | 11.3               | 9.8                 |
| Undecided            | 36.4                        | 37.5                   | 37.1               | 36.7                |
| Test of independence | $\chi^2(2) = 4.02$          |                        | $\chi^2(2) = 1.32$ |                     |

Notes: \*\*\*p < 0.001, \*\*p < 0.005, \*p < 0.010; Cell percentages sum to 100 across columns.

Table 6.10 Initial and Current Return Intentions, Professionals (%)

| Current Intentions                       | n                          | %     | Initial Intentions                    |           |      |
|------------------------------------------|----------------------------|-------|---------------------------------------|-----------|------|
|                                          |                            |       | Return                                | Undecided | Stay |
| Definitely return, plans                 | 54                         | 4.4   | 83.3                                  | 14.8      | 1.9  |
| Definitely return, no plans              | 272                        | 22.2  | 74.3                                  | 23.2      | 2.6  |
| Return probable                          | 416                        | 34.0  | 51.7                                  | 43.3      | 5.1  |
| Return unlikely                          | 401                        | 32.8  | 36.7                                  | 42.9      | 20.5 |
| Definitely not return                    | 81                         | 6.6   | 27.2                                  | 28.4      | 44.4 |
| n                                        | 1224                       | 100.0 | 631                                   | 446       | 147  |
| Test of Independence                     | $\chi^2(8) = 232.16^{***}$ |       |                                       |           |      |
| Measures of ordinal-ordinal association: |                            |       | gamma = 0.5776; ASE = 0.032           |           |      |
|                                          |                            |       | Kendall's tau-b = 0.3921; ASE = 0.024 |           |      |

Notes: \*\*\*p < 0.001, \*\*p < 0.005, \*p < 0.010; Cell percentages sum to 100 across rows; ASE refers to the asymptotic standard error.

Table 6.11 Initial and Current Return Intentions, Students (%)

| Current Intentions                       | n                           | %     | Initial Intentions                    |           |      |
|------------------------------------------|-----------------------------|-------|---------------------------------------|-----------|------|
|                                          |                             |       | Return                                | Undecided | Stay |
| Return without completing studies        | 13                          | 1.2   | 61.5                                  | 38.5      | 0.0  |
| Return immediately after studies         | 149                         | 13.5  | 82.6                                  | 15.4      | 2.0  |
| Definitely return, but not soon after    | 389                         | 35.3  | 67.6                                  | 29.1      | 3.3  |
| Return probable                          | 308                         | 27.9  | 42.5                                  | 51.6      | 5.8  |
| Return unlikely                          | 211                         | 19.1  | 27.0                                  | 52.6      | 20.4 |
| Definitely not return                    | 33                          | 3.0   | 9.1                                   | 9.1       | 81.8 |
| n                                        | 1103                        | 100.0 | 585                                   | 414       | 104  |
| Test of Independence                     | $\chi^2(10) = 388.25^{***}$ |       |                                       |           |      |
| Measures of ordinal-ordinal association: |                             |       | gamma = 0.5776; ASE = 0.032           |           |      |
|                                          |                             |       | Kendall's tau-b = 0.3921; ASE = 0.024 |           |      |

Notes: \*\*\*p < 0.001, \*\*p < 0.005, \*p < 0.010; Cell percentages sum to 100 across rows; ASE refers to the asymptotic standard error.

The relationship between initial and current return intentions is presented for professionals and students in Tables 6.10 and 6.11 respectively. According to the gamma and Kendall's tau-*b* statistics—two measures of ordinal-ordinal association (Agresti, 1984)—a strong, positive relationship exists between initial and current return intentions. This is also evident from examining the percentages in the tables: current return intentions are more likely to be in favor of remaining abroad when initial intentions are also to stay.

### 6.2.8 Reasons for Returning and the Time Frame of Return

While a majority of respondents (61% of professionals and 88% of students) have indicated that they intend to return to Turkey, it appears that many of them do not have short term return plans: half of professionals and 41 percent of students intend to return in five years or more. About one third have indicated they will return within 2-5 years, while another third intends to return within 5-10 years. A significant proportion of professionals (18%) plan to return after 10 years, which is much higher than the proportion for students (8%). On the other hand, a greater percentage of students have immediate return plans (11%) compared to professionals (6%). There are no significant differences in the predicted return dates of male and female respondents.

Table 6.12 Predicted Return Dates for Respondents with Return Intentions (%)

|                      | Professionals<br>( <i>n</i> = 699) | Students<br>( <i>n</i> = 827) | Females<br>( <i>n</i> = 490) | Males<br>( <i>n</i> = 1036) |
|----------------------|------------------------------------|-------------------------------|------------------------------|-----------------------------|
| within 6 months      | 2.9                                | 5.7                           | 4.1                          | 4.5                         |
| 6 - 12 months        | 2.7                                | 5.0                           | 3.9                          | 4.0                         |
| 1 - 2 years          | 10.6                               | 13.1                          | 13.5                         | 11.2                        |
| 2 - 5 years          | 33.6                               | 35.0                          | 36.3                         | 33.4                        |
| 5 - 10 years         | 32.1                               | 33.7                          | 31.6                         | 33.6                        |
| over 10 years        | 18.2                               | 7.6                           | 10.6                         | 13.3                        |
| Test of significance | $\chi^2(5) = 48.04^{***}$          |                               | $\chi^2(5) = 4.78$           |                             |

Notes: \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$ ; Cell percentages sum to 100 across columns. *n* indicates total valid responses; there is a total of 85 missing responses (43 for the professionals survey and 32 for the student survey).

Figures 6.5 and 6.6 present the return reasons for professionals and students, respectively. More than half of respondents marked "missing family" as an important reason for returning in the professionals survey. Achievement of specific goals was also an important reason for nearly as many respondents, while achieving career goals, retirement

and “other” reasons were the next most often marked options. Three quarters of students who indicated that they will be returning indicated that reaching specific goals, such as

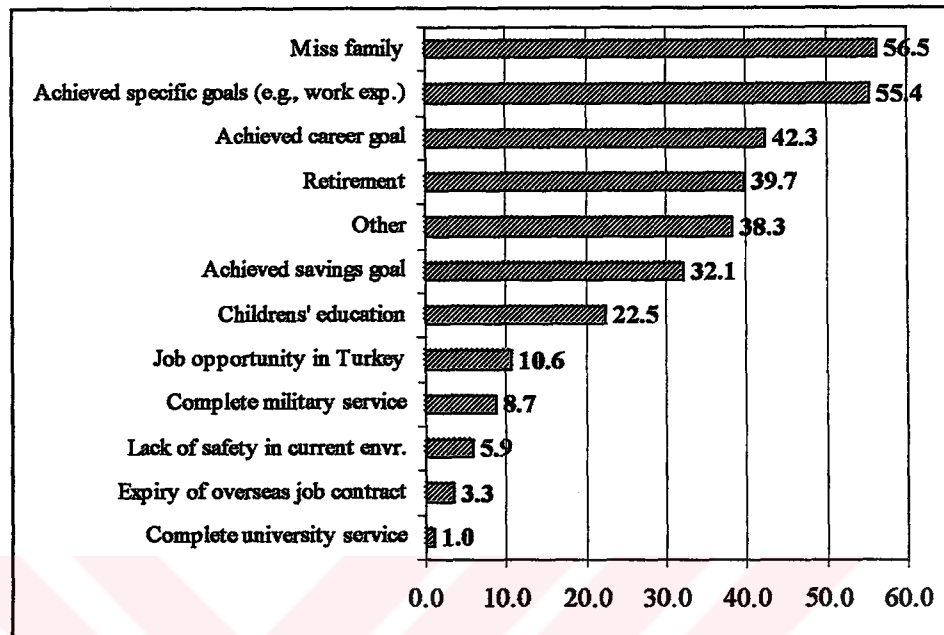


Figure 6.5 Return Reasons for Turkish Professionals (%),  $n = 728$

Notes: Respondents were asked to mark all valid choices; there are 14 nonresponses.

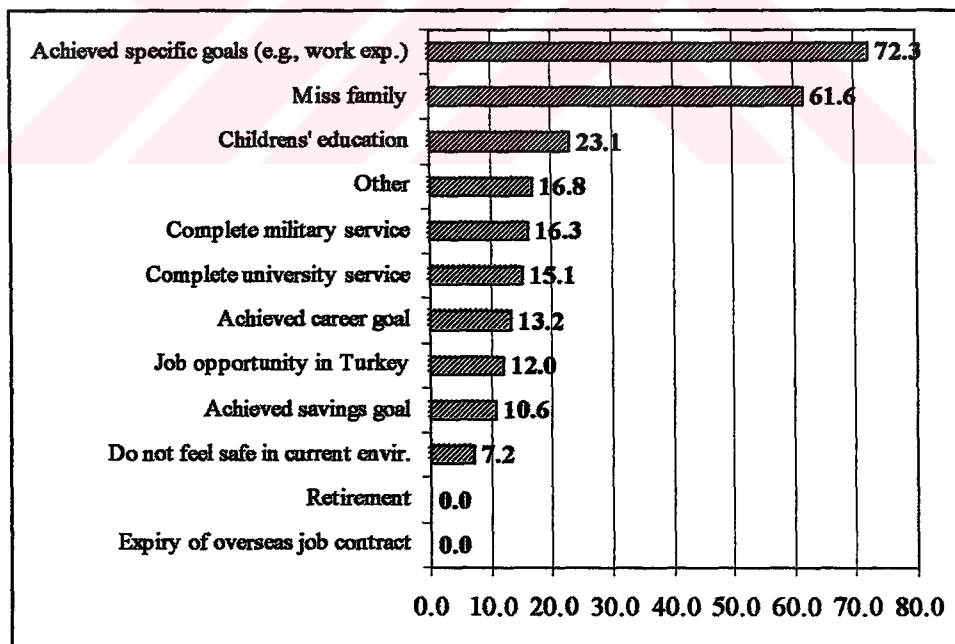


Figure 6.6 Return Reasons for Turkish Students (%),  $n = 847$

Notes: Respondents were asked to mark all valid choices. The options “achievement of career goal” and “achievement of savings goal” were not available in the English version of the student survey. As a result, the percentages for these categories are valid only for students who answered the Turkish version of the survey ( $n = 269$ ).

work experience, was an important return reason<sup>3</sup>. This was followed by “missing their family while abroad” (62 percent), and the desire to have their children educated in Turkey (23 percent). Return reasons do not show significant variation between male and female respondents, although for male respondents “military duty” is another important reason for returning.

Table 6.13 presents the future overseas stay plans for those who have indicated they will return to Turkey. In general, students appear to have plans for longer term stays (e.g., greater than 2 years) as well as being slightly more inclined toward permanent settlement abroad. There are, however, a significant number of respondents in each group who plan short term stays of up to three months at most. This category of stay length constitutes one-quarter of professionals and one-fifth of students. This indicates that “migration” is not a once and for all decision for a great number of participants. Frequent visits back and forth or to third countries may provide a more realistic view of the career trajectories of many highly skilled individuals from Turkey. There are a significant number of academicians and employees of multinational firms in the professionals survey, which means that frequent international travel may be expected from this group.

Table 6.13 Future Plans for Overseas Stay, by Survey Type and Gender (%)

| Predicted Length of Future Stay                 | Professionals<br>(n = 631) | Students<br>(n = 737) | Females<br>(n = 433) | Males<br>(n = 935) |
|-------------------------------------------------|----------------------------|-----------------------|----------------------|--------------------|
| Few days to several weeks at most               | 18.7                       | 18.6                  | 17.1                 | 19.4               |
| 1-3 months at most                              | 26.8                       | 20.5                  | 23.6                 | 23.3               |
| 4-6 months at most                              | 12.8                       | 7.3                   | 8.8                  | 10.4               |
| 7-12 months at most                             | 2.7                        | 5.6                   | 3.9                  | 4.4                |
| 1-2 years at most                               | 5.6                        | 10.7                  | 7.9                  | 8.6                |
| Longer than 2 years, but will definitely return | 23.0                       | 28.5                  | 31.0                 | 23.6               |
| Permanent settlement                            | 1.1                        | 2.7                   | 1.9                  | 2.0                |
| No plans for future overseas travel, etc.       | 9.4                        | 6.1                   | 6.0                  | 8.3                |
| Total                                           | 742                        | 859                   | 517                  | 1084               |
| Nonresponses                                    | 111                        | 122                   | 84                   | 149                |
| Test of significance:                           | $\chi^2(7) = 46.85^{***}$  |                       | $\chi^2(7) = 10.19$  |                    |

Notes: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010; Cell percentages sum to 100 across columns; n is the valid number of responses.

<sup>3</sup> This is a much higher figure than for professionals. This may be due to the fact that respondents to the English survey were not given two related reasons—reaching career goals and reaching savings goal—as options in the survey. It is, therefore, difficult to make comparisons between students and professionals for this particular question.



### 6.2.9 General Assessments of Study, Work, Social and Living Conditions

Respondents were asked to compare various aspects of their life in their current country of residence with that in Turkey. A third indicated that social life was worse in their current country of residence than in Turkey, while two-fifths felt it was neither better nor worse. Less than one fifth of respondents indicated that their social environment was “better” or “much better” than in Turkey. There is no significant difference in this evaluation between professionals and students and between males and females.

In general, respondents believe that their standard of living was “better” or “much better” in their current country of residence (80 percent). However, for students and for females the share of those who felt that their standard of living was better than in Turkey was somewhat lower: 70 percent for students compared to 88 percent for professionals, and 74 percent for females compared to 83 percent for males.

Table 6.14 Respondents' General Assessment of Social Conditions in their Current Country of Residence versus in Turkey (%)

| Assessment                  | Total | Survey Type        |          | Gender             |        |
|-----------------------------|-------|--------------------|----------|--------------------|--------|
|                             |       | Professionals      | Students | Male               | Female |
| Much worse                  | 10.5  | 10.3               | 10.7     | 11.1               | 9.3    |
| Worse                       | 33.0  | 33.3               | 32.6     | 33.8               | 31.4   |
| Neither better nor worse    | 39.3  | 40.8               | 37.7     | 38.0               | 41.9   |
| Better                      | 8.8   | 7.4                | 10.3     | 8.7                | 8.8    |
| Much better                 | 7.9   | 7.5                | 8.5      | 7.9                | 8.0    |
| Do not know                 | 0.5   | 0.7                | 0.4      | 0.5                | 0.5    |
| <i>n</i> (excludes missing) | 2317  | 1218               | 1099     | 1546               | 771    |
| Nonresponses                | 10    | 6                  | 4        | 9                  | 1      |
| Test of independence        |       | $\chi^2(5) = 8.78$ |          | $\chi^2(5) = 4.31$ |        |

Note: \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$

Table 6.15 Respondents' General Assessment of the Standard of Living in their Current Country of Residence versus in Turkey (%)

| Assessment                  | Total | Survey Type                |          | Gender                    |        |
|-----------------------------|-------|----------------------------|----------|---------------------------|--------|
|                             |       | Professionals              | Students | Male                      | Female |
| Much worse                  | 1.2   | 0.7                        | 1.7      | 1.1                       | 1.3    |
| Worse                       | 4.2   | 1.5                        | 7.2      | 3.2                       | 6.2    |
| Neither better nor worse    | 14.6  | 9.1                        | 20.7     | 12.9                      | 17.9   |
| Better                      | 26.1  | 26.2                       | 26.0     | 26.5                      | 25.2   |
| Much better                 | 53.7  | 62.2                       | 44.3     | 56.1                      | 49.0   |
| Do not know                 | 0.3   | 0.3                        | 0.2      | 0.2                       | 0.4    |
| <i>n</i> (excludes missing) | 2315  | 1217                       | 1098     | 1545                      | 770    |
| Nonresponses                | 12    | 7                          | 5        | 10                        | 2      |
| Test of independence        |       | $\chi^2(5) = 138.57^{***}$ |          | $\chi^2(5) = 26.32^{***}$ |        |

Note: \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$

Professionals were also asked to make a general assessment about their work environment in their current country of residence in relation to that in Turkey (Table 6.16). Similar to the living conditions assessment, the work conditions assessment is tilted toward the “better” and “much better” categories. Those in academia and male respondents appear slightly more satisfied with their work environments than female respondents and respondents working in other types of organizations.

Table 6.16 Turkish Professionals' General Assessment of Work Conditions in their Current Country of Residence versus in Turkey (%)

| Assessment               | Gender             |        | Type of Organization      |       |
|--------------------------|--------------------|--------|---------------------------|-------|
|                          | Male               | Female | Academia <sup>a</sup>     | Other |
| Much worse               | 0.5                | 0.6    | 0.0                       | 0.7   |
| Worse                    | 1.8                | 2.1    | 0.3                       | 2.5   |
| Neither better nor worse | 9.0                | 10.3   | 7.5                       | 10.1  |
| Better                   | 23.9               | 27.9   | 22.0                      | 26.2  |
| Much better              | 59.2               | 52.8   | 65.9                      | 54.0  |
| Do not know              | 5.6                | 6.5    | 4.3                       | 6.5   |
| Freq. (n)                | 871                | 341    | 346                       | 866   |
| Nonresponses             | 8                  | 4      | 2                         | 10    |
| Test of independence     | $\chi^2(5) = 4.21$ |        | $\chi^2(5) = 20.45^{***}$ |       |

Note: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010

<sup>a</sup>Academia includes Universities, Research Centers and Medical Schools.

Table 6.17 Turkish Students' General Assessment of Academic Conditions in their Current Institution of Study versus in Turkey (%)

| Assessment               | Gender             |        | Academic Program <sup>a</sup> |         |           |         |
|--------------------------|--------------------|--------|-------------------------------|---------|-----------|---------|
|                          | Male               | Female | Bachelors                     | Masters | Doctorate | Postdoc |
| Much worse               | 0.3                | 0.0    | 0.9                           | 0.0     | 0.2       | 0.0     |
| Worse                    | 1.9                | 1.9    | 0.9                           | 5.9     | 0.3       | 0.0     |
| Neither better nor worse | 10.4               | 8.2    | 3.4                           | 17.5    | 7.1       | 7.3     |
| Better                   | 24.6               | 27.5   | 18.6                          | 28.1    | 27.1      | 12.7    |
| Much better              | 62.6               | 62.4   | 75.4                          | 48.5    | 65.3      | 80.0    |
| Do not know              | 0.2                | 0.0    | 0.9                           | 0.0     | 0.0       | 0.0     |
| Freq. (n)                | 671                | 425    | 118                           | 303     | 620       | 55      |
| Nonresponses             | 5                  | 2      | 1                             | 0       | 5         | 1       |
| Test of independence     | $\chi^2(5) = 4.09$ |        | $\chi^2(15) = 99.34^{***}$    |         |           |         |

Note: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010

<sup>a</sup>Respondents in associates degree post-bachelors programs are included in bachelors program figures.

Respondents in post-masters programs are included in masters program figures.

Students, on the other hand, were asked to assess academic conditions at their current institution (Table 6.17). A great majority (87 percent) indicated academic life to be “better” or “much better” in their current country of study. A breakdown of student responses by

academic program indicates that students in master's degree programs appear to be less enthusiastic about academic conditions than those in bachelors, doctorate and post-doctorate programs. In future survey studies, more specific questions could be asked about study and work conditions to pinpoint which aspects of their jobs or academic programs that respondents are particularly dissatisfied with in Turkey.

#### 6.2.10 Difficulties Abroad and Adjustment Factors

The difficulties faced while studying or working abroad may be interpreted as being part of the "psychic" costs of moving to a new location. A list of potential difficulties was presented to respondents, and they were asked to mark the difficulties that were significant for them. Table 6.18 gives the results by gender and survey type. Four-fifths of professionals and students marked "missing family members left behind in Turkey" as an important difficulty. For females, this proportion was significantly higher (87 percent). High cost of living was the next most often marked category for student respondents, followed by lack of leisure time, and loneliness or being unable to adjust. For professionals, lack of leisure time, children growing up in a foreign culture and high cost of living were,

Table 6.18 Difficulties Faced Abroad by Gender and Survey Type (%)

| Difficulties                               | Gender |      |             |     | Survey Type |          |             |     |
|--------------------------------------------|--------|------|-------------|-----|-------------|----------|-------------|-----|
|                                            | Female | Male | $\chi^2(1)$ |     | Profes.     | Students | $\chi^2(1)$ |     |
| Being away from family                     | 87.2   | 78.5 | 25.59       | *** | 80.9        | 81.9     | 0.38        |     |
| Children growing up in a different culture | 11.4   | 15.5 | 7.03        | *** | 21.8        | 5.5      | 125.74      | *** |
| Loneliness, not being able to adjust       | 22.7   | 21.9 | 0.19        |     | 18.6        | 26.2     | 19.21       | *** |
| Fast-paced life                            | 17.4   | 16.0 | 0.65        |     | 12.8        | 20.6     | 24.7        | *** |
| Little or no leisure time                  | 31.1   | 27.7 | 2.89        | *   | 25.7        | 32.3     | 12.33       | *** |
| Unemployment                               | 5.1    | 4.0  | 1.38        |     | 3.9         | 4.9      | 1.34        |     |
| No jobs in my area of specialty            | 2.9    | 2.2  | 0.84        |     | 2.1         | 2.9      | 1.48        |     |
| Discrimination against foreigners          | 12.1   | 16.1 | 6.35        | *** | 16.2        | 13.2     | 3.83        | **  |
| Lower income than in Turkey                | 5.1    | 2.7  | 8.55        | *** | 1.8         | 5.5      | 23.18       | *** |
| Higher Taxes                               | 11.5   | 11.6 | 0.01        |     | 15.3        | 7.4      | 34.79       | *** |
| Crime, lack of personal security           | 5.1    | 5.0  | 0.01        |     | 4.1         | 6.1      | 4.90        | **  |
| High cost of living                        | 29.8   | 28.5 | 0.43        |     | 21.7        | 36.9     | 64.76       | *** |
| Other                                      | 16.3   | 14.1 | 2.04        |     | 13.2        | 16.6     | 5.07        | **  |
| No difficulties experienced                | 0.7    | 1.7  | 4.17        | **  | 2.0         | 0.6      | 9.56        | *** |
| <i>n</i> (valid responses)                 | 766    | 1515 |             |     | 1201        | 1080     |             |     |

Notes: \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$ ; There are 46 missing observations.

in that order, shown to be important difficulties. Significant chi-square statistics in the gender and survey groups indicate that there are important differences in the response patterns between males and females and between students and professionals for different types of difficulties faced while abroad. A greater proportion of male respondents are concerned about their children growing up in a different culture, as well as discrimination from foreigners compared to female respondents, while more females indicate that a lower income level and having less leisure time abroad are significant difficulties.

Table 6.19 gives the most important difficulties for the same groups. The top three difficulties do not change by gender or survey type, although the proportions with which they are chosen are slightly different. Being away from or missing family is chosen by more than half the respondents as the most important difficulty faced while abroad. This is followed by loneliness / inability to adjust and "other" difficulties.

Table 6.19 Top Difficulties by Gender and Survey Type (%)

| Difficulties                               | Gender                      |      | Survey Type                |          |
|--------------------------------------------|-----------------------------|------|----------------------------|----------|
|                                            | Female                      | Male | Profes.                    | Students |
| Being away from family                     | 65.0                        | 52.7 | 58.0                       | 55.5     |
| Children growing up in a different culture | 1.3                         | 5.2  | 6.0                        | 1.5      |
| Loneliness, not being able to adjust       | 8.9                         | 9.7  | 7.8                        | 11.1     |
| Fast-paced life                            | 1.5                         | 2.5  | 1.9                        | 2.4      |
| Little or no leisure time                  | 4.2                         | 5.6  | 4.8                        | 5.5      |
| Unemployment                               | 2.0                         | 1.3  | 1.3                        | 1.8      |
| No jobs in my area of specialty            | 1.3                         | 0.4  | 0.8                        | 0.6      |
| Discrimination against foreigners          | 2.6                         | 4.1  | 4.4                        | 2.7      |
| Lower income than in Turkey                | 0.4                         | 0.5  | 0.3                        | 0.7      |
| Higher Taxes                               | 0.4                         | 1.4  | 1.6                        | 0.5      |
| Crime, lack of personal security           | 0.0                         | 0.9  | 0.5                        | 0.7      |
| High cost of living                        | 4.2                         | 5.4  | 3.1                        | 7.2      |
| Other                                      | 7.5                         | 8.8  | 7.4                        | 9.5      |
| No difficulties experienced                | 0.7                         | 1.7  | 2.1                        | 0.6      |
| <i>n</i> (valid responses)                 | 757                         | 1493 | 1187                       | 1063     |
| Test of Independence:                      | $\chi^2(10) = 388.25^{***}$ |      | $\chi^2(13) = 82.60^{***}$ |          |

Notes: \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$ ; There are 77 missing observations; Cell percentages sum to 100 across columns.

Some of the most cited adjustment problems faced by the respondents were communication difficulties related to language problems, cultural barriers, and having a more limited social network compared to that in Turkey (e.g., lack of close social ties;

family ties not being as strong), as well as a lack of sense of community and feeling of “belonging”, and hence alienation. A number of participants emphasized the difficulties of having to adjust to small town life after living in a cosmopolitan city like İstanbul, while others were dissatisfied with the social and cultural lifestyle in their host countries:

[There is] no real quality of life socially and culturally. [There is] misfit with the extreme individuality and selfishness of American society in general. Too much work, too little leisure. Too isolated, systematic and cold.

We are from totally different historical and cultural backgrounds: We don't laugh, cry, or enjoy the same things.

It was a step down in my social status. In Turkey, I was a member of the privileged group. Here I am a typical middle income.

There were two factors in particular that were important in terms of having an impact (in terms of a significant bivariate association) on the return intentions of both students and professionals: loneliness and missing family. For professionals, a high chi-square statistic indicates that high cost of living and “other” factors also significantly affected return intentions.

Figure 6.7 presents the adjustment factors marked by professionals and students as being important in overcoming the difficulties of life abroad. A group of participants indicated they had no adjustment problems; this group is represented in the “other” category. It is also interesting to note that many of the adjustment factors have a negative association with foreign high school language instruction. Some respondents explicitly mention that they experienced little or no difficulty in adjusting to life outside Turkey because of the foreign-language education they received in Turkey. For students, “time” and having Turkish friends at current institute of study were the most often marked adjustment factors, while for professionals, the presence of their spouse and having prior overseas experience are also important. In Figure 6.8, the top adjustment factors are depicted for each survey group. “Spouse”, “previous experience” and “time” are the top three adjustment factors for professionals, while “time”, “having Turkish friends” and “previous experience” are the top three for students.

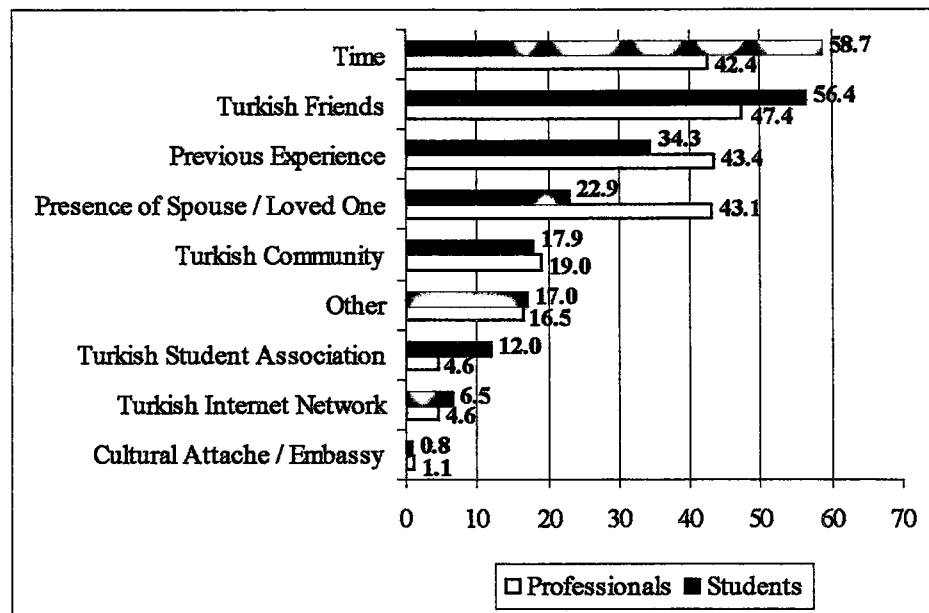


Figure 6.7 Adjustment Factors by Survey Type (%)

*Note:* The sum of the percentages exceed 100 since more than one factor could be chosen.

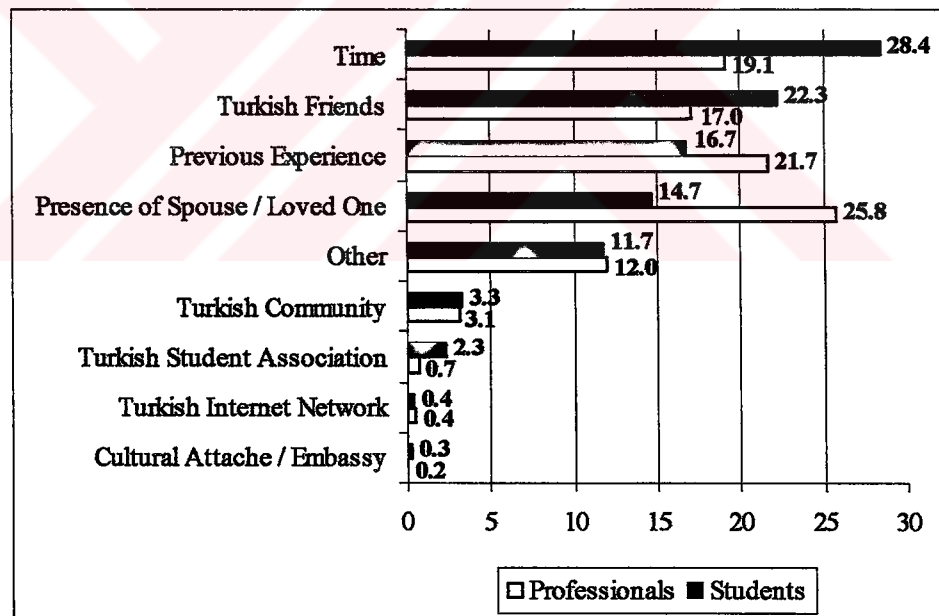


Figure 6.8 Top Adjustment Factors by Survey Type (%)



Interestingly, a male respondent working in a multinational corporation indicated that the difficulties faced abroad are just part of the price of having a more comfortable lifestyle:

Personally, I never want to return to Turkey. My main reasons are a better standard of living, much better job satisfaction and more liberal way of life (especially here in California). I believe the loneliness I feel (not too many close friends, no family members) is the price I need to pay to have all the other stuff. In my company, 90% of the engineers are first generation immigrants (from Russia to Brazil, China to Iran) and they all told me about the loneliness. And just like them, I will endure the loneliness to have a much better life.

#### **6.2.11 Evaluation of Various Push and Pull Factors**

“Push” factors are those characteristics or circumstances of the home country that prompt a person to migrate to another country, while “pull” factors are the characteristics of the receiving country that provide incentives for individuals to settle in the receiving country. Economic factors or differences in income levels have been cited most often as reasons for the loss of highly skilled workers in developing countries. Respondents were asked to rank various “push” and “pull” factors on a five-point scale ranging from least important “1” to most important “5”<sup>4</sup> in terms of their relative significance in the decision to remain abroad.

Table 6.20 gives the percentage of respondents marking the various push and pull factors as “important” or “very important” in the professionals and student surveys. Economic instability is the top push factor for both groups: 76 percent of students and 84 percent of professionals indicate that economic instability is an important reason for not returning. This is not surprising since unemployment among high school and university graduates reached nearly 30 percent in the aftermath of the February 2001 economic crisis according to the State Institute of Statistics Household Survey results. For students, economic instability is followed by low income levels (73.4 percent), little opportunities for advancing in career (71.5 percent) and bureaucratic obstacles (71.3 percent). For professionals, bureaucracy (79.4 percent), unsatisfactory income levels (68.4 percent), political instability (64.7 percent) and lack of opportunities for advancing in occupation (61.7 percent) were the next most often marked push factors. Less than a quarter of respondents in both surveys chose an “unsatisfactory social and cultural life in Turkey” as important push factors. Many of those who marked the “other” category included

---

<sup>4</sup>It is technically a 6-point scale since items that are “not applicable” are given a score of “0”.

**Table 6.20 Push and Pull Factors Viewed as Important<sup>‡</sup> by Professionals and Students (%)**

| Push and Pull Factors                                | Professionals<br>(n = 1189) | Students<br>(n = 1095) | $\chi^2(1)$ |     |
|------------------------------------------------------|-----------------------------|------------------------|-------------|-----|
| PUSHA: Low income in occupation                      | 68.4                        | 73.4                   | 7.03        | *** |
| PUSHB: Little opport. for advancement in occupation  | 61.7                        | 71.5                   | 24.82       | *** |
| PUSHC: Limited job opport. in specialty              | 53.0                        | 58.6                   | 7.36        | *** |
| PUSHD: No opportunity for advanced training          | 36.1                        | 57.8                   | 108.17      | *** |
| PUSHE: Away from research centers and advances       | 39.5                        | 58.7                   | 84.04       | *** |
| PUSHF: Lack of financial resources for business      | 29.1                        | 34.4                   | 7.48        | *** |
| PUSHG: Less than satisfying social/cultural life     | 24.6                        | 22.9                   | 0.84        |     |
| PUSHH: Bureaucracy, inefficiencies                   | 79.4                        | 71.3                   | 20.08       | *** |
| PUSHI: Political pressures, discord                  | 64.7                        | 58.3                   | 9.91        | *** |
| PUSHJ: Lack of social security                       | 59.0                        | 51.3                   | 13.74       | *** |
| PUSHK: Economic instability                          | 83.7                        | 76.2                   | 20.20       | *** |
| PUSHL: Other                                         | 11.9                        | 8.1                    | 8.72        | *** |
| PULLA: Higher salary or wage                         | 79.1                        | 76.8                   | 1.69        |     |
| PULLB: Greater advancement oppr. in profession       | 76.1                        | 82.1                   | 12.36       | *** |
| PULLC: Better work environment                       | 71.3                        | 67.8                   | 3.26        | *   |
| PULLD: Greater job availability in specializ.        | 65.9                        | 75.1                   | 22.84       | *** |
| PULLE: Greater oppr. to develop specialty            | 69.9                        | 82.1                   | 45.67       | *** |
| PULLF: More organized, ordered envir.                | 76.4                        | 76.6                   | 0.01        |     |
| PULLG: More satisfying social/cultural life          | 26.6                        | 28.5                   | 1.05        |     |
| PULLH: Proximity to research and innov. Centers      | 42.0                        | 60.4                   | 76.66       | *** |
| PULLI: Spouse's preference or job                    | 31.0                        | 21.4                   | 26.43       | *** |
| PULLJ: Better educational opport. for children       | 37.4                        | 19.7                   | 87.10       | *** |
| PULLK: Need to finish /continue with current project | 15.2                        | 30.0                   | 71.66       | *** |
| PULLL: Other                                         | 4.8                         | 3.7                    | 1.82        |     |

Notes: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010

<sup>‡</sup>Marked as "Very Important" or "Important" by Respondents

corruption (bribery, partisanship, nepotism) and, in the case of male respondents, compulsory military duty as important push factors.

The top pull factors for both groups complement these results. In the student sample, the great majority of respondents have marked greater advancement in occupation (82 percent) and greater opportunities for developing their specialty (82 percent) as important or very important pull factors in their host country. This is followed by higher salaries (76.8 percent), a more organized and ordered environment (76.6 percent), and greater job availability in specialty (75.1). The emphasis on professional opportunities advancing in or developing the field of specialization is not surprising given that the majority of students are post-doctorate and PhD students. The majority of Turkish professionals, on the other hand, indicate that a higher salary in the host country is an important pull factor (79.1

percent). Three-quarters also indicate that a more organized / ordered environment and greater opportunities for advancement in occupation are very important pull factors.

One of the most common views expressed in the survey by those who have chosen an academic career is that there is a lack of value given to science and to academics in Turkey. Many respondents have indicated that, as a result of this, they fear they will find themselves in an “unproductive environment” when they return. Others have stated that “there is a point where money is no object” and that they would be willing to work for lower wages in Turkey provided that they are “valued and respected”. The following comments illustrate the dilemma faced by respondents contemplating return:

Everyone should realize [the] fact that we stay abroad because of the lack of scientific advancements and economic instability in Turkey. Like the movie says, “If you build it, they will come...” If the government/industry/institutions work together and build a good structure, why should we work for another country? This is a close loop and the good approximation is the “Chicken-egg” analogy. Which one comes first? Chicken? or Egg? Should we build the structure first or should we come back without a good structure? This is the main question! How much money I am making in this country or how happy I am, these are all nonsense. How can you be happy when you are away from your family, culture, and people?

I advise many Turkish students who work for their PhD, either with me or in my institution, or field of work (Experimental Physics). My advice to them is to stay rather than to return. [...] The research budget of Turkey is negligible compared to many developed countries. That translates directly to the fact that there cannot be a sustained, competitive, internationally recognized research programs in Turkish institutions. Yet, this is precisely why young people spend 5-to-10 years extra after their Bachelor's degree to get their PhD's. So in a way, returning is tantamount to negating all of your hard work. Once the importance of original creative work is understood, and appreciated by the society, and the required resource allocations are made by the politicians, the situation will remedy itself over a period of time, like a decade.

Unfortunately, many respondents contemplating an academic career after completing their studies abroad are hesitant about working in newly created state universities in Turkey, even when they have a compulsory service requirement. Many believe the private or foundation universities offer them better conditions.

Bu yaz Amerika'da doktora öğrenimimi bitirdim. Türkiye’de bir üniversiteden burslu olarak gelmişim. Masterimi TR’nin bursu ile, doktoramı ABD üniversitesinin bursu ile bitirdim. Ama TR ile ilişkiyi kesmedim. Bu yaz Türkiye’de burs aldığım üniversitenin rektörü ve bölüm başkanım ile görüştim. Amacım onların geri dönmem konusunda ne düşündüklerini öğrenmek, bize sağlanacak imkanları görmek idi. Hem rektör, hem de bölüm başkanı bana gelmemin gereksiz olduğunu, dönmem halinde bana sağlayacakları hiç bir imkan olmadığını, benim ABD’den onlara daha fazla faydalı olacağımı doğrudan veya dolaylı olarak söylediler. Hatta bölüm başkanı ...

bilgisayar verilip verilmeyeceğini sorduğumda, eğer masa ve sandalye bulursam kendimi şanslı saymam şeklinde cevabı çok ilginçti. Gerçekten de TR'ye dönmek çok istiyorum. Ama devlet üniversitesine değil. Özel bir üniversiteye. (After finishing my doctoral studies in the United States, I visited the university where I have a compulsory service requirement and spoke with the department head and the rector. I wanted to find out about what they thought about my returning and what kind of opportunities they could offer me. I was told, both directly and implicitly, that there was no reason why I should return, there were no opportunities they could offer me and that I would be more useful to them if I stayed in the United States. When I asked if they could provide a computer, the department head said I would be lucky if I could find a chair and table. I really do want to return to Turkey. Not to a state university, but a private one.)

You need to assess the importance of and contributions made by private universities in Turkey. My main reason for wanting to return to Turkey is to join one of these institutions. I have already contributed to Sabanci and Koc University programs. Facilities provided in Turkish private universities are as good as abroad but they need to be scrutinized by independent academic groups in order to maintain and enhance quality of teaching and research.

While many academic participants would be willing to work in state universities with established reputations, there is no guarantee that those who return will be employed in one of these institutions.

As I had a firm belief of returning and giving back what was given to me by my country after my PhD in 1975, I taught at ODTU in 1975-77, and Bogazici, 78-80. I returned to USA because of political turmoil; moved to Sydney to join my partner in 1989. I am now an academic living abroad; in 1993, I came and presented myself to ODTU and Bogazici; had I been offered a job, we would have moved back.. I still maintain very close contact, and participate in training and development [activities].

Other respondents' comments give more detailed explanations for why many of the educated are choosing not to return to Turkey. It is usually a combination of factors that keep professionals and students abroad. There are also generational differences in the reasons for not returning. Below are some of these explanations as well as suggestions for remedies.

I think the main factor [in not returning] is, lack of good jobs, lack of opportunities. People move away and they get treated so much better professionally and they get used to the salary and the opportunities other countries have to offer that they don't consider going back. Why would you move back and take a job cut, a pay cut and make your life more difficult. People move to make things better not worse.

My personal belief is that the most important reason is the business climate; and mostly the lack of entrepreneurial culture. My school (METU), TUBITAK and others [have spent] a lot of effort on technoparks, etc but nothing came out of them because they are isolated efforts.

In the early years (1970s) terror in Turkey was the main factor causing us to stay in [the] USA. Later on, political instability and lack of opportunities in our fields. But, overall, government policies to encourage growth of private sector, especially in terms of regulations, taxation, bureaucracy, corruption kept us working in USA rather than returning. Later on, after a year of living in Turkey, 1992-3, we decided to return to USA since we had two elementary school children and we felt we could not get them into acceptable middle education schools (özel okullar), and comparably we could find better quality schools in USA for them.

Please add the mandatory military service as a reason to work abroad. For me, the main reason [for continuing to live] in the States is the business environment (lack of professional environment) and corruption.

Due to the fact I will not be able to find a job (a job close to this one) in Turkey, It will not be easy to [return]. I design, analyze and construct and manage the wireless sites.

Türkiye'ye gitmek istememdeki bir faktör de Türkiye'deki trafik. Ailemden 2 kişi (annem ve teyzemin oğlunu trafik kazasında kaybettim. 4 kişi ciddi şekilde yaralandı). Ayrıca, sağlık hizmetlerinin kötü olması (hastanelerin durumu, ambulans sistemi vs), insana değer verilmemesi, kanunların uygulanmaması, herşeyin torpil ve tanıdıklar vasıtasıyla yürütülmesi kendimi Türkiye'de güvende hissetmememe sebep oluyor. Türkiye'ye dönsem bile orada birşeyi değiştiremeyeceğimi ve yeni birşey getiremeyeceğimi düşünüyorum. (Traffic in Turkey is another factor that makes me not want to return. I lost my mother and cousin in a traffic accident. In addition, the poor health services (in terms of hospitals, ambulance system, etc), lack of value given to human life, lack of law enforcement, and everything being done through nepotism or other such connections add to my apprehension about being in Turkey. I feel that if I return I won't be able to change anything or bring anything new to Turkey).

I believe the most important factors of brainpower not returning to Turkey are: 1) money and increased likelihood [for promoting] your career abroad 2) economic and political stability and order abroad. However, the social environment and culture of foreign countries are very different from that of Turkey, and most people I know would return immediately if they knew the situation [was] more stable and predictable, and that they knew they would be financially secure.

I think that the brain drain argument implies two things: First, what I know is not known in Turkey; second, Turkey would be interested in implementing what I know. Turkey has professionals who are very capable. However, the majority of Turkish people and the governments are not listening to them. Under these circumstances, what would be the contribution of a Turkish professional to Turkey, if she returned to Turkey? Not much, I think.

I was planning to return to Turkey but ... the crisis in banking delayed my decision again. Another main reason not to return is the education of my children. Each time you decide to go back you remember the race they have to enter for their higher education.

I think this is a great concern to Turkey and that there are no strategic planning to recover any of the brain drain. While most of us would like to entertain the possibility [of coming] back, even for lesser opportunities, there is no structure that creates platforms for capturing the value of brains outside of Turkey. I would even say that there is some resentment and/or resistance to such attempts.



In US you feel like you can really contribute to the society. [For] some reason I hardly felt this in Turkey, the feeling of doing something really useful and making a difference.

I think one thing we need to do to prevent the "brain drain" is to give a little hope and inspiration to young people. With no hope for the future, no trust, and no opportunities to make a difference or to speak up, stand up for what we believe, life comes pretty much down to basics: food, shelter, etc. Unfortunately, on that scale, I am far better rewarded for my efforts here than I would be in Turkey. So I make my decision based primarily on that "quality of life" criterion. Sad and materialistic maybe, but true.

Anecdotal evidence further indicates that the inability to find satisfying work is a relevant factor in looking for overseas jobs in the non-academic private sector. Many university graduates do not work in their field of study, but in unrelated sectors as noted by one respondent:

There should be a question asking if the person is practicing the profession he/she has studied. A lot of people, particularly those who have studied liberal arts, do not practice their professions and do unrelated things to make a living (they may be practicing their studies as a hobby or 2nd job, etc).

Lack of planning or knowledge when making study or work decisions also appears to contribute to the drive to go abroad to work or study among young people in Turkey. It is not difficult to imagine that a considerable number of young people are influenced by their peers and by societal pressures (e.g., conform to society norms) to do what is acceptable in terms of career and life choices:

I think making a decision to go abroad is just like choosing a major for your college degree. You do not know much about what is waiting [for] you, until you get into it. For the college degree you choose whatever is most popular, or whichever one is the hardest to get into. And once you are done with your degree, the next definition of "success" is going abroad to get your Masters degree.... Sometimes in this rush you forget why you started it all.

I believe that the most important reason people don't return is the fact that they get caught up in daily activities and never look at the big picture.

I personally feel confusion about returning because I really am not aware of the opportunities in Turkey in many fields. Resources and professional information and information for potential future are not very clear and accessible in and about Turkey. I wish there would be more aggressive and promotional governmental and professional activities in Turkey to bring people back.

As these responses illustrate, much of Turkey's brain drain problems may be attributed to a lack of planning at the individual level through the education and career choices people make (which is of course a response to the current education system and labor market conditions) and lack of planning at the national or institutional levels.



### **6.3 A Closer Look at Student Respondents**

This section gives a more detailed presentation of the responses of Turkish students studying overseas in terms of their current program and field of study, sources of financial support, and the reasons for choosing the current institution of study, as well as future work destinations and expected work activities when overseas schooling is completed. The importance of various push and pull factors differ with the level and field of study and according to the current return intention of the respondent. These are also examined in this section. Finally, two factors not explicitly included in the survey as possible push factors—namely, compulsory military service and compulsory academic service—are also discussed in terms of their impact on return intentions.

#### **6.3.1 Current Program and Field of Study**

Nearly two-thirds of the respondents are enrolled in a doctoral degree or postdoctoral program. The remaining respondents are pursuing masters and undergraduate degrees, with 28 percent and 11 percent shares respectively (Table A.11, Appendix A). The highest degree planned (or obtained in the case of postdoctoral fellows) by three-quarters of participants is the doctorate, while nearly one-quarter plan to get a master's degree (Table A.12). The most popular field of study among participants is "Engineering and Technical Sciences", except for females and those pursuing master's degrees (Table A.15; Table A.16).

The high percentage of respondents in the technical fields is likely to be a reflection of the greater number of graduates produced in these fields by the Turkish higher education system. Engineering and related sciences is surpassed only by the social sciences, where business administration is also a popular subject. Traditionally the technical fields hold great prestige in Turkey and there is a great desire to get accepted into a technical program. This requires a relatively high score on the nation-wide entrance exam, which is even higher for the more prestigious universities as a result of the greater demand. There is also a proportionately higher percentage of postdoctoral students in the "Math and Natural Sciences" and "Medicine and Health-Related programs", which is perhaps an indication of the greater emphasis on basic science at this level of study.

Table 6.21 presents return intentions according to the field of study. Return intentions appear to be the greatest in the social sciences and education fields. This may be due to the greater number of government- or public sector-sponsored students in these fields, where there is a compulsory academic service obligation (see Table A.17).

**Table 6.21 Fields of Study and Return Intentions<sup>††</sup>, Students (%)**

| Field                                | Likely to Return<br>( <i>n</i> = 160) | Somewhat                              | Unlikely to Return<br>( <i>n</i> = 244) | Total<br>( <i>n</i> = 1100) |
|--------------------------------------|---------------------------------------|---------------------------------------|-----------------------------------------|-----------------------------|
|                                      |                                       | Likely to Return<br>( <i>n</i> = 696) |                                         |                             |
| Engineering and Technical Sciences   | 31.9                                  | 47.1                                  | 42.6                                    | 43.9                        |
| Economic and Administrative Sciences | 25.6                                  | 28.9                                  | 26.2                                    | 27.8                        |
| Math and Natural Sciences            | 9.4                                   | 11.2                                  | 13.5                                    | 11.5                        |
| Social Sciences                      | 11.3                                  | 5.3                                   | 7.0                                     | 6.6                         |
| Educational Sciences                 | 12.5                                  | 3.6                                   | 5.7                                     | 5.4                         |
| Medical and Health Sciences          | 4.4                                   | 1.6                                   | 2.5                                     | 2.2                         |
| Architecture and Urban Planning      | 3.1                                   | 0.7                                   | 1.2                                     | 1.2                         |
| Language and Literature              | 1.9                                   | 0.6                                   | 0.8                                     | 0.8                         |
| Arts                                 | 0.0                                   | 1.0                                   | 0.4                                     | 0.7                         |
| Test of Independence                 | $\chi^2(16) = 51.84^{***}$            |                                       |                                         |                             |

Notes: \*\*\**p* < 0.001, \*\**p* < 0.005, \**p* < 0.010; Cell percentages sum to 100 across columns; There are three missing responses.

<sup>††</sup> The six categories of the return intentions variable have been collapsed into three as follows: "Likely to Return" = "Return Immed. without Completing Studies" + "Return Immed. after Completing Studies"; "Somewhat Likely to Return" = "Return, but not soon after completing studies" + "Probably Return"; "Unlikely to Return" = "Return Unlikely" + "Definitely Not Return".

### 6.3.2 Types of Financial Support

According to Ministry of Education statistics, the majority of Turkish students studying abroad are private students who are studying with their own means. In our sample, the great majority of respondents are private students, which reflects the aggregate distribution. Only about one-fifth are sponsored by public or private organizations in Turkey. Approximately 17 percent of respondents are government-sponsored students who hold scholarships that have a compulsory service requirement in Turkey: 11 percent from the Turkish Ministry of Education (MEB), 5 percent from the Higher Education Council (YÖK), and less than one percent from the Turkish Academy of Sciences (TÜBA) and the Scientific and Technical Research Council (TÜBİTAK) (Figure 6.9).

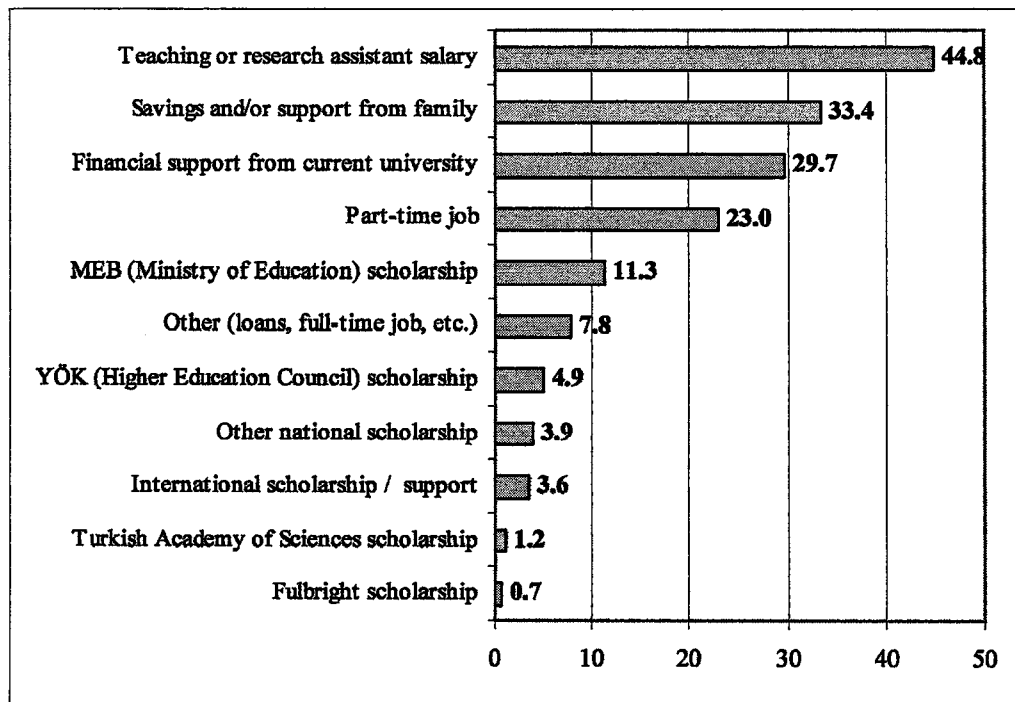


Figure 6.9 Students Abroad by Type of Financial Support (%)

*Notes:* The sum of the figures does not add to 100, since respondents could have more than one relevant source of financial support for their study abroad; ( $n = 1098$ ); There are five missing answers.

Table 6.22 Return Intentions and Compulsory Academic Service (%)

| Return Intention                      | Compulsory Academic Service |                      | Total<br>( $n = 1098$ ) |
|---------------------------------------|-----------------------------|----------------------|-------------------------|
|                                       | No<br>( $n = 907$ )         | Yes<br>( $n = 191$ ) |                         |
| Return without completing studies     | 0.7                         | 3.7                  | 1.2                     |
| Return immediately after studies      | 8.6                         | 37.2                 | 13.6                    |
| Definitely return, but not soon after | 37.5                        | 25.1                 | 35.3                    |
| Return probable                       | 28.8                        | 23.6                 | 27.9                    |
| Return unlikely                       | 21.2                        | 8.9                  | 19.0                    |
| Definitely not return                 | 3.3                         | 1.6                  | 3.0                     |
| Test of independence                  | $\chi^2(5) = 129.36^{***}$  |                      |                         |

*Notes:* \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$ ; Cell percentages sum to 100 across columns.

Many private students later obtain scholarships from the foreign universities they are attending or from foreign governments. In our sample, many of the private students are research or teaching assistants at the institutions they are studying. Many private- and government-sponsored students also receive financial support from their families during the

course of their studies. One third of respondents have received financial support from their families or used previous savings. Many of those without scholarships finance their education by working at a part-time job, usually within the university. Loans, full-time job and spouse's job were also indicated as means for financing overseas studies.

### 6.3.3 Reasons for Choosing Current Overseas Institution

Various factors have been cited as being important in choosing an overseas study location. For three-fifths of the respondents the fact that their institution provided the most relevant program in their field of specialization was important for their choice of institution. One undergraduate student indicated that she chose to study at an American university because she was provided greater diversity in terms of the fields of study and curriculum. The reputation and relevance of the program (61 percent) was followed by the respondent's ability to get acceptance (44 percent), better financial support or scholarship opportunities offered by the university (42 percent), recommendation of the adviser or other professors (37 percent), and the possibility of greater job opportunities (26 percent). The "other" category was also marked by 22 percent of the respondents which indicates that the categories provided did not give the full range of possible reasons for choosing current institution of study. The two categories "having Turkish contacts at institution" and "being with or near spouse" was marked as important by 18 and 11 percent of respondents respectively. This information is summarized in Figure 6.10.

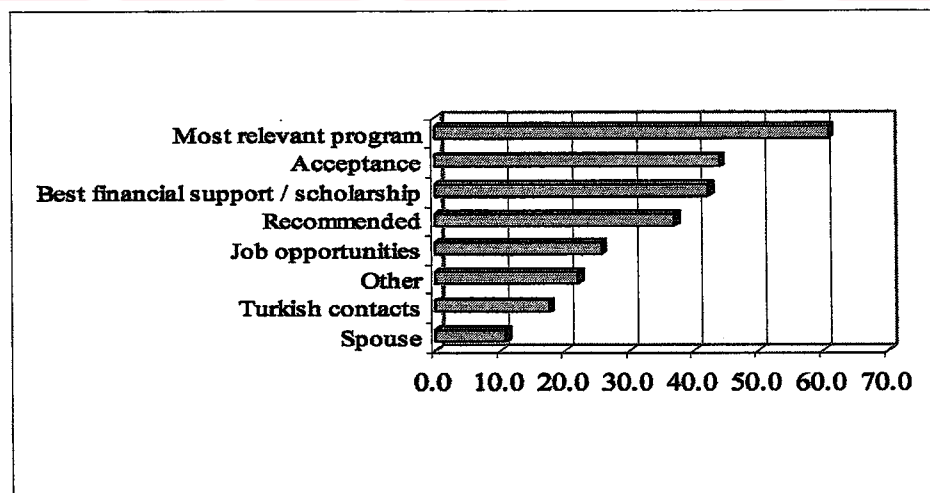


Figure 6.10 Reasons for Choosing Current Institution of Study  
(by % of respondents marking category)

Notes: Respondents were asked to mark all valid choices;  $n = 1099$ ; missing responses = 4.

The respondents were also asked to choose the factor they considered to be the *most* important in their decision to study at their current institution (See Figure 6.11). “Provided most relevant program” is indicated to be the most important factor for nearly one third of respondents, followed by “best financial support / scholarship” (18 percent) and “able to get acceptance” (11 percent) which ties with the “other” category. Some of the factors indicated as important by those who marked the “other” category are “prestige of institution” (e.g., institution ranked in top 5 percent for field), “recommended by Ministry of Education”, “lower costs”, “friends are there”, “location”, and “weather”. Private students base an important part of their decision on cost considerations and family contacts in the destination location.

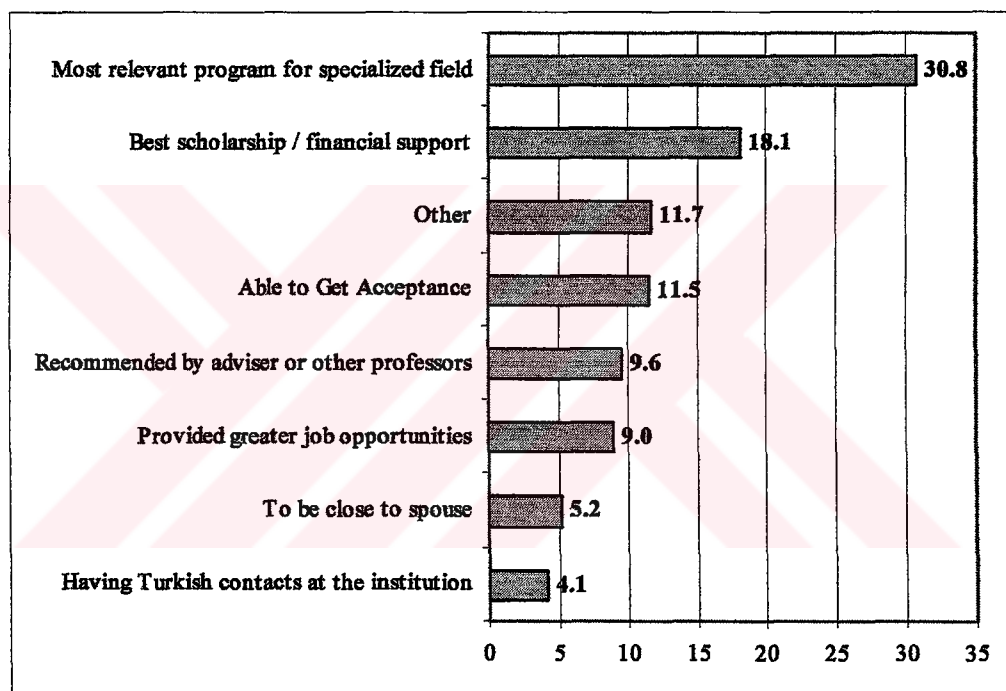


Figure 6.11 Most Important Reason for Choosing Current Institution (%)

Notes: Respondents were asked to choose the most important factor; There are 17 nonresponses; ( $n = 1086$ ).

### 6.3.4 Work Intentions after Completion of Studies

Students were asked in which country they expected to be working immediately after completing their studies. The United States was the most popular work location for two-thirds of the respondents. Turkey, on the other hand, was chosen by only a quarter of students as their immediate work destination. The majority of the remaining respondents

chose countries in the West as possible work locations (Table A.18, Appendix A). Not surprisingly, there appears to be a tendency for choosing a location that one is already familiar with, since this reduces the costs involved in job search and adjusting a new environment (Table 6.23). The majority of those studying in Canada, for example, indicated Canada to be their immediate work location, and so on. This is less pronounced for those residing in Europe, where there is a greater tendency for returning to Turkey. Language also appears to be a deciding factor in choosing a work destination; respondents who have experienced German language instruction in high school, for example, also tend to choose German-speaking countries or regions, such as Germany and Austria.

Table 6.23 Work Destinations and Current Country of Residence

| Work Destination | Current Country of Residence |       |          |       |          |       |
|------------------|------------------------------|-------|----------|-------|----------|-------|
|                  | USA                          |       | Canada   |       | Europe   |       |
|                  | <i>n</i>                     | %     | <i>n</i> | %     | <i>n</i> | %     |
| USA              | 652                          | 71.8  | 3        | 7.9   | 11       | 12.8  |
| Canada           | 3                            | 0.3   | 26       | 68.4  | 3        | 3.5   |
| Europe           | 15                           | 1.7   | 1        | 2.6   | 40       | 46.5  |
| Turkey           | 222                          | 24.4  | 6        | 15.8  | 28       | 32.6  |
| Other/Don't Know | 16                           | 1.8   | 2        | 5.3   | 4        | 4.7   |
| Total            | 908                          | 100.0 | 38       | 100.0 | 86       | 100.0 |

*Notes:* There are 49 missing responses ( $n = 1049$ ); 17 individuals residing in locations outside the USA, Canada and Europe are not shown in the tabulations.

### 6.3.5 Types of Organizations and Activities at Work after Completion of Studies

The work intentions of survey respondents are presented in this subsection. Students were asked the type of organization they planned to work for (or believed they would be working for) and the type of job activities they expected to be involved in, both immediately after and five years after completing their studies.

The majority (73 percent) of those who intend to return to Turkey immediately after completing their studies indicate that they will start work in a university or technical college, while the percentage of those who plan to work in the private sector is relatively low (13.8%). A shortage of academicians persists at higher education institutions in Turkey. In 1995, the number of positions available at these institutions was pretty much balanced by the supply. In 2000, the number of academicians fell short of demand by



19,000. This gap is projected to widen further to 35,000 in 2005 (SPO, 1995, 2000). The proliferation of higher education institutions in Turkey from the early 1990s onward has increased the demand for higher education personnel. On the other hand, the environment created by the economic crises has led to a contraction of private sector jobs, exacerbating the private sector's ability to absorb educated individuals. This may explain why respondents who plan to return to Turkey are headed for careers in academia rather than the private sector or other public sector jobs (Table 6.24; see Tables A.19 and A.20, Appendix A for more detailed organizational classifications). Of those who intend to work in a university in Turkey, the great majority believe they will be working at a public (state) university. For some, this is because they have an academic service obligation at a state university in Turkey.

Close to one half (48 percent) of those who indicated that they will be working in the United States immediately after completing their studies believe they will be working in the non-educational private sector, while 39 percent believe they will be working in a 4-year higher education institution. The great majority of those who expect to be working at a four-year educational institution in the US indicated they will work in a private university. More than a quarter of respondents indicated that they will work in US-based private firm, and one-fifth in a multinational corporation. The remaining students expect to be employed either in a non-profit organization, international organization, or be self-employed.

Table 6.24 Intended Work Destinations and Organizations Immediately after Completing Studies (%)

| Organization Soon After Studies     | United States | Turkey | Europe | Canada | Other / Not Known | Total |
|-------------------------------------|---------------|--------|--------|--------|-------------------|-------|
| University / School – Private       | 24.1          | 11.5   | 19.6   | 21.9   | 27.6              | 20.7  |
| University / School – Public        | 14.9          | 61.9   | 23.2   | 15.6   | 27.6              | 27.5  |
| Multinational Corporation           | 19.9          | 6.5    | 30.4   | 25.0   | 6.9               | 16.9  |
| Other Private Organization          | 27.8          | 7.3    | 19.6   | 25.0   | 6.9               | 21.6  |
| Government / Non-Profit / Int. Org. | 5.1           | 7.7    | 3.6    | 6.3    | 10.3              | 5.9   |
| Not sure                            | 8.3           | 5.0    | 3.6    | 6.3    | 20.7              | 7.5   |
| Total (n)                           | 665           | 260    | 56     | 32     | 29                | 1042  |

Notes: There are 61 missing responses; Cell percentages sum to 100 across columns.

Table 6.25 presents respondents' workplace intentions five years after the completion of their studies. The percentage of respondents who believe they will be working in a state university falls to about one half.

Table 6.25 Intended Organization Five Years after Completing Studies by Initial Work Destination (%)

| Organization 5 Years After Studies  | United States | Turkey | Europe | Canada | Other / Not Known | Total |
|-------------------------------------|---------------|--------|--------|--------|-------------------|-------|
| University / School – Private       | 26.2          | 20.5   | 17.9   | 27.3   | 34.5              | 24.6  |
| University / School – Public        | 14.7          | 46.5   | 14.3   | 9.1    | 17.2              | 22.5  |
| Multinational Corporation           | 15.6          | 4.7    | 28.6   | 21.2   | 3.5               | 13.5  |
| Other Private Organization          | 21.3          | 9.8    | 28.6   | 27.3   | 17.2              | 19.0  |
| Government / Non-Profit / Int. Org. | 6.8           | 7.9    | 3.6    | 6.1    | 3.5               | 6.7   |
| Not sure                            | 15.3          | 10.6   | 7.1    | 9.1    | 24.1              | 13.8  |
| Total ( <i>n</i> )                  | 652           | 254    | 56     | 33     | 29                | 1024  |

Notes: There are 79 missing responses; Cell percentages sum to 100 across columns.

The majority of those who will be working in a public university believe that their main activity would be teaching (48.3 percent), followed by applied research (30 percent), basic research (14.5 percent), and development (3.4 percent). For respondents who indicated that they will be working in a private university, the majority believe their main activity will be applied research (43.2 percent), followed by basic research (27 percent), teaching (27 percent), and development (2.7 percent). Therefore, we may conclude that students who expect to be working in a public university, also expect to be involved more in teaching activities than research, while those who plan to work in a private university believe their activities will be research-oriented. Furthermore, some of those who intend to work in a public university initially are intending to move to a private university within five years.

### 6.3.6 Push-Pull Factors by Degree Program and by Return Intentions

The push-pull motivations may be different for students at different levels of study. Table 6.26 gives a breakdown of the push-pull factors by the level of study: bachelors, masters, doctorate and post doctorate. As expected, at the higher levels of study more importance is given to opportunities for advanced research and training. Salary

considerations, lifestyle preferences and economic instability appear to be important for a greater proportion of respondents at the bachelors and masters levels of study.

Table 6.26 Program of Study and Push / Pull Factors Viewed as Important<sup>‡</sup> by Students (%) (n = 1095)

| Push and Pull Factors |                                                 | bachelors<br>(n = 116) | masters<br>(n = 300) | PhD<br>(n = 620) | Postdoc<br>(n = 55) | $\chi^2(3)$ |
|-----------------------|-------------------------------------------------|------------------------|----------------------|------------------|---------------------|-------------|
| PUSHA                 | Low income in occupation                        | 68.1                   | 73.0                 | 75.0             | 69.1                | 3.03        |
| PUSHB                 | Little opport. For advancement in occupation    | 73.3                   | 70.0                 | 71.6             | 74.6                | 0.77        |
| PUSHC                 | Limited job opport. in specialty                | 55.2                   | 56.3                 | 59.8             | 65.5                | 0.45        |
| PUSHD                 | No opportunity for advanced training            | 50.9                   | 49.7                 | 62.3             | 65.5                | 17.02 ***   |
| PUSHE                 | Away from research centers and advances         | 39.7                   | 35.7                 | 72.1             | 72.7                | 133.82 ***  |
| PUSHF                 | Lack of financial resources for business        | 41.4                   | 35.3                 | 33.3             | 27.3                | 4.17        |
| PUSHG                 | Less than satisfying social/cultural life       | 25.0                   | 33.3                 | 17.8             | 20.0                | 28.26 ***   |
| PUSHH                 | Bureaucracy, inefficiencies                     | 72.4                   | 63.0                 | 75.2             | 70.9                | 14.76 ***   |
| PUSHI                 | Political pressures, discord                    | 59.5                   | 57.3                 | 58.3             | 60.0                | 0.25        |
| PUSHJ                 | Lack of social security                         | 53.5                   | 54.0                 | 50.2             | 45.5                | 2.17        |
| PUSHK                 | Economic instability                            | 78.5                   | 80.7                 | 74.2             | 69.1                | 6.53 *      |
| PUSHL                 | Other                                           | 12.1                   | 8.0                  | 7.1              | 12.7                | 4.95        |
| PULLA                 | Higher salary or wage                           | 84.6                   | 79.7                 | 74.7             | 69.1                | 8.80 **     |
| PULLB                 | Greater advancement oppr. in profession         | 82.9                   | 77.3                 | 83.7             | 89.1                | 7.63 *      |
| PULLC                 | Better work environment                         | 70.9                   | 69.3                 | 66.6             | 65.5                | 1.39        |
| PULLD                 | Greater job availability in specializ.          | 75.2                   | 72.3                 | 76.5             | 74.6                | 1.84        |
| PULLE                 | Greater oppr. to develop specialty              | 74.4                   | 75.7                 | 86.3             | 85.5                | 21.00 ***   |
| PULLF                 | More organized, ordered envir.                  | 73.5                   | 73.3                 | 78.9             | 74.6                | 4.32        |
| PULLG                 | More satisfying social/cultural life            | 33.3                   | 37.0                 | 23.6             | 27.3                | 19.49 ***   |
| PULLH                 | Proximity to research and innov. centers        | 51.3                   | 38.7                 | 71.6             | 70.9                | 98.40 ***   |
| PULLI                 | Spouse's preference or job                      | 12.0                   | 23.0                 | 22.1             | 25.5                | 7.36 *      |
| PULLJ                 | Better educational opport. for children         | 21.4                   | 19.3                 | 18.7             | 29.1                | 3.69        |
| PULLK                 | Need to finish or continue with current project | 23.9                   | 21.3                 | 34.8             | 34.6                | 20.26 ***   |
| PULLL                 | Other                                           | 4.3                    | 4.7                  | 2.9              | 5.5                 | 2.49        |

Note: \*\*\*p < 0.001, \*\*p < 0.005, \*p < 0.010

<sup>‡</sup>Marked as "Very Important" or "Important" by Respondents



Table 6.27 gives the breakdown of the push-pull factors according to the return intention of respondents. With few exceptions, a greater proportion of the respondents who are unlikely to return rate each of the push and pull factors as being “important” or “very important”. Therefore, it is difficult to determine which factors will be significant in the empirical analysis of return intentions.

Table 6.28 gives the top five push and pull factors according to each return intention category (made compact by combining adjacent categories as explained in the notes to the table). Almost 90 percent of respondents who are unlikely to return have marked economic instability as an important push reason, compared to 74 percent for those who are “somewhat likely to return” and 66 percent for those who are “likely to return”. Three-quarters of those who are somewhat likely or unlikely to return have marked low salary levels in Turkey as an important push factor, while only two-thirds of those who are likely to return have done so. Higher salary in the current country of residence is also an important pull factor for a majority of respondents at each level of return intention. Greater opportunities for developing specialty and greater advancement opportunities in profession are also among the top five pull factors. The pull factors are, in general, chosen as important by a greater proportion of respondents compared to the push factors. This is to be expected since respondents are likely to give more weight to their current surroundings rather than the environment they left behind in Turkey. Similarly, one would expect push factors to be more prominent in a survey on the brain drain “e.g., intention to go overseas” conducted within Turkey.

### **6.3.7 Compulsory Military Service as a Reason for Not Returning**

The military service requirement for males in Turkey is generally viewed as a career interruption. For a considerable number of male respondents, postponing their military service was an important reason for pursuing study and work opportunities overseas. Military service in Turkey ranges between 15 to 18 months, and thus represents a significant break from participating in the labor force. The time spent out of the labor market signifies a greater economic loss for the university-educated population in Turkey, since, as corroborated by empirical studies, the economic returns to education are highest at the tertiary level. The time lapse can also lead to significant skill erosion and lower

Table 6.27 Return Intentions<sup>††</sup> and Push and Pull Factors Viewed as Important<sup>†</sup> by Students (%)

| Push and Pull Factors                                 | Likely to<br>Return<br>(n = 160) | Somewhat<br>Likely to<br>Return<br>(n = 694) | Unlikely to<br>Return<br>(n = 241) | $\chi^2(2)$ |     |
|-------------------------------------------------------|----------------------------------|----------------------------------------------|------------------------------------|-------------|-----|
|                                                       |                                  |                                              |                                    |             |     |
| PUSHA: Low income in occupation                       | 65.6                             | 74.5                                         | 75.5                               | 5.94        | **  |
| PUSHB: Little opport. For advancement in occupation   | 58.1                             | 74.6                                         | 71.4                               | 17.41       | *** |
| PUSHC: Limited job opport. in specialty               | 40.0                             | 62.4                                         | 60.2                               | 27.18       | *** |
| PUSHD: No opportunity for advanced training           | 50.0                             | 58.4                                         | 61.4                               | 5.37        | *   |
| PUSHE: Away from research centers and advances        | 51.3                             | 58.2                                         | 65.2                               | 7.86        | **  |
| PUSHF: Lack of financial resources for business       | 20.6                             | 37.5                                         | 34.9                               | 16.36       | *** |
| PUSHG: Less than satisfying social/cultural life      | 13.8                             | 21.5                                         | 33.2                               | 22.84       | *** |
| PUSHH: Bureaucracy, inefficiencies                    | 68.8                             | 69.2                                         | 79.3                               | 9.51        | *** |
| PUSHI: Political pressures, discord                   | 56.9                             | 54.9                                         | 68.9                               | 14.53       | *** |
| PUSHJ: Lack of social security                        | 41.3                             | 49.1                                         | 64.3                               | 24.11       | *** |
| PUSHK: Economic instability                           | 65.6                             | 73.9                                         | 89.6                               | 35.78       | *** |
| PUSHL: Other                                          | 6.3                              | 6.1                                          | 15.4                               | 21.61       | *** |
| PULLA: Higher salary or wage                          | 59.0                             | 77.9                                         | 85.8                               | 40.07       | *** |
| PULLB: Greater advancement oppr. in profession        | 67.7                             | 83.9                                         | 86.7                               | 27.75       | *** |
| PULLC: Better work environment                        | 59.0                             | 67.3                                         | 75.0                               | 11.48       | *** |
| PULLD: Greater job availability in specializ.         | 55.9                             | 76.7                                         | 83.3                               | 41.37       | *** |
| PULLE: Greater oppr. to develop specialty             | 72.1                             | 83.8                                         | 83.8                               | 12.83       | *** |
| PULLE: More organized, ordered envir.                 | 66.5                             | 74.7                                         | 88.8                               | 30.39       | *** |
| PULLG: More satisfying social/cultural life           | 16.2                             | 25.3                                         | 45.8                               | 50.88       | *** |
| PULLH: Proximity to research and innov. centers       | 54.7                             | 59.2                                         | 67.5                               | 7.70        | **  |
| PULLI: Spouse's preference or job                     | 13.7                             | 20.7                                         | 28.8                               | 13.63       | *** |
| PULLJ: Better educational opport. for children        | 16.8                             | 17.2                                         | 28.8                               | 15.99       | *** |
| PULLK: Need to finish / continue with current project | 31.7                             | 29.4                                         | 30.4                               | 0.36        |     |
| PULLL: Other                                          | 2.5                              | 3.2                                          | 5.8                                | 4.29        |     |

Notes: \*\*\*p < 0.001, \*\*p < 0.005, \*p < 0.010

<sup>†</sup> Marked as "Very Important" or "Important" by Respondents

<sup>††</sup> The six categories of the return intentions variable have been collapsed into 3 as follows:

"Likely to Return" = "Return immed. w/o Completing Studies" + "Return immed. after Completing Studies"

"Somewhat Likely to Return" = "Return, but not soon after completing studies" + "Probably Return"

"Unlikely to Return" = "Return Unlikely" + "Definitely Not Return"

**Table 6.28 Top Five Push and Pull Factors according to Return Intentions**

| <b>PUSH Factors</b>                        |                                              |          |
|--------------------------------------------|----------------------------------------------|----------|
| <b>Likely to Return (n = 160)</b>          |                                              | <b>%</b> |
| PUSHH                                      | Bureaucracy, inefficiencies                  | 68.8     |
| PUSHA                                      | Low income in occupation                     | 65.6     |
| PUSHK                                      | Economic instability                         | 65.6     |
| PUSHB                                      | Little opport. For advancement in occupation | 58.1     |
| PUSHI                                      | Political pressures, discord                 | 56.9     |
| <b>Somewhat Likely to Return (n = 694)</b> |                                              | <b>%</b> |
| PUSHB                                      | Little opport. for advancement in occupation | 74.6     |
| PUSHA                                      | Low income in occupation                     | 74.5     |
| PUSHK                                      | Economic instability                         | 73.9     |
| PUSHH                                      | Bureaucracy, inefficiencies                  | 69.2     |
| PUSHC                                      | Limited job opport. in specialty             | 62.4     |
| <b>Unlikely to Return (n = 241)</b>        |                                              | <b>%</b> |
| PUSHK                                      | Economic instability                         | 89.6     |
| PUSHH                                      | Bureaucracy, inefficiencies                  | 79.3     |
| PUSHA                                      | Low income in occupation                     | 75.5     |
| PUSHB                                      | Little opport. for advancement in occupation | 71.4     |
| PUSHI                                      | Political pressures, discord                 | 68.9     |
| <b>PULL Factors</b>                        |                                              |          |
| <b>Likely to Return (n = 160)</b>          |                                              | <b>%</b> |
| PULLE                                      | Greater oppr. to develop specialty           | 72.1     |
| PULLB                                      | Greater advancement oppr. in profession      | 67.7     |
| PULLF                                      | More organized, ordered envir.               | 66.5     |
| PULLA                                      | Higher salary or wage                        | 59.0     |
| PULLC                                      | Better work environment                      | 59.0     |
| <b>Somewhat Likely to Return (n = 694)</b> |                                              | <b>%</b> |
| PULLB                                      | Greater advancement oppr. in profession      | 83.9     |
| PULLE                                      | Greater oppr. to develop specialty           | 83.8     |
| PULLA                                      | Higher salary or wage                        | 77.9     |
| PULLD                                      | Greater job availability in specializ.       | 76.7     |
| PULLF                                      | More organized, ordered envir.               | 74.7     |
| <b>Unlikely to Return (n = 241)</b>        |                                              | <b>%</b> |
| PULLF                                      | More organized, ordered envir.               | 88.8     |
| PULLB                                      | Greater advancement oppr. in profession      | 86.7     |
| PULLA                                      | Higher salary or wage                        | 85.8     |
| PULLE                                      | Greater oppr. to develop specialty           | 83.8     |
| PULLD                                      | Greater job availability in specializ.       | 83.3     |



productivity upon resumption of career-related or educational pursuits. The career break may be even more crucial for those with advanced graduate degrees who are pursuing careers in academia and in cutting-edge occupations in which skills must be renewed or upgraded continuously.

In 1980, an important change was made in the military service law. Individuals working abroad for at least three years were allowed exemption from long term military service in return for the payment of approximately € 5,000. Instead of the 18 months of regular service, they were required to finish only one month of basic military training. Several other important changes were made in the military service system in 1992, which include the shortening of service duration to 15 months and the extension of the short term military service in return for fees to those living in Turkey. This exemption from long term service, however, could take place only through legislation during periods when the supply of new recruits exceeded the military's demand<sup>5</sup>. While compulsory military service was not listed as a "push" factor in the survey questionnaire, many male respondents indicated that for them and for many of their friends delaying or shortening military service duty played an important role in the decision to not return. One respondent explained in this way:

Compulsory military service is perhaps one of the most important reasons why Turks studying abroad, particularly the male students pursuing a masters degree, delay returning to Turkey. Almost all of the male students studying abroad plan to work three years abroad in order to qualify for short-term military service. Some of these students return to Turkey after three years but others want to continue with their careers abroad and so make plans for permanent settlement in their country of work.

A 25-year-old master's student studying in the United States

### **6.3.8 Views of National Scholarship Recipients**

The Ministry of Education (MEB), the Higher Education Council (YÖK) and the Turkish Academy of Science (TÜBİTAK) all award scholarships in return for compulsory

---

<sup>5</sup> Most recently, a law was passed in 1999 allowing those born before 1973 to take advantage of short-term military service provided they would pay the fee of around € 7,500 to € 10,250. Those born before 1960 were allowed to bypass the one month basic military training if they wished. The demand for short term military duty was huge, but not everyone who wanted to benefit from it did, either because of the age limit or the high exemption fee. As a result, some of those who have not completed their military service are waiting for a new law to pass. In the mean time, education and training abroad allow many to delay their military duty, and after three years of full-time work abroad they qualify for short term service anyway, though subject to a higher fee.

academic service, usually to be served in the state universities of Turkey. As indicated in Chapter Four, non-returning scholarship recipients have become a concern. While a greater percentage of students who have an academic service obligation are returning compared to private students, the significant number of non-returning scholarship recipients point to the lack of efficiencies within the scholarship system and to a lack of planning in terms of making the return home more productive for both the recipient and for the development of the higher education system. One respondent, who returned to Turkey to complete her compulsory academic service, was dismayed to learn that her university did not have a program in her specialization. Her requests to transfer to another university that included her field of study were turned down without explanation, and her attempts to engage in research projects were mired in bureaucratic obstacles. A different respondent listed the following deficiencies of the scholarship and higher education system:

1) There are no facilities or the department in the specific university [in Turkey] which I have been funded through. The [rector] of the university (I think he is really like that) is thinking of assigning me to the technical college. I do not see any reasons to send me studying abroad for that need. I bet just an instructor with a BS degree would be sufficient... 2) YÖK spent almost \$90,000 on me, excluding the tuition fees for four years. So it might have been about \$140,000 if I had not received a tuition waiver. However, they do not want to spend any more money for us to establish a lab or to bring our own software, computers, equipments when we return. I guess for my particular case, I need to have \$10,000-\$20,000 (It seems high but I can earn this money within one year here) to establish my work environment in Turkey in order to be successful and productive for my country. Otherwise, it is not making sense just to bring people back immediately after their graduation without technology or the things they need. 3) I need to spend a few more years here before going back to learn really what the overall picture is. The Ph.D. is so specialized that I don't think [it is sufficient] for a person to continue with his/her career without some other sources. I believe there should be [more] inputs, supportive information, and environment for us to be fruitful and productive. These are again not provided in Turkey.

A frustrated participant made the following comment:

Beyin göçünü biz isteyerek yapmıyoruz. Bizi buna itekliyorlar. Biz buraya geldikten sonra YÖK olsun MEB olsun bizimle hiç iyi yönde ilgilenmiyorlar. Hep karşımıza bir sürü zorluk çıkartıp bezdiriyorlar. Aslında hepimizin ytreği gelmek için yanıp tutuşuyor. Ama burada doktorasını deprem üzerine yapan İnşaat Mühendisi arkadaşımızın Türkiye'ye döndükten sonra Kayseri Milli Eğitim Müdürlüğüne memur olarak atandığını öğrendikten sonra içimiz kan ağlıyor ve Türkiye'ye dönme hevesimiz, ateşimiz, aşkımız zarar görüyor.

To summarize, these examples illustrate that the advanced education and training received abroad is not being put to the best possible use for both the returnees and the higher education system. As the anecdotal evidence indicates, scholarship recipients have, by and

large, come to share a negative perception about working conditions in the universities where they have to complete their compulsory academic service, especially the newly established universities located in less developed regions. These impressions, in turn, have a negative impact on the decision to return to Turkey for some. Despite the dissatisfactions outlined above, the current survey results indicate that national scholarship recipients are more likely to be returning to Turkey immediately after completing their studies: 37.2 percent indicate they will return immediately after completing their studies compared to 8.6 percent for the remainder.

## 6.4 A Closer Look at Professionals

### 6.4.1 Highest Degree Held and Field of Highest Degree

A majority of respondents hold a masters degree (41%); this is followed by those with doctorate (37%) and bachelors degrees (22%). The most common field of study at all levels of education is the engineering and technical sciences, followed by economic and administrative sciences (see Table 6.29). These two broad fields account for 84%, 89% and 70% of respondents with bachelors, masters and doctoral degrees, respectively. The mathematical and natural sciences, and the medical and health sciences also accounts for a significant proportion—more than one-fifth—of doctorate holders. These patterns, including the greater emphasis on technical fields, are possibly a reflection of the demand for skilled foreign workers in the country of residence.

Table 6.29 Highest Degree Held and Field of Highest Degree (%)

| Highest Degree Field                 | Highest Degree              |         |           |
|--------------------------------------|-----------------------------|---------|-----------|
|                                      | Bachelors                   | Masters | Doctorate |
| Engineering and Technical Sciences   | 62.2                        | 51.5    | 52.9      |
| Economic and Administrative Sciences | 22.2                        | 37.6    | 17.3      |
| Architecture and Urban Planning      | 4.4                         | 2.6     | 2.0       |
| Math and Natural Sciences            | 3.6                         | 3.4     | 11.5      |
| Social Sciences                      | 3.6                         | 2.8     | 4.2       |
| Educational Sciences                 | 1.5                         | 0.6     | 0.2       |
| Medical and Health Sciences          | 1.5                         | 0.4     | 10.8      |
| Language and Literature              | 0.7                         | 0.2     | 1.1       |
| Arts                                 | 0.4                         | 0.8     | 0.0       |
| Total                                | 100.0                       | 100.0   | 100.0     |
| <i>n</i>                             | 275                         | 497     | 452       |
| Test of Independence                 | $\chi^2(16) = 152.18^{***}$ |         |           |

Note: \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$

Where a respondent receives his/her highest degree may also be of significance. Table 6.30 below gives both the level and country of highest degree of respondents. More than two-thirds have obtained their highest degrees from a foreign country and this is generally at the masters or doctoral level. Of those who received their highest degree from Turkey, more than half hold a bachelors degree, about a third hold a masters degree and only one in seven hold a doctorate.

**Table 6.30 Highest Degree by Level and Country (%)**

| Highest Degree       | Country of Highest Degree  |        |
|----------------------|----------------------------|--------|
|                      | Foreign Country            | Turkey |
| Bachelors            | 7.3                        | 55.9   |
| Masters              | 45.5                       | 29.8   |
| Doctorate            | 47.2                       | 14.4   |
| Total                | 100.0                      | 100.0  |
| <i>n</i>             | 841                        | 383    |
| Test of independence | $\chi^2(2) = 369.90^{***}$ |        |

Note: \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$

#### 6.4.2 Stay Duration and Return Intentions

One of the purposes of this thesis is to do an econometric investigation of the determinants of return intentions to Turkey. Before proceeding with the empirical analysis of the determinants of return intentions, it may be useful to do a preliminary analysis of the relationship between some of the variables of interest. A very useful inductive method for analyzing and interpreting the associations in large datasets comprised of categorical variables is the technique called *correspondence analysis*. This methodology allows the associations between the categories of a set of variables to be described in terms of a small number of dimensions. It is thus similar to principal components analysis, which is used to uncover common dimensions among a set of continuous variables. One of the advantages of correspondence analysis is that it doesn't require making any restrictive assumptions about the characteristics of the dataset (see Clausen, 1998 for further details). This technique is used to examine the relationship between stay duration, initial return intentions and current return intentions in this section.

Simple correspondence analysis (CA) gives a visual depiction of the relative proximity between the categories of two categorical variables as measured by the chi-square distance. Figure 6.12 illustrates the relationship uncovered by CA between the responses given by survey participants on their initial and current intentions about returning to Turkey, and their length of stay in the current country of residence. The boxed categories represent current return intentions, while the remaining points represent the categories of the combined 'stay duration' and 'initial intention' variables. The initial intention variable has three categories—return, uncertain, and stay—that are indicated by R, U, and S respectively.

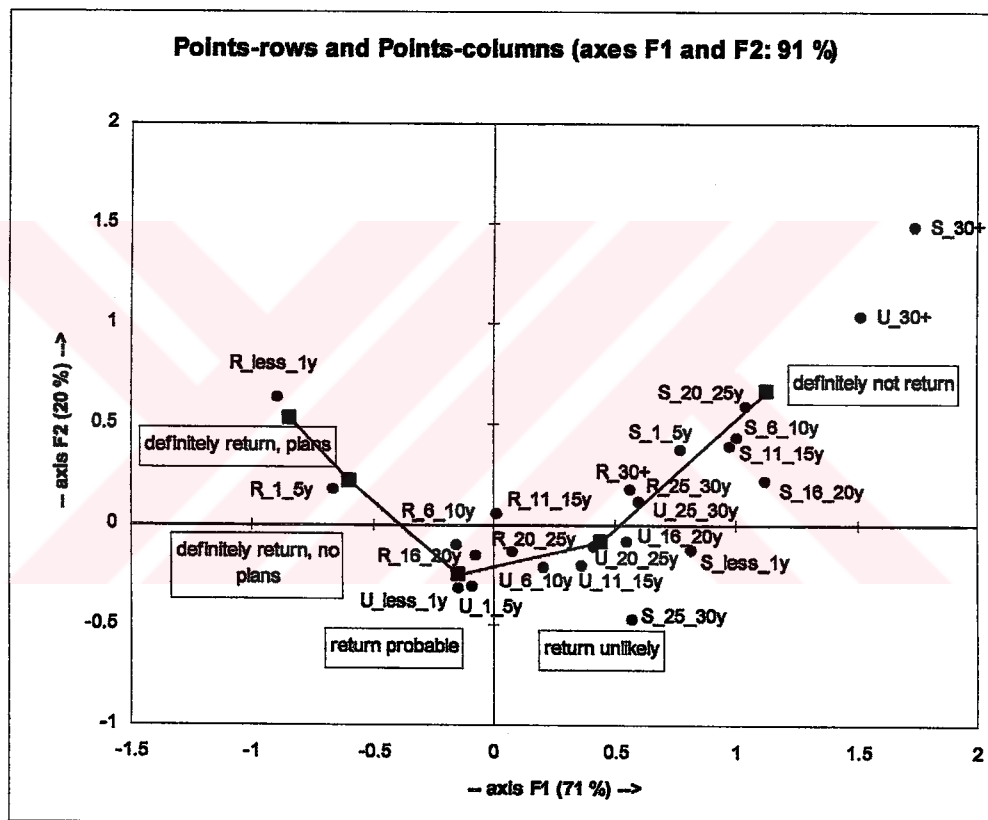


Figure 6.12 Correspondence Analysis of Initial and Current Return Intentions and Stay Duration

Two things are noteworthy: first, initial intentions appear to be positively associated with current return intentions, and secondly, return intentions also appear to weaken with the length of stay. For example, survey participants who have stayed for less than a year in their current country of residence and who have also indicated an initial intention to return are associated with definite return plans. Return plans weaken for the

group with initial return intention when the length of stay increases to between one and five years, and further still when the duration of stay is longer than five years. The same pattern holds for those who were initially uncertain about returning; as stay duration increases, the likelihood of returning declines. Those with an initial intention of not returning (staying) lie close to the “unlikely to return” and “definitely not return” categories regardless of stay duration.<sup>6</sup>

#### 6.4.3 Return Intentions According to Location of Highest Degree

In Figure 6.13, correspondence analysis is used to reveal the response pattern of three separate groups in terms of their current intentions about returning to Turkey. The three groups are 1) those who have obtained their highest tertiary-level degree from a Turkish university, represented by *HDTUR*; 2) those holding their highest degree from a foreign institution and whose first full time job after completing their studies is located outside Turkey, whether in the same city or same country as their studies or in another country [*HDFOR(samecity)*; *HDFOR(samecountry)*; *HDFor(dif\_country)*]; and 3) those with a foreign highest degree who initially returned to Turkey to work after completing their studies and then went abroad to work, represented by *HDFOR(Turkey)*.

The upper-left cluster of Figure 6.13 reveals that those who have obtained their highest degree from a Turkish university appear to be closely associated with definite return intentions. The second group, forming the bottom left cluster, represents the phenomenon of student non-return—those who have remained abroad to work after completing their studies. The members of this group appear less definite about their return intentions; the co-ordinates of the points representing this group lie close to the “return probable” and “return unlikely” points. The third group forming the center-right cluster differs from the other two in that it comprises those who returned to Turkey to work at a full-time job immediately after completing their studies at a foreign university and who then decided to go abroad again to work. The members of this group appear more likely to indicate that they will definitely not return to Turkey. If intentions translate into reality, it would appear that the migration of professionals—or brain drain in the traditional sense—as measured by those

---

<sup>6</sup> There is the possibility that the current intentions of respondents may cloud their memory of their initial intentions about returning. One way of remedying this would be to undertake a longitudinal study of the same individuals over time and comparing their recent responses to previous responses.



whose highest degree is from a Turkish university, is less of a concern than non-returning students for Turkey's brain drain problem. Even more troublesome is the third group of returning students who have experienced working in Turkey after completing their studies; they appear to be the least likely to return to Turkey.

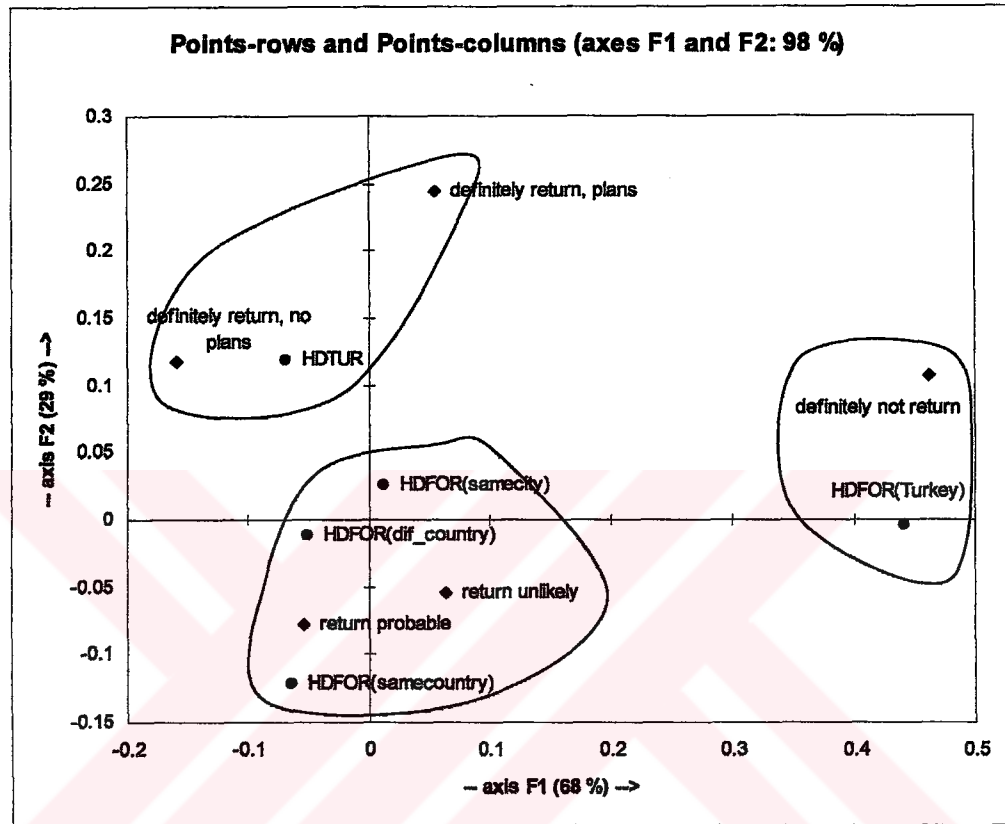


Figure 6.13 Correspondence Analysis of Return Intentions: Student Non-return versus Professional Migration

#### 6.4.4 Return Intentions by Level of Highest Degree

Disaggregating the three groups in Section 6.4.2 further by level of highest degree (bachelors, masters, or doctorate) also reveals interesting information. Figure 6.14 presents the correspondence analysis of return intentions for respondents differentiated by their level and location of highest degree (*FOR\_bach*, *FOR\_mast*, *FOR\_PHD*; *HDTUR\_bach*, *HDTUR\_mast* and *HDTUR\_PHD*) and whether they initially started work in Turkey or a foreign country after completing their studies (*workTUR*, *workFOR*). Since the level of highest degree is an indication of the level of specialization achieved by the respondent through formal study, a pattern of non-return for students with foreign doctorate degrees

will provide some confirmation that specialized training in a foreign country has an adverse impact on return intentions.

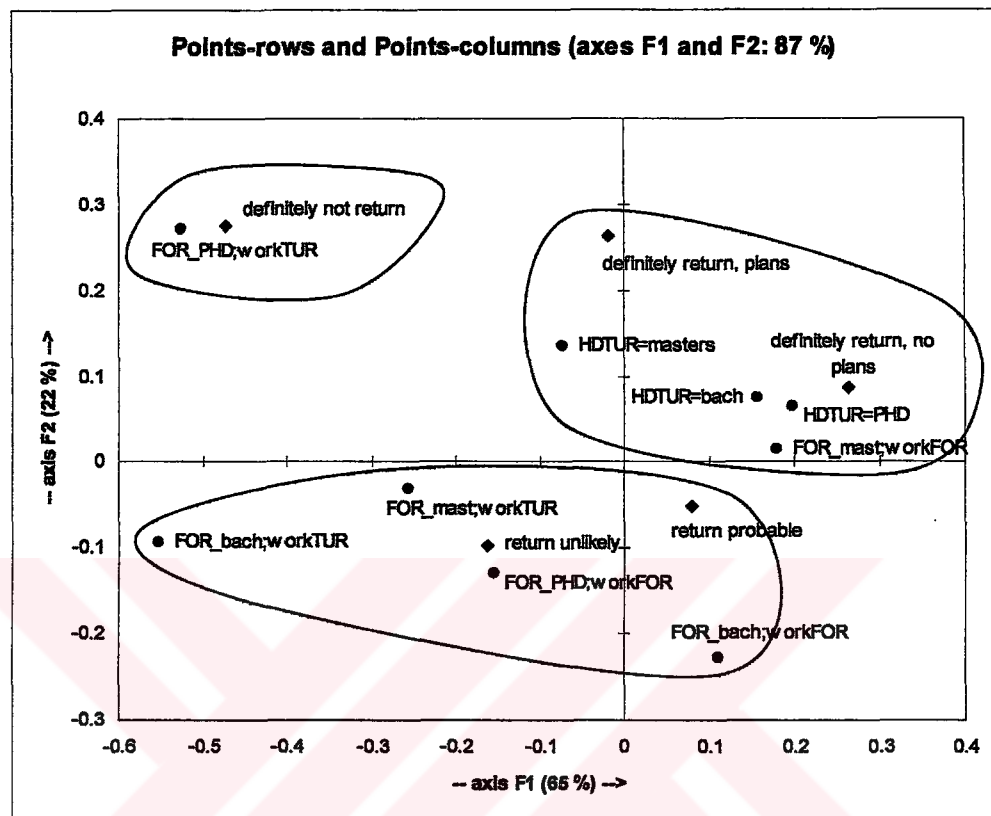


Figure 6.14 CA of Return Intentions and Level of Highest Degree: Student Non-return versus Professional Migration

Figure 6.14 shows that respondents with a foreign highest degree, regardless of level, are more disinclined to return than those holding degrees from Turkish universities. Respondents with foreign doctorate degrees who also have some work experience in Turkey after completing their studies constitute the group that is least associated with return intentions. The following comments by the survey participants are insightful:

I come from a family of professors and I lived in a university campus (lojman) throughout all my life in Turkey. I have seen some cases of failed attempts to return to Turkey after getting a degree abroad. People come back after 5-10 years and get a university position, but re-adaptation is not very easy. Your own country becomes harder to adapt to than US was when you left Turkey years ago. Turkey is easier to live in if you haven't seen the other side and what's worse is that the changes Turkey goes through "culturally" is a lot faster than what you can find here in the US.

There was no question [in the survey] about job experience (length of time, etc.) in Turkey. In my case my first 4 years of employment were in Turkey, as well as one year of sabbatical. It might have shed some light on informed comparisons on the part of those who've elected to remain abroad.

#### 6.4.5 Respondents by Occupation and Job Activities

A little over one-fifth of the sample of professionals is working in educational occupations, almost entirely at the university level. The sample is roughly equally divided between management, computer & mathematical science, architecture & engineering, education and the remaining occupations. The first four broad occupation groups thus account for about 80 percent of the total sample. The remaining fifth is divided mainly between those in business and finance and those in the life, physical and social sciences (see Tables A.21 and A.22 for more detailed groupings).

Table 6.31 Broad Occupation Groups and Return Intentions

| Occupation             | <i>n</i> | DRP<br>(y = 1) | DRNP<br>(y = 2) | RP<br>(y = 3) | RU<br>(y = 4) | DNR<br>(y = 5) |
|------------------------|----------|----------------|-----------------|---------------|---------------|----------------|
| Managerial             | 253      | 3.2            | 22.5            | 35.2          | 34.0          | 5.1            |
| Business / Finance     | 87       | 2.3            | 29.9            | 40.2          | 26.4          | 1.2            |
| Computer & Math        | 255      | 4.3            | 26.3            | 35.3          | 27.5          | 6.7            |
| Arch / Engineering     | 234      | 4.7            | 23.1            | 35.0          | 29.9          | 7.3            |
| Social & Life Sciences | 83       | 3.6            | 25.3            | 32.5          | 31.3          | 7.2            |
| Education              | 263      | 5.7            | 14.5            | 32.7          | 38.4          | 8.8            |
| Other                  | 49       | 8.2            | 18.4            | 14.3          | 51.0          | 8.2            |
| Total                  | 1,224    | 54             | 272             | 416           | 401           | 81             |

Test of significance:

$$\chi^2(7) = 46.85^{***}$$

Notes: \*\*\*p < 0.001, \*\*p < 0.005, \*p < 0.010; Cell percentages sum to 100 across each row. Lower values for y indicate greater return intentions.

Table 6.32 Occupation Categories Sorted by Return and Non-Return Intentions

| Occupation             | %<br>DRP/DRNP | Occupation             | %<br>RU/DNR |
|------------------------|---------------|------------------------|-------------|
| Business / Finance     | 32.2          | Other                  | 59.2        |
| Computer & Math        | 30.6          | Education              | 47.2        |
| Social & Life Sciences | 28.9          | Managerial             | 39.1        |
| Arch / Engineering     | 27.8          | Social & Life Sciences | 38.6        |
| Other                  | 26.5          | Arch / Engineering     | 37.2        |
| Managerial             | 25.7          | Computer & Math        | 34.1        |
| Education              | 20.2          | Business / Finance     | 27.6        |

Table 6.31 presents the occupation groupings by return intention. A significant chi-square statistic indicates that return intentions differ by occupation classification. However, much of this variation appears to be between education (academe), where return intentions are weakest, and the other groups. In Table 6.32, the two strongest (DRP and DRNP) and weakest (RU and DNR) return intention categories are combined together, and the occupation groups are sorted according to the two new return intention categories. Respondents working in education and in “other” occupations are the least likely to return, while those in business or finance are the least likely to indicate non-return intentions. In terms of definite return plans, those in the education/academic occupations appear to have the weakest return intentions: only one-fifth of respondents in education are definitely planning to return. The proportion of respondents with definite return plans does not appear to be significantly different from each other in the other occupations: approximately 30 percent have definite return intentions.

**Table 6.33 Percentage of Time Spent on Various Job Activities (valid  $n = 1186$ )**

| Code   | Activities                             | <20% | 20-40% | 40-60% | 60-80% | 80-100% | >50% | Top <sup>a</sup> Activ. |
|--------|----------------------------------------|------|--------|--------|--------|---------|------|-------------------------|
| ACTV1  | Teaching                               | 77.3 | 11.1   | 8.9    | 1.8    | 0.9     | 6.7  | 13.7                    |
| ACTV2  | Applied Research                       | 67.2 | 19.1   | 8.6    | 2.5    | 2.5     | 9.1  | 17.6                    |
| ACTV3  | Basic Research                         | 79.1 | 12.7   | 4.7    | 2.5    | 1.1     | 5.8  | 10.0                    |
| ACTV4  | Development                            | 73.8 | 15.4   | 7.3    | 1.4    | 2.3     | 6.6  | 14.0                    |
| ACTV5  | Computer Related                       | 64.5 | 12.1   | 9.5    | 4.9    | 8.9     | 19.4 | 26.6                    |
| ACTV6  | Administrative Activities, Supervision | 80.8 | 11.6   | 4.8    | 1.1    | 1.7     | 5.5  | 10.5                    |
| ACTV7  | Professional Services                  | 84.2 | 2.8    | 3.5    | 3.3    | 6.2     | 11.6 | 14.0                    |
| ACTV8  | Quality Control, Production Management | 95.3 | 2.5    | 1.1    | 0.6    | 0.5     | 1.8  | 3.2                     |
| ACTV9  | Accounting, Contracts                  | 97.0 | 1.9    | 0.6    | 0.3    | 0.3     | 0.8  | 1.7                     |
| ACTV10 | Marketing, Consumer Services           | 91.4 | 4.3    | 1.9    | 0.6    | 1.8     | 3.7  | 6.0                     |
| ACTV11 | Other                                  | 95.2 | 1.3    | 1.3    | 0.8    | 1.5     | 3.0  | 4.0                     |
| R&D    | Research & Development (2+3+4)         | 35.2 | 18.4   | 20.1   | 12.4   | 14.0    | 35.5 | 45.6                    |

Notes: R & D activities are applied and basic research and development.

<sup>a</sup>Top activity is defined as the activity that respondents spend most of their time on compared to other activities.

The percentage of time spent on various job activities is presented in Table 6.33. These job activities are the same as those in the US National Science Foundation’s Survey of Doctorate Recipients. One-fifth of respondents spend more than half their time on computer related activities, which is not surprising since a good proportion of participants

are in computer related occupations. The relationship between job activities and occupations is given in Table A.23 in Appendix A. More than a third of respondents spend the majority of their time in research and development activities. These activities constitute highly specialized work that may be difficult to find in Turkey. One would, therefore, expect return intentions to decrease with increases in the R&D content of the overseas job. However, there is no discernible positive or negative association between the R&D intensity of job activities and return intentions (Table A.24, Appendix A).

#### **6.4.6 Work Experience and Overseas Training**

Previous work experience, in Turkey or abroad, is likely to be an important determinant of return intentions. The great majority (70 percent) of the survey participants have held one or more full-time jobs in Turkey (Table A.23, Appendix A). Work experience in Turkey could have two possible effects on return intentions. Respondents who have held a full time job in Turkey have firsthand knowledge of the work environment and work conditions in Turkey and are, therefore, able to make comparisons based on this information. Those who judge work conditions to be worse in Turkey are more likely to remain abroad. Having work experience in Turkey may also increase the chance of return since individuals with previous experience in Turkey can perhaps re-adapt more easily to an environment they already have knowledge about.

Full-time overseas work experience is also expected to be important in determining who is more likely to return to Turkey. Many of the respondents (about 30 percent) have only one to two years of overseas job experience. The sample, in general, is tilted toward those with fewer years of job experience (Table A.24 and Table A.25, Appendix A). Return intentions are expected to decrease with the number of years of work experience in the host country (see Section 3.3.4 in Chapter Three).

Transfer of knowledge and technology may be difficult when the training received abroad is highly specific to an organization or to an industry which is not developed in the home country (see Section 3.3.3, Chapter Three). To determine the impact of different types of work experience (on-the-job training) and formal training, questions were asked on the type of training received abroad—whether general, specific to industry or specific to the current organization. The tabulations for on the job training and formal training are given in Table 6.34 and Table 6.35 respectively.

**Table 6.34 Type of On the Job Training and Return Intentions (%) (valid n = 1213)**

| Return Intentions           | Type of On the Job Training |                      |                                   |                                   | Total<br>(n = 1,213) |
|-----------------------------|-----------------------------|----------------------|-----------------------------------|-----------------------------------|----------------------|
|                             | None<br>(n = 524)           | General<br>(n = 230) | Industry<br>Specific<br>(n = 353) | Organiz.<br>Specific<br>(n = 111) |                      |
| Definitely return, plans    | 5.2                         | 2.6                  | 4.3                               | 5.4                               | 4.4                  |
| Definitely return, no plans | 19.9                        | 25.7                 | 24.4                              | 19.8                              | 22.3                 |
| Return probable             | 32.1                        | 36.1                 | 35.4                              | 35.1                              | 34.1                 |
| Return unlikely             | 35.3                        | 30.4                 | 30.3                              | 32.4                              | 32.7                 |
| Definitely not return       | 7.6                         | 5.2                  | 5.7                               | 7.2                               | 6.6                  |
|                             | 100.0                       | 100.0                | 100.0                             | 100.0                             | 100.0                |

Notes: Cell percentages sum to 100 across columns;  $\chi^2(12) = 11.40$

**Table 6.35 Type of Formal Training and Return Intentions (%) (valid n = 1213)**

| Return Intentions           | Type of Formal Training |                      |                                   |                                  | Total<br>(n = 1,213) |
|-----------------------------|-------------------------|----------------------|-----------------------------------|----------------------------------|----------------------|
|                             | None<br>(n = 485)       | General<br>(n = 301) | Industry<br>Specific<br>(n = 384) | Organiz.<br>Specific<br>(n = 43) |                      |
| Definitely return, plans    | 5.2                     | 3.7                  | 3.7                               | 7.0                              | 4.4                  |
| Definitely return, no plans | 19.8                    | 24.9                 | 23.7                              | 20.9                             | 22.3                 |
| Return probable             | 34.6                    | 31.9                 | 35.2                              | 32.6                             | 34.1                 |
| Return unlikely             | 33.2                    | 32.9                 | 32.3                              | 27.9                             | 32.7                 |
| Definitely not return       | 7.2                     | 6.6                  | 5.2                               | 11.6                             | 6.6                  |
|                             | 100.0                   | 100.0                | 100.0                             | 100.0                            | 100.0                |

Notes: Cell percentages sum to 100 across columns;  $\chi^2(12) = 8.87$

Only 3.5 percent of respondents have received formal training that is specific to the organization they are working for. This is a somewhat higher (about 10 percent) for informal on the job training. There does not appear to be a significant relationship between the type of training and return intentions, as one would expect.

#### 6.4.7 Respondents by Type of Organization

Close to half (46 percent) of respondents are working in multinational corporations, while 17 percent are working in other private firms. Slightly less than a third are working in a university (22 percent), research center (3 percent), or in a hospital/medical center (3 percent) (Table A.29, Appendix A). Return intentions are weaker for those working in an academic environment: 46 percent are either unlikely to return or definitely not considering returning, compared to 36 percent for the non-academic group (Table 6.36). Many (43 percent) found their current job while already in their current country of residence, while 30



Table 6.36 Return Intentions by Whether Respondent is Working in an Academic or Related Environment

| Return Intentions           | Academic2 |      |
|-----------------------------|-----------|------|
|                             | No        | Yes  |
| Definitely return, plans    | 4.0       | 5.5  |
| Definitely return, no plans | 24.5      | 16.4 |
| Return probable             | 34.7      | 32.2 |
| Return unlikely             | 30.9      | 37.4 |
| Definitely not return       | 5.8       | 8.6  |
| <i>n</i>                    | 876       | 348  |

Notes: Columns sum to 100; Academic2 refers to those working in a university, research center or hospital/medical center;  $\chi^2(4) = 15.23^{***}$  where \*\*\* denotes significance at the 1 percent significance level.

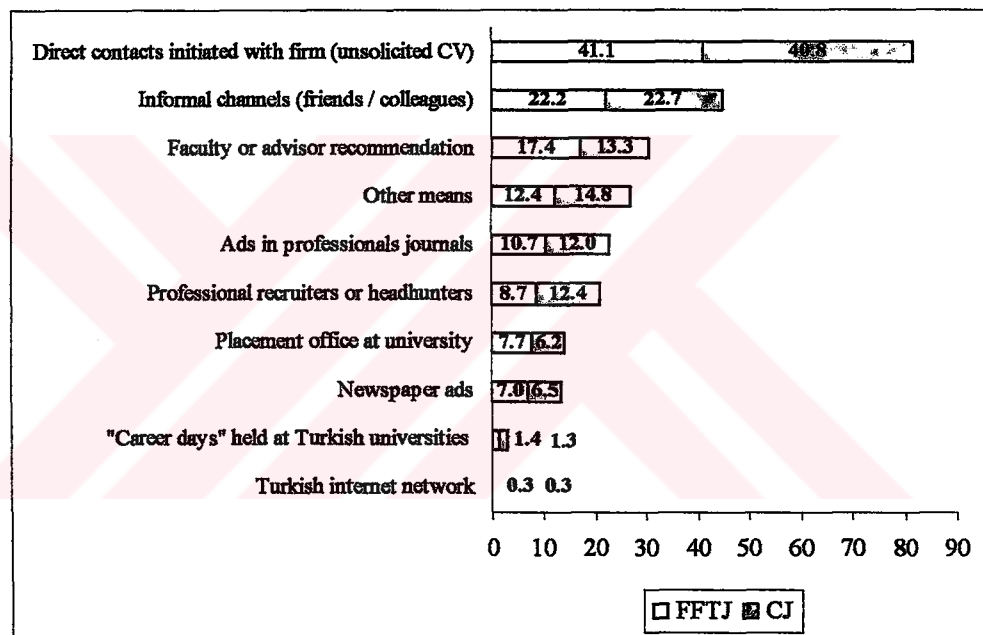


Figure 6.15 Channels for Finding First Full-Time Job Abroad (FFTJ) and Current Job (CJ) (%)

Note: The figures do not sum to 100 since more than one channel could be picked.

percent were located in Turkey and close to 30 percent were located in another country (Table A.30, Appendix A). Figure 6.15 shows the channels respondents have used to find their current job and their first full-time job abroad. It is clear that in both cases many respondents have used their own initiative to contact potential employees by sending their CVs. A greater proportion of respondents (30 percent) who found their full time job while

in Turkey or in a third country have made use of informal channels (e.g., friends and colleagues) compared to those who found their current jobs while in their current country of residence. This points to the importance of information exchange through informal channels for taking advantage of work opportunities at a global level.

#### 6.4.8 Positive Contributions to Turkey During Stay

The extent of positive contributions to Turkey during the stay abroad is given in Figure 6.16. Most respondents believe they contributed by increasing knowledge about Turkey in the country they are staying. About 40 percent are involved in lobbying activities on behalf of Turkey. Over one-third believe they have helped increase professional contacts between their colleagues in their host countries and colleagues in Turkey. Over a third has also made donations to Turkish organizations (36 percent). Some (mostly those in academe) have participated in conferences and teaching activities in Turkey, which is a potential route for knowledge transfer. Those in academe also help Turkish students find scholarships in their institutions. Some of the respondents have been very active in terms of increasing contacts and knowledge transfer between their current residence and Turkey, as the comments of one university professor clearly shows:

I spent six weeks in Turkey in 2000 visiting 8 universities (including METU) and the TUBITAK research centre, giving 25 lectures on my research programs. Over the past year I had two visiting scientists from Anadolu University in my lab working on joint projects. We are looking at organizing a conference next year in Eskisehir. Another colleague of Turkish origin who is currently in USA has organized two NATO summer schools in Kemer and I attended both as a presenter. Another colleague organized a conference in Istanbul in 1996 and is organizing another one in 2001 in Istanbul again, which I will be attending. I am working towards increasing my collaborations with colleagues in Turkey and act as a resource for them. I currently have a PhD student who is a graduate of METU.

On the other hand, others believe the right environment in Turkey must be created before their knowledge and skills can be put to efficient use:

Risk yatırımı ile uğraşıyorum. Kendi ekonomik gücüm arttığında ve Türkiye'de girişimcilik için uygun şartlar oluştuğunda bu işi ülkemde yapmak isterim. Silikon Vadisi'nde elde ettiğim tecrübe ve ilişki ağım sayesinde Türkiye'ye de daha faydalı olabilirim. Buluşu, fikri olan Türkiye'de yaşayan Türk girişimcilere elimden gelen yardımı yapmaya da çalışırım. Eğer bir Türk Teknoloji ile ilgili İş Adamları ve Girişimcileri isimli veri tabanı oluşturursanız ülkeye büyük faydanız olabilir. (I am involved in risk capital. I would like to do this in Turkey when the right conditions for entrepreneurship are created and when my own economic situation strengthens. Then I can be of greater use to Turkey through the experience I have gained and my personal network in Silicon Valley. I will do everything that I can for Turkish entrepreneurs in

Turkey who have new ideas or inventions. I believe that a database for linking Turkish businessmen and entrepreneurs in and outside Turkey will be very useful.)

I do not believe that we can help Turkey from where we are despite some of your questions along those lines. Turkey needs to create the environment to attract the talent abroad. Then again, many people wouldn't want their positions to be challenged by "outsiders".

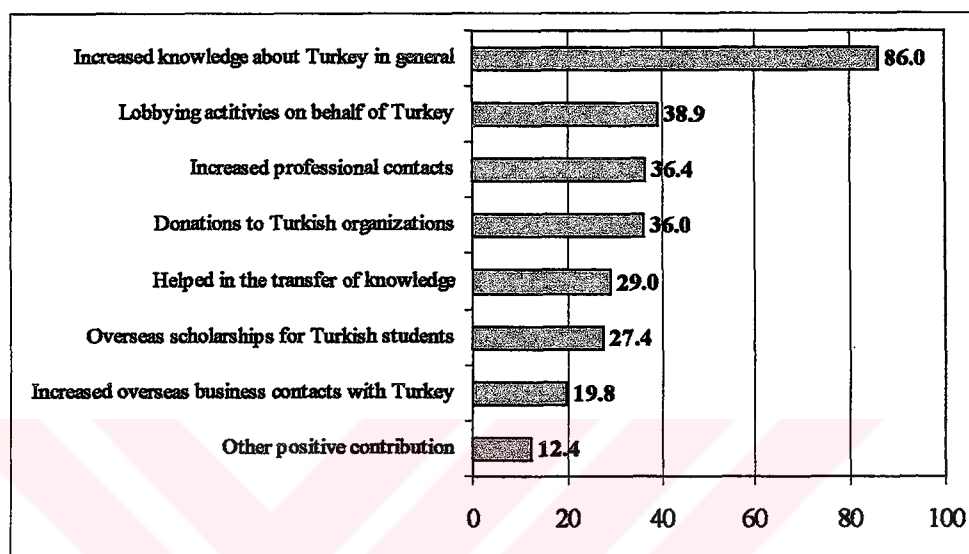


Figure 6.16 Positive Contributions to Turkey During Stay (%) ( $n = 1099$ )

*Note:* The percentages do not add to 100 since more than one item could be picked.

## 6.5 Concluding Remarks

Overseas work and study opportunities are seen by participants as a means for investing in themselves and as a way to increase their value in the marketplace at home (Turkey) and abroad. It also appears that the quality of both the work environment and the greater amount of career and study opportunities are important factors for going overseas. For those contemplating an academic career, overseas experience is often a requirement for tenure positions at some of Turkey's best universities, and this acts as a significant "push" factor. There is also a positive association between initial return intentions and current return intentions, although it is weaker for those who initially intended to return to Turkey. Return intentions weaken considerably when stay duration increases. Student non-return compared to professional migration also appears to be more significant: those with foreign degrees in the professionals survey are less likely to be returning.

The significance of the brain drain from Turkey becomes apparent when the average years of educational attainment of the adult population in Turkey is considered. In the year 2000, the average years of educational attainment of the adult (25 and older) female population was 4.6, which is below the primary level. Male educational attainment levels are somewhat higher than the female levels as a result of the gender gap in education. The adult male population had an educational attainment level that was below the middle school level but above the primary level of education.

In comparison, the respondents' parents have an average educational attainment level of nearly 11 years which is equivalent to the high school level in Turkey. There is a considerable difference of 6 years between mothers' educational attainments and the 25 and over female population. The average educational attainment level of respondents' fathers, on the other hand, is nearly 13 years. The difference between the average educational attainment level of the respondents' parents and the adult male population in Turkey is also six years. If we take into consideration that social mobility is limited, in that the probability of receiving more education and thus greater earnings is considerably lower for those with less educated parents, then these are striking figures. This suggests that Turkey is losing a significant amount of human capital that will be difficult to replace.

## **CHAPTER 7**

### **AN EMPIRICAL INVESTIGATION OF THE RETURN INTENTIONS OF TURKISH STUDENTS AND TURKISH PROFESSIONALS**

#### **7.1 Introduction**

In this chapter, the information collected through the Internet survey is used to determine the empirical importance of various factors on the return intentions of the target populations: Turkish professionals working abroad and Turkish students studying abroad. The first sample of respondents consists of individuals with bachelors or higher level degrees who were employed or who were between jobs during the period of the survey. The second sample consists of students who were in the process of obtaining a tertiary level degree from a foreign university or college. Section 7.2 presents a brief discussion of model selection and estimation methodology. The empirical specification of the model and the explanatory variables used in the empirical analysis are given in section 7.3. This is followed by the empirical investigation of the determinants of return intentions of Turkish professionals and other skilled workers in section 7.4; and by a similar analysis in section 7.5 for Turkish students studying abroad.

#### **7.2 Estimation Procedures and Model Selection**

The purpose of the empirical study is to determine the factors that are significant in explaining the skilled migration from Turkey and the non-return of Turkish students. The dependent variable is the likelihood of returning to Turkey based on the response to the question "What are your current intentions about returning to Turkey?". The following possibilities were presented to respondents in the Turkish professionals survey:

Table 7.1 Dependent Variable: Return Intentions of Turkish Professionals

| <b>RESPONSE CATEGORIES</b>                                          | <b>Label</b> | <b>Index</b> |
|---------------------------------------------------------------------|--------------|--------------|
| I will definitely return and have made plans to do so.              | <i>DRP</i>   | 1            |
| I will definitely return but have not made concrete plans to do so. | <i>DRNP</i>  | 2            |
| I will probably return.                                             | <i>RP</i>    | 3            |
| I don't think that I will be returning.                             | <i>RU</i>    | 4            |
| I will definitely not return.                                       | <i>DNR</i>   | 5            |

For the student sample, the choices forming the categories of the dependent variable “likelihood of returning to Turkey” are slightly different from the ones used for those working abroad. The table below gives these choices:

Table 7.2 Dependent Variable: Return Intentions of Turkish Students

| <b>RESPONSE CATEGORIES</b>                                         | <b>Label</b>  | <b>Index</b> |
|--------------------------------------------------------------------|---------------|--------------|
| I will return as soon as possible without completing my studies.   | <i>R_BS</i>   | 1            |
| I will return immediately after completing my studies.             | <i>R_IAS</i>  | 2            |
| I will definitely return but not soon after completing my studies. | <i>R_NSAS</i> | 3            |
| I will probably return.                                            | <i>RP</i>     | 4            |
| I don't think that I will be returning.                            | <i>RU</i>     | 5            |
| I will definitely not return.                                      | <i>DNR</i>    | 6            |

These choices form a set of ordered categories in which each consecutive category indicates an increase in intensity in the respondents' intentions to stay in their current country of residence. Because of the way the index is constructed, categories with a higher index value imply a greater intensity in feeling about not returning (staying). In the econometric analysis, this means that positive coefficients on the independent variables indicate an increase in the probability of “not returning”. However, the change in intensity between categories cannot be assumed to be uniform. Given the ordered and non-uniform nature of these choices, the appropriate model appears to be an ordered response model (Maddala, 1983). Formally, the observed discrete index is given by

$$y_i = \{1, 2, 3, \dots, J\} \quad (7.1)$$

where  $i$  indexes the observations and  $J$  is the number of categories of the dependent variable. It is assumed that a continuous, latent variable underlies the discrete, ordered



categories. This latent variable is explained by a set of observed characteristics and a random element as given below:

$$y_i^* = \beta'X_i + u_i \quad (7.2)$$

where  $y^*$  is the unobserved “return intention” variable,  $X$  is the  $(k \times 1)$  vector of explanatory variables,  $\beta$  is the parameter vector to be estimated and  $u$  is the random disturbance term. The relationship between the discrete, observed  $y$  and unobserved, continuous  $y^*$  is given as follows:

$$y_i = \begin{cases} 1 & \text{if } y_i^* \leq 0 (= \mu_1) \\ 2 & \text{if } 0 < y_i^* \leq \mu_2 \\ 3 & \text{if } \mu_2 < y_i^* \leq \mu_3 \\ 4 & \text{if } \mu_3 < y_i^* \leq \mu_4 \\ \dots & \\ J & \text{if } \mu_{J-1} < y_i^* \end{cases} \quad (7.3)$$

where  $\mu_1, \mu_2, \mu_3 \dots \mu_{J-1}$  are the threshold parameters that link  $y$  to  $y^*$ . Since the threshold parameters are not known, they are estimated along with the explanatory variable coefficients. Normalizing  $\mu_1$  to 0 will reduce the number of threshold parameters to be estimated to three (Liao, 1994).

Whether to use an ordered logit or an ordered probit model depends on the assumption made about the distribution of the error term  $u$ . Since the two models essentially give similar results, choosing one model over the other appears for the most part to be a matter of preference. When a very large number of observations are concentrated at the tails of the distribution, however, the logit specification with an underlying logistic distribution has been shown to be the appropriate specification. In this study, the ordered probit specification, which assumes an underlying normal distribution for the error term, is used. Choosing between a logit and probit model also means making an assumption about the nature of the latent dependent variable. A logit specification implies a discrete latent variable, whereas a probit specification implies a continuous latent variable (Pampel, 2000).

Given an ordered probit specification, the probability that an observed response falls into an arbitrary category  $j$  is given below as:

$$\text{Prob}(y_i = j) = \Phi(\mu_j - \beta'x_i) - \Phi(\mu_{j-1} - \beta'x_i) \quad (7.4)$$

where  $\Phi(\cdot)$  is the cumulative normal distribution. Differentiating this probability with respect to the explanatory variables gives the marginal effect of each on the probability of choosing category  $j$ . Model estimation is carried out by using maximum likelihood (ML) estimation techniques since it has been shown that ML gives unbiased and efficient estimates for nonlinear models.

Figures 7.1 and 7.2 present the observed frequencies of the dependent variable return intentions for the two samples. These figures show that the distribution of responses is concentrated in the middle rather than the extreme categories, which justifies the initial choice of an ordered probit over an ordered logit specification.

Choosing between an ordered probit or logit model also implies making the assumption that the explanatory variables of the model will have the same impact across each of the categories of the dependent variable. This is known as the “parallel regression assumption” (Long and Freese, 2001). It could well be that the coefficients of some or all of the explanatory variables are significantly different across each categorical choice, in which case alternative models must be considered, such as the multinomial logit model or generalized ordered logit / probit models. In the generalized ordered models, a separate parameter vector is estimated for each of the  $J$  categories (e.g.,  $\beta^1, \beta^2, \dots, \beta^J$ ). The parallel regression assumption may be tested with an approximate LR test or a Wald test (see Long and Freese, 2001, p. 151 for details).

After choosing an appropriate estimation method based on the characteristics of the dependent variable, a suitable model selection procedure must be decided on to determine the set of regressors to keep in the final estimation model. There are several things to note. One is that the set of possible factors (variables) presented in the bivariate analysis in Chapter Six do not have the same number of valid points (cross-sections) because of missing responses<sup>1</sup>. Including some of these regressors will come at the cost of reducing the sample size and thus the precision of the estimated parameters. On the other hand, excluding key variables will also compromise the fit of the estimated model.

---

<sup>1</sup>Table B.1 in Appendix B provide a quick reference to the associations between the dependent variables and the set of possible regressors for the professionals survey.

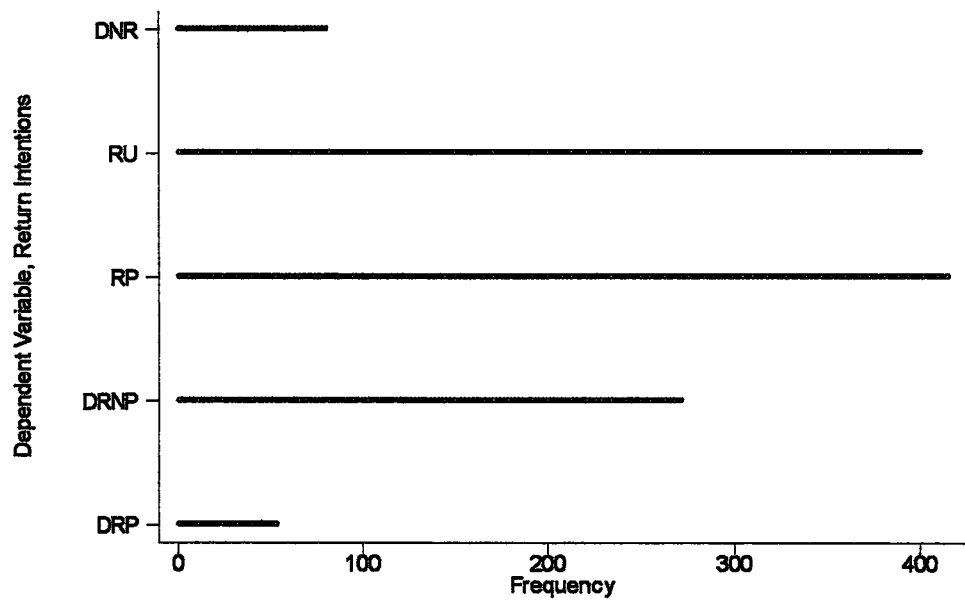


Figure 7.1. Return Intentions of Turkish Professionals, Observed Frequencies

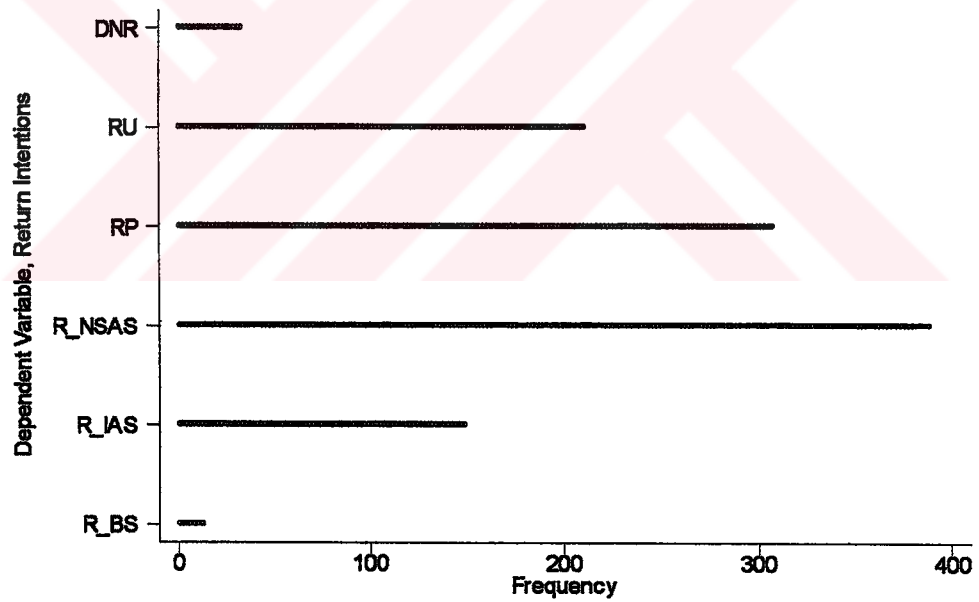


Figure 7.2. Return Intentions of Turkish Students, Observed Frequencies

The analysis in Chapter Six provides an initial criterion for reducing the number of regressors: variables with a large number of missing responses that are not significantly associated with the dependent variable(s), based on the chi-square test of independence, are excluded. The various migration theories, set out in Chapter Three, also serve to provide a guideline for keeping or excluding variables from the initial model.

After determining the initial set of explanatory variables, which are discussed in detail in Section 7.3, the next stage in model selection involves adopting an appropriate strategy for choosing the best possible model—one that fits the data well and is relatively easy to interpret. The model may be complicated by non-linearities and interactions among the regressors. Some of these significant interactions were uncovered in Chapter Six. One approach to take would be to start from a saturated model—a model that incorporates all possible variables, interactions and higher-order terms—and to use a backward elimination procedure. At each step, terms that are not statistically significant individually and that also do not contribute significantly to the fit of the model are eliminated. The elimination procedure continues until further model reduction involves a significant deterioration in model fit. The advantage of this approach is that all of the reduced or pared down models are nested in the previous models so that one could use testing procedures, such as the likelihood ratio (LR) test, that are suitable for testing nested non-linear models. Otherwise, measures of fit based on information criteria must be used to compare non-nested models or models with different sample sizes.

One difficulty of the current study is that the response rates vary considerably across different sets of questions in the survey study. For example, there is a lower response rate for questions appearing at the end of the survey than for those appearing at the beginning. This means that starting from a saturated model with all possible sets of regressors, even with the initial reduction in the variable set, leads to a significant reduction in the sample size. Another approach that can be used is that of forward selection where the explanatory variables are added sequentially to the model. The criteria for adding a variable is based on whether the new variable significantly improves the fit of the model. With this strategy, the explanatory variables that have the greatest significant bivariate association with the dependent variable are used in the initial regression; then, more complicated models are gradually built up from this preliminary model. The disadvantage of this approach is that the final model may be sensitive to the initial set of regressors and to the

order in which the remaining regressors are added. The ultimate strategy adopted in the current study is a combination of both approaches, while keeping in mind the hypotheses to be tested.

The parallel regression assumption underlying the ordered probit model is violated in both the student and professionals samples. A possibility is to estimate a multinomial logit model. The drawback of using the multinomial logit model is that it does not preserve the inherent ordering of the return intention categories and therefore does not incorporate this information when estimating the coefficients of the explanatory variables. This results in a loss in the efficiency of the estimators (Long, 1997). While the generalized ordered logit model provides an alternative model that does preserve the ordering (e.g., it is a restricted version of the multinomial logit model), it is very sensitive to low frequency counts (e.g., small cell sizes). Thus, it is often necessary to combine the dependent variable categories that have low frequencies with adjacent categories in order for the estimation procedure to work<sup>2</sup>. However, combining categories may also lead to a loss in information, especially if the underlying latent variable is multi-leveled or continuous. For example, while the “definitely not return” category has relatively few observations, it expresses a much more intense feeling about returning than the “unlikely to return” category, which is an important distinction within the context of the current study. As a result, we have chosen to present the results from the ordered probit model. A larger sample size and fewer explanatory variables would have made the use of generalized models more feasible.

### 7.3 Empirical Specification of the Model: Explanatory Variables

The models estimated in this study are based on the human capital theory of migration, which was presented in Chapter Two. Human capital theory predicts that individuals will migrate when the net present value of benefits from migration is positive. Wage differentials between the host and source countries provide the main motivation for moving to a foreign country. This basic assumption is pertinent to both skilled and non-skilled labor migration. However, since the focus is on the return intentions of skilled individuals who are currently residing outside Turkey, a slightly different set of explanatory variables may be relevant. These variables represent a combination of economic, social,

---

<sup>2</sup> The *gologit* command in Stata 7.0 was used to obtain estimates for the generalized ordered logit model. The number of categories of the dependent variable was reduced to three. These results are not included.

political, psychological and institutional factors. This section provides descriptive details of some the explanatory variables that are considered in the econometric analysis of return intentions.

### 7.3.1 Income Differentials

According to human capital theory, the difference in the expected foreign and domestic income levels is the key determinant of skilled migration. Since *expected* income is the relevant variable, employment opportunities and labor market conditions both at home and abroad play an important role in the perceptions of economic opportunity held by skilled individuals. Given the importance of perceptions in making the migration decision, a set of “subjective” variables are used to determine the significance of economic factors. These include the respondents’ rankings of various push-pull factors in terms of their importance in their decision to return or stay. To account for the pecuniary aspects of this decision, lack of a satisfactory income level in the home country was included among the push factors and a competitive income level in the current country of residence was included as a pull factor (*pushA* and *pullA*).

The approach of using subjective measures to test the impact of income differences may be justified by the fact that each migrant may have different perceptions of the income differential based on incomplete information of all alternative employment opportunities available to him or her. Not everyone may be equally informed of the prevailing income differentials, and more importantly, they may not place equal weight or importance to the same information. Another difficulty in using actual income differences is that it would require income information for a diverse range of occupations, and comparisons across countries would also need to take into account cost-of-living differences.

As the analysis of the previous chapter has revealed, the income differential is an important consideration (marked as “very important” or “important”) for a majority of respondents. The task of the econometric analysis, however, is to determine the factors that distinguish between respondents with strong return intentions versus those with weak return intentions. It is possible that the income differential may fail to be a discerning factor since it is considered to be important for a good proportion of respondents.



### 7.3.2 Explanatory Variables for Testing Specific Brain Drain Theories

In addition to the assessments made by respondents about their level of income in their current country of residence versus what they expect when they return to Turkey, the survey included variables that were designed to test some of the explanations of wage differentials outlined in Chapter Three. These theories all adopt the human capital framework but provide different explanations for the existence of income differentials between the sending and receiving countries. Examining the validity of the first model based on the asymmetric information hypothesis would require firm-level data on the recruitment and compensation practices taking place in Turkey and the receiving countries. This is not possible from information collected in the current study; therefore, the empirical analysis excludes the evaluation of this particular model.

*Miyagiwa's model of agglomeration economies.* The second hypothesis based on the human capital framework is Miyagiwa's "increasing returns to scale in advanced education" hypothesis. The argument was that skilled individuals migrate to more advanced countries because physical proximity to other skilled individuals concentrated in institutions and research centers in developed countries has the effect of increasing their individual productivities, and thus wages. There are several variables that come close to this idea, although implicitly<sup>3</sup>. One of these is the importance of proximity to research centers for respondents as an important reason for not returning. This is given by the variables *pushE* (being away from research centers and advances in the home country) and *pullH* (proximity to research centers and advances in the host country), both of which are constructed as dummy variables where "one" indicates that the item scored high on the Likert scale (received either a score of "five" or a "four") whereas "zero" indicates the item was not important to the respondent (received at most a "three").

Because they are closely associated (e.g.,  $\chi^2(1) = 489.9$ ,  $\text{Pr} = 0.000$ ,  $n = 1176$  for professionals), including both *pushE* and *pullH* as separate regressors in the model would

---

<sup>3</sup> This hypothesis may be more readily tested at the aggregate level or separately for different occupations, given available data. The ratio of the number of skilled individuals (for example, PhD holders) in a sending country (or within a specific occupation in the sending country) to the number of skilled individuals in the receiving country (e.g., the United States) could be used as an explanatory variable in a model explaining human capital flows into the receiving country, with the sending countries representing the cross-sectional unit in the study. A negative, significant relationship could then be interpreted as confirming Miyagiwa's "agglomeration economies" hypothesis.

be redundant. Thus, only *pullH* is included in the model. Since proximity to research centers may be more important for respondents in academia or with a higher degree of specialization, an interaction term, *ACADxpullH*, is added to the model. In future survey studies, more detailed questions could be asked about the importance of being in close proximity to *experts* in a given field.

*Chen and Su's model of on-the-job training.* Another hypothesis to be tested is “on-the-job training” as an explanation for brain drain, especially student non-return, as set out in the model by Chen and Su. In the Chen-Su model (1995), six disciplines are looked at: medicine, engineering and sciences, which are labeled the “hard-sciences” or capital-dependent disciplines; and law, business and humanities, which are labeled the “liberal-arts” or non-capital-dependent disciplines. The capital-dependent and non-capital-dependent distinction among disciplines is an important one, since it is used to test whether the theory that on-the-job training after a period of study abroad provides an important explanation for brain drain in the form of student non-return. It is hypothesized that brain drain will be more prominent for graduates from capital-dependent disciplines. This is because in capital-dependent disciplines education and training that take place in the same country are believed to be complementary and lead to higher productivity than when training occurs in another country. On-the-job training in the foreign country is therefore expected to increase the likelihood of not returning to the home country for students who completed their studies in the foreign country. In the empirical analysis conducted by Chen and Su, whether a student studied in a capital-dependent discipline as defined above did not provide an explanation for the Taiwanese brain drain.

In addition to the division of disciplines as capital-dependent or not according to the Chen-Su definition, specific questions about on-the-job training and formal training in the workplace were asked in the professionals survey. Becker's pioneering work on human capital formalized the notion that workers' productivities improve with the amount of time they spend on the job, and with the amount and type of training they receive. With general training, for example, workers acquire skills that are easily transferable to other firms. The more specific the training a worker receives, the more difficult it is to transfer the acquired skills to other firms. Thus, workers with specific training will tend to be less mobile since mobility will have a higher cost. Two sets of variables are included in the empirical model. One has to do with the formal training received by respondents, while the other has to do

with less formal on-the-job training. These variables are represented by the following set of dummy variables:

*FTr1*: No formal training

*FTr2*: General formal training

*FTr3*: Formal training specific to industry

*FTr4*: Formal training specific to current firm

*OTJT1*: No on-the-job training

*OTJT2*: General on-the-job training

*OTJT3*: On-the-job training specific to industry

*OTJT4*: On-the-job training specific to current firm

*Wong's model of learning-by-doing.* Wong's (1995) model of brain drain based on learning-by-doing interprets the greater output level in the host country as representing a cumulative base of experience. Foreign workers choosing to stay in the host country are able to take advantage of the greater base of experience and increase their productivities from learning-by-doing. This model can be tested by including the variable "number of years of overseas work experience" in the model (*yrs\_wrkd\_abrd*) or the number of years of experience in current country of residence (*yrs\_wrkd\_cc*) in the professionals survey. Return intentions are expected to decline as the number of years spent working abroad increases. If this is the case, Wong's learning by doing model will receive confirmation.

### 7.3.3 Other Explanatory Variables

*Gender:* Although it is expected that there would be differences in the likelihood of returning between the male and female samples, there is no *a priori* expectation about the direction of this difference. The dummy variable for gender takes on the value 1 for "female" and 0 for "male". In previous empirical studies, women have been found to be more reticent about returning to their homelands. In the case of China (Zweig and Changgui, 1995: 36-7), this is believed to be caused by a lack of career opportunities for women (e.g., the biases they face in the workplace) and constraints imposed on their behavior in China, as well as certain convenience factors abroad, aside from greater wage levels, that offer them many more modern conveniences and a more comfortable lifestyle

than they could expect to experience in China. These factors, including less lifestyle freedom, may also be important for women in Turkey making them less willing to return. According to one respondent:

There is a very specific reason for why I stayed in the USA initially. I had had all the intentions of returning at the end of my PhD. When I left Turkey I was 24 and had been married for three years. Toward the end of my PhD I got a divorce at the age of 26. In 1986, Turkey was not ready to accept the notion of a 26 year old divorced woman living by herself. My family expected me to live with them. That was not acceptable to me. Even today I do not feel that I would be as comfortable (or receive the same amount of respect I get in the USA) living in Turkey as a divorced 42 year old.

*Age:* “Age” and “Age squared” are included as explanatory variables in order to control for cohort effects and possible nonlinearities. Previous empirical research has established age as an important factor in determining the net present value of migration. Older workers tend to be less mobile than younger workers since the “psychic costs” of moving increase with age (Stark and Bloom, 1985). Older workers in the sample of professionals may therefore be expected to indicate a greater intention of remaining in the host country. Chen and Su (1995) have suggested, however, that a younger graduate has a greater likelihood of staying in the foreign country than an older one since the present value of her income streams in the foreign country is greater (amplifying the wage differential between home and host country and the relative returns to be earned). Workers approaching retirement may therefore exhibit stronger intentions for returning than younger workers who face a longer time frame for working and earning a high salary level in the foreign country.

*Stay Duration:* Stay duration is the number of years spent in the current country. When stay duration increases, the incentive to return is expected to diminish, since individuals become more accustomed to living abroad. Thus, there may be an “inertial effect” with an increase in the length of stay. Longer stay duration may also be indicative of a preference to live abroad, whether existing initially or acquired with time. Since the stay duration variable also incorporates the effects of age, initial preferences and work experience (and hence the effect of on-the-job training on the migration decision), controlling for these variables will reveal the “pure inertial effects” of stay duration. Another possibility, which appears to be pertinent for Turkey and other developing countries, is given by one of the survey respondents:

Dışarıda 3-5 yıl yaşadıkdan sonra dönmek çok zorlaşıyor. Türkiye'de işler informal ilişkilerle bulunuyor. Dışarıda olmaktan dolayı informal ilişkiler gelişmediğinden, dönmünce olanakların ne olabileceğini kestirmek zor oluyor. (Returning becomes very difficult after living abroad for 3-5 years. In general, finding a job in Turkey depends on informal relations, and being outside Turkey means that you can't develop these informal networks. Therefore, it is difficult to imagine what kind of opportunities you will be facing when you return.)

According to another respondent, re-adapting to Turkey can be as difficult as the initial adjustment to a foreign culture when stay duration increases:

Yabancı bir ülkede uzun süre kalınca, insan Türkiye'deki alışkanlıklarını unutuyor, dil değişimini kaçırıyor, kültür değişimini takip edemiyor. Hatta bazen Türkiye'ye gitmek yabancı bir ülkeye gitmek gibi stresli oluyor. (When a person stays for a long time in a foreign country, they miss the cultural and language changes that take place in Turkey and can forget their old habits and living patterns. Going to Turkey can sometimes be as stressful as going to a foreign country.)

***Years of Work Experience:*** The number of years of work experience is believed to contribute to the general skills level of the respondents, which is believed to increase mobility. Goss and Paul (1986), argue that when the number of years of work experience is not controlled for, the coefficient on the “age” variable will be the sum of two countervailing factors. If the distinction between work experience in the home country versus in the foreign country is important for return intentions, then the number of years of work experience abroad may be the more pertinent variable (Wong, 1995), since this implies that respondents with greater overseas work experience will have acquired skills that are related to the capital stock of the host countries (see previous section).

***Initial Return Intentions:*** Respondents were asked about their initial return intentions prior to going abroad to work or study. The possible responses were “return”, “undecided” and “stay”. The dummy variables, *init\_RETURN*, *init\_STAY* and *init\_UNSURE*, were constructed to reflect the initial intention of the respondent. In the ordered probit analysis, “stay” was chosen as the reference category. It is expected that respondents who left Turkey with the intention to return will be more likely to express the same intention at the time of filling out the survey.

***Marital Status and Family Support:*** Family considerations are also expected to have considerable weight in the mobility decision of individuals. The marital status of respondents is included as an explanatory variable to account for family constraints. The effect of this variable on return intentions can work in either direction. Marriage to a



foreign spouse is expected to reduce return intentions, while marriage to a Turkish spouse may either reduce or increase return intentions depending on the spouse's preferences and position in the family. The respondents were asked about the attitudes of their families both in terms of their initial decision to go abroad (*fam\_sup1*) and in terms of settling down permanently in their current location (*fam\_sup2*). In a family-oriented culture, family attitudes may be expected to have a significant impact on the return decision of respondents. Both of the family support variables are ordinal categorical variables<sup>4</sup>, which are treated as interval variables in the econometric model whenever appropriate (e.g. this decision is based on whether the null hypothesis of evenly spaced categories is rejected by a likelihood ratio test).

#### ***Parental Education Levels:***

Parents' educational backgrounds provide information about the socio-economic background of their children. Socioeconomic background is probably more important in whether a person is ever able to go overseas for study or work experience. The educational attainment of parents will determine the educational opportunities available for their children. Children from higher income, more educated families are more likely to get a better education (e.g., since their families will be able to afford better quality schools or be able to spend more time with them on schoolwork), and proceed on to higher level studies. Those with higher, university-level skills have greater prospects for finding overseas education and employment opportunities. Since the more educated are more mobile than the less educated, and because the level of educational attainment increases with the parents' education levels (see Tansel, 2002a), it is not surprising to find that the sample of respondents come from highly educated backgrounds (see Section 6.2.3 in Chapter Six.).

***Occupation and Work Activities:*** A distinction can be made between academic and non-academic occupations. A dummy variable representing working in academia (or plans for working in academia in the case of students) was constructed to determine whether academicians are more or less likely to return than those in other occupations. Respondents were also asked to give the percentage of time they spend on various job-related activities. The first three job activities (basic research, applied research and development) are R&D activities (OECD, 1994: "*Frascati Manual 1993*"). The other activities considered are technical support, administrative and various other activities. These activities have been

---

<sup>4</sup> See Questions 21 and 25 in the student and professionals surveys respectively.



used as part of the National Science Foundation (NSF) Survey of Doctorate Recipients in the US (NSF, 1997). The same definitions of job activities are also used in the current survey study. It is expected for respondents involved in activities related to research and development have weaker return intentions, since they are doing very specialized work that may be difficult to duplicate or develop in Turkey.

***Previous Overseas Experience:*** Prior overseas experience (work, study or travel) before coming to the current country of residence may be an influential factor in adjusting to or feeling comfortable with the current country of stay. Some of those with previous overseas experience who returned to Turkey to work for a period of time have also had the opportunity to compare the work environments and therefore base their return decisions on this comparison. In addition to prior experience overseas, various adjustment factors were included in the questionnaire, including having a large Turkish community in the city of residence (see Section 6.2.10). These factors and difficulties faced while abroad are included in the model as dummy variables.

***Level and Location of Highest Degree Completed:*** Each consecutive level of higher education represents an increasing degree of specialization. It is postulated that those who have received more specialized formal education abroad, based on the degree level, are less likely to return since their advanced training will be more relevant or attuned to the needs of the foreign country and thus provide them with higher monetary returns in the foreign country than in their native country. The level of highest degree is represented by the following set of dummy variables: *bachelors*, *masters* and *doctorate*.

If the highest degree completed by a respondent is from a Turkish institution of higher education, then the individual is part of the “classic brain drain” (*HD\_TUR*). On the other hand, if the highest degree completed is from an educational institutional outside Turkey, then the respondent is part of the phenomenon of “student non-return” (*HD\_FOR*).

***Language Facility / Skill:*** Language skills may also be an important part of adjusting to life abroad. The greater the command of a foreign language, the easier it is to make the transition to a foreign culture. Language acquisition is also related to the age of the respondent, which suggests that those who go abroad at an earlier age will generally have better command of the foreign language in question. As mentioned before, foreign language instruction in the home country should also increase language skills and prepare

students for foreign study or work experience. To account for early exposure to a foreign language, language of instruction in high school for science and social science classes are included as dummy variables in the model (*HSsci\_TUR* and *HSsoc\_TUR*). The expectation is that those who have received foreign language instruction in high school will adjust more easily to a foreign culture (since it will be less foreign to them) and exhibit less intense return intentions than those who complete their high school education in Turkish language schools.

***Economic Instability and Uncertainty:*** General economic conditions and economic stability will determine relative employment opportunities and can lower or increase an individual's expected income accordingly. Economic instability and uncertainty in the home country was included among the Likert scale items as a push factor (*pushK*). This variable is expected to have a strong deterring effect on return intentions for the sample considered since at the time of the survey the Turkish economy was experiencing the effects of the 2001 economic crisis.

The variables discussed above may be divided into policy and non-policy variables in order to distinguish between those factors for which "something can be done about", such as income differences, and those that form part of the respondent's lifestyle preferences and constraints including brain drain due to marriage to a foreign spouse.

#### **7.4. Determinants of the Return Intentions of Turkish Professionals**

In the ordered probit model, the independent variable "return intention" is constructed in a way such that categories that suggest greater intensity in feeling about not returning (staying) are assigned higher values. As a result, positive coefficients on the independent variables indicate an increase in the probability of "not returning" while negative coefficients imply an increase in the probability of "returning". Table B.2 in Appendix B provides summary statistics and descriptions of the variables used in the final model, which was chosen on the basis of goodness-of-fit statistics: mainly the AIC and McFadden's adjusted  $R^2$ . In comparing nested models, the likelihood ratio test was also used. In general, these three statistics gave very similar results. The final model has 59 regressors, many of which are qualitative or dummy variables. The ordered probit model results are used in the analysis of the determinants of return intentions, since model selection (e.g., determining the appropriate explanatory variables) are based on the results

from fitting various ordered probit models<sup>5</sup>. Estimates of the coefficients and the associated marginal effects are provided in Appendix B for both the ordered probit model and the alternative multinomial logit model (Tables B.3 and B.4). The effects of various factors on the “non-return” decision are discussed under separate headings below.

#### *Gender Effects:*

There are gender differences in the estimated probabilities of return intentions. Positive, statistically significant coefficients on the dummy variable, *female*, indicates that female respondents have a higher probability of indicating an intention of “non-return” in the ordered probit results. Table 7.3 summarizes the marginal effects of gender on the probabilities associated with each outcome. The marginal effects were computed by holding all other explanatory variables at their means and accounting for gender interaction effects (e.g., setting *femalepullK* to zero for males and to  $1 \times (\text{mean of pullK})$  for females). The gender differences in the marginal effects show a clear tendency for females to indicate that they plan to remain abroad compared to males. The probability of returning to Turkey being unlikely is 0.10 points higher for female respondents, and the probability of definitely returning ( $y = 1$  or  $2$ ) decreases by 0.07. This may be because educational and migration opportunities for women are more limited, which makes the migration of females a more selective process (e.g., as evidenced by the higher socio-economic background of females in the survey as measured by parental education levels). Another important factor may be the greater freedom of lifestyle that some of them may enjoy while abroad.

Table 7.3 Marginal Effect of Gender, Professionals

|                | DRP     | DRNP    | RP      | RU     | DNR    |
|----------------|---------|---------|---------|--------|--------|
| Probabilities: | y = 1   | y = 2   | y = 3   | y = 4  | y = 5  |
| Male           | 0.0045  | 0.1785  | 0.5157  | 0.2937 | 0.0076 |
| Female         | 0.0018  | 0.1139  | 0.4744  | 0.3935 | 0.0164 |
| Difference     | -0.0027 | -0.0646 | -0.0413 | 0.0998 | 0.0088 |

#### *Cohort Effects:*

The *age* and *agesq* variables are statistically significant at the 1% significance level for the ordered probit model when the stay duration and work experience variables are

<sup>5</sup>Since the ordered probit model violates the parallel regression assumption, the results of the multinomial logit model are given as an alternative. The fit, however, is not as good as the ordered probit model, and the results are less intuitively appealing. Further studies can explore different estimation strategies.

excluded. A positive sign on the *age* coefficient indicates a higher intensity in non-return intentions for older respondents. This may be a reflection of the possibility that older respondents have spent more time abroad than younger respondents and are more firmly established in their overseas careers and/or have become more accustomed to the lifestyle abroad. As such, the “age” variable may be echoing the effects of the “stay duration” variable. Older individuals also tend to be less mobile than younger individuals, and therefore may exhibit a greater tendency (“inertia”) to stay in their current place of residence. A negative sign on *agesq* means that the tendency for individuals to “not return” increases with age at a diminishing rate. When stay duration, years of work experience and possible interaction effects (e.g., *AGExSTAYDUR* and *AGESQxSTAYDUR*) are controlled for, the coefficients become marginally statistically insignificant.

*Effects of Stay Duration and Work Experience:*

The probability of returning to Turkey is expected to decrease as stay duration increases, holding everything else constant (including age, work experience, lifestyle preference). Stay duration may be thought of as reflecting “inertial effects”: returning becomes more difficult after individuals become accustomed to living conditions abroad. Increases in the length of stay duration may also speed up the acculturation process and shift personal lifestyle preferences toward the culture of the host country. Another important effect of stay duration is that “psychic” or adjustment costs associated with the initial move to a foreign country diminish as the length of stay increases.

Figures 7.3a and 7.3b show the effects of stay duration on return intentions holding age constant at 35 years, which is close to the average age for the sample. The marginal effects for the extreme categories (DRP and DNR) are small and lie close to the origin as illustrated in Figure 7.3a, although definite return plans show a decrease in probability with stay duration, while the probability of definitely not returning shows an increase. The overall trend is an increase in the probability of not returning and a decrease in the probability of returning as stay duration increases, which is as expected.

The number of years of work experience in the current country of residence is included as a separate explanatory variable in the model. This measure serves as a proxy for the amount of learning-by-doing accumulated in the host country. Figure 7.4 presents the effect of different amounts of work experience on return intentions. The same qualitative results apply as for the stay duration variable, except that increases in work experience

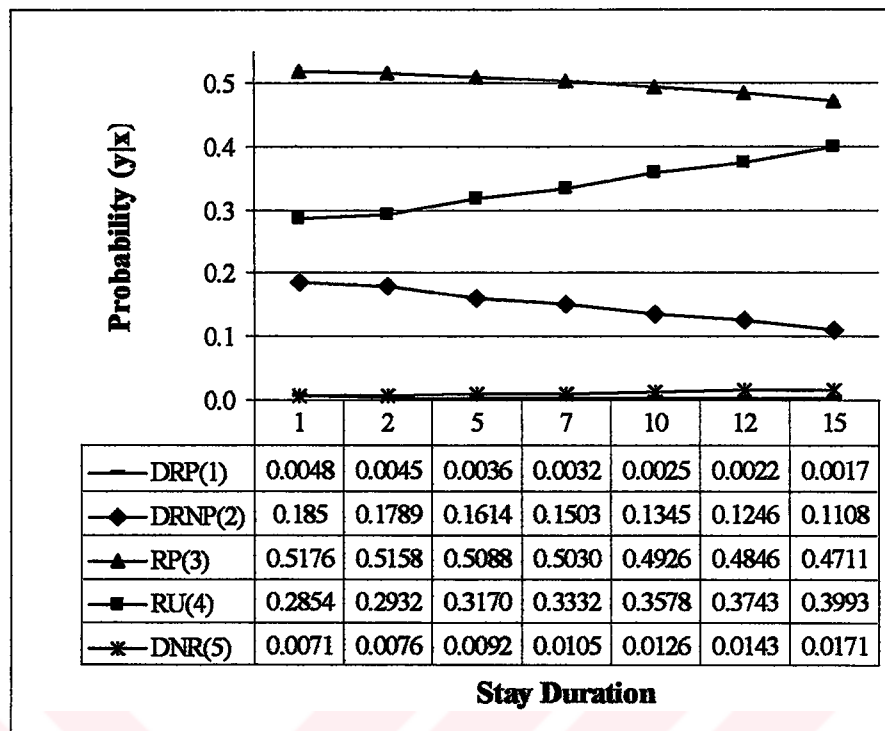


Figure 7.3a Effect of Stay Duration on Return Intentions (Age = 35 years)

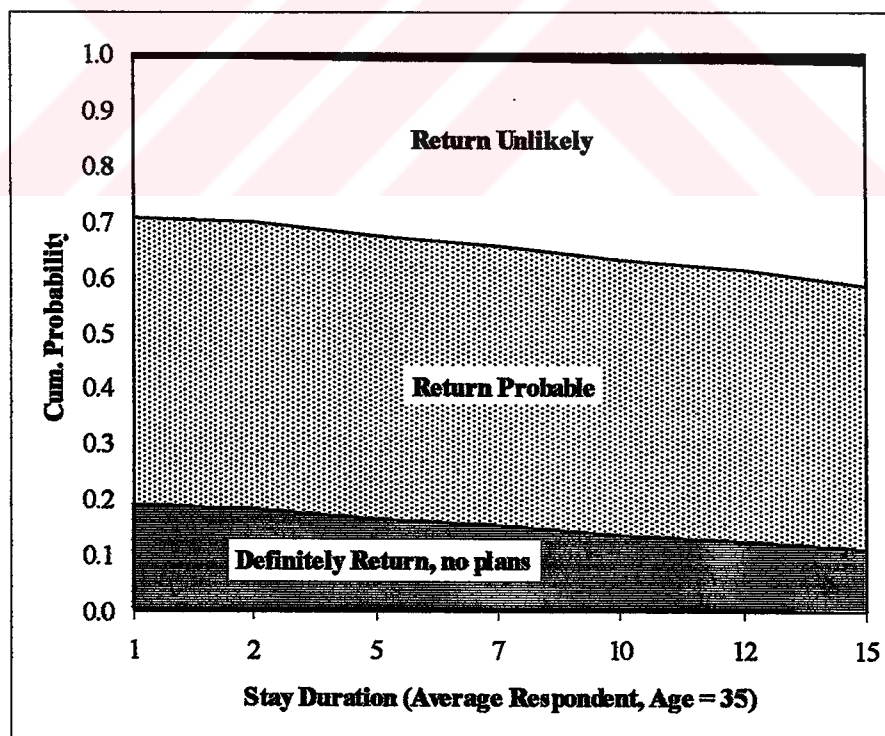


Figure 7.3b Cumulative Probabilities: Stay Duration & Return Intentions

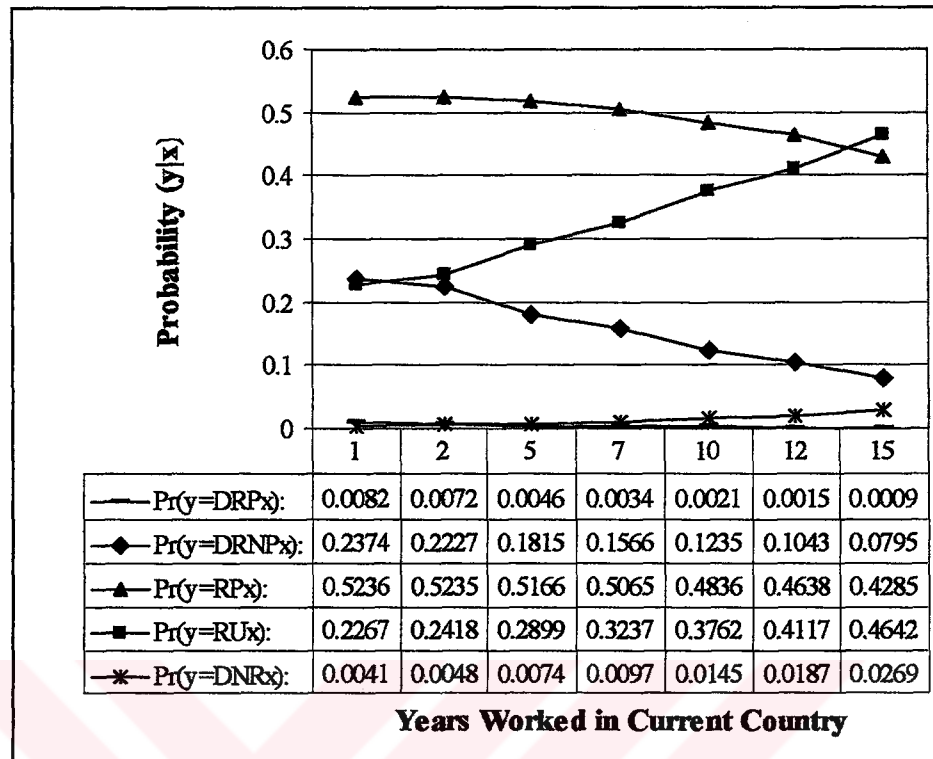


Figure 7.4 Effect of Work Experience in Current Country on Return Intentions

appear to have a stronger negative effect on return intentions than do increases in stay duration. The probability of not returning ( $y = 4$  or  $5$ ) increases by 0.07 for the first five years of work experience, and then by 0.09 for the second five years, and finally by 0.10 for the next five years after that. By comparison, the same figures for stay duration are 0.03, 0.04 and 0.05 respectively. The negative impact of foreign work experience on return intentions provides empirical support for Wong's learning-by-doing model of brain drain.

Whether a respondent has had *any* work experience in Turkey also appears to be an important determinant of current return intentions, in addition to the amount of work experience obtained in the host country. When a respondent has no full-time job experience in Turkey ( $NWexpTUR=1$ ), the probability of not returning ( $y = 4$  or  $5$ ) increases by 0.08, and is slightly higher for females (see Table 7.4 below).



**Table 7.4 Marginal Effect of Having No Work Experience in Turkey**

|                 | DRP     | DRNP    | RP      | RU     | DNR    |
|-----------------|---------|---------|---------|--------|--------|
| Probabilities:  | y = 1   | y = 2   | y = 3   | y = 4  | y = 5  |
| <b>Total:</b>   |         |         |         |        |        |
| NWexpTUR=0      | 0.0043  | 0.1751  | 0.5145  | 0.2982 | 0.0079 |
| NWexpTUR=1      | 0.0023  | 0.1269  | 0.4865  | 0.3704 | 0.0139 |
| Difference 0→1  | -0.0020 | -0.0482 | -0.0280 | 0.0722 | 0.0060 |
| <b>Males:</b>   |         |         |         |        |        |
| NWexpTUR=0      | 0.0055  | 0.1963  | 0.5204  | 0.2716 | 0.0063 |
| NWexpTUR=1      | 0.0029  | 0.1444  | 0.4994  | 0.3421 | 0.0112 |
| Difference 0→1  | -0.0026 | -0.0519 | -0.0210 | 0.0705 | 0.0049 |
| <b>Females:</b> |         |         |         |        |        |
| NWexpTUR=0      | 0.0023  | 0.1273  | 0.4869  | 0.3697 | 0.0138 |
| NWexpTUR=1      | 0.0011  | 0.0888  | 0.4433  | 0.4434 | 0.0233 |
| Difference 0→1  | -0.0012 | -0.0385 | -0.0436 | 0.0737 | 0.0095 |

The correspondence analysis of the previous chapter (see Section 6.4.4) suggested the possibility that respondents who returned to Turkey to work after obtaining foreign degrees are less likely to return a second time. The dummy variable *FFTJ\_TUR* takes on a value of 1 for respondents completing their highest degree abroad if their first full-time job (*FFTJ*) after completing their studies is located in Turkey. Table 7.5 shows the marginal effects of working in Turkey immediately after completing foreign studies for each return intentions category. The probability of not returning ( $y = 4$  or  $5$ ) increases by 0.18, while the more positive return intention categories—“definitely return, no plans” (DRNP:  $y = 2$ ) and “return probable” (RP:  $y = 3$ )—decrease in total by about the same amount. The probability of choosing the “definitely return, no plans” category decreases by 0.10 for male respondents compared to a decline of 0.07 for females, and the probability of “probably returning” (RP) decreases by 0.11 for female respondents versus a decline of 0.07 for males.

These results (e.g., the negative impact of work experience in Turkey for respondents with foreign degrees and the phenomenon of student non-return) have important implications for the “brain circulation” hypothesis, which is pervasive in the current literature on the impact of migratory flows. It appears that respondents who start their work life abroad after completing their overseas studies are less likely to have strong return intentions, and respondents with foreign degrees who start their work life in Turkey

are less likely to have plans for returning to Turkey again<sup>6</sup>. Those who make contributions to Turkey during their stay abroad are also more likely to indicate they will return. This is included in the model as the dummy variable *contr*, which takes on a value of 1 when respondents have contributed either by making donations, taking part in lobbying activities or by participating in activities such as attending conferences in Turkey. The effect of this on the likelihood of returning is substantial: the probability of definitely returning increases by 0.09. This suggests perhaps that those who are already likely to return are also those contributing the most to Turkey through various activities.

**Table 7.5 Marginal Effect of Working in Turkey Immediately after Completing Overseas Studies**

|                 | DRP     | DRNP    | RP      | RU     | DNR    |
|-----------------|---------|---------|---------|--------|--------|
| Probabilities:  | y = 1   | y = 2   | y = 3   | y = 4  | y = 5  |
| <b>Total:</b>   |         |         |         |        |        |
| FFTJ_TUR=0      | 0.0040  | 0.1693  | 0.5122  | 0.3061 | 0.0084 |
| FFTJ_TUR=1      | 0.0009  | 0.0774  | 0.4249  | 0.4691 | 0.0278 |
| Difference 0→1  | -0.0031 | -0.0919 | -0.0873 | 0.1630 | 0.0194 |
| <b>Males:</b>   |         |         |         |        |        |
| FFTJ_TUR=0      | 0.0051  | 0.1900  | 0.5190  | 0.2792 | 0.0067 |
| FFTJ_TUR=1      | 0.0012  | 0.0899  | 0.4449  | 0.4412 | 0.0229 |
| Difference 0→1  | -0.0039 | -0.1001 | -0.0741 | 0.1620 | 0.0162 |
| <b>Females:</b> |         |         |         |        |        |
| FFTJ_TUR=0      | 0.0021  | 0.1225  | 0.4827  | 0.3780 | 0.0147 |
| FFTJ_TUR=1      | 0.0004  | 0.0514  | 0.3678  | 0.5361 | 0.0442 |
| Difference 0→1  | -0.0017 | -0.0711 | -0.1149 | 0.1581 | 0.0295 |

**Table 7.6 Marginal Effect of Contributions to Turkey**

|                | DRP    | DRNP   | RP     | RU      | DNR     |
|----------------|--------|--------|--------|---------|---------|
| Probabilities: | y = 1  | y = 2  | y = 3  | y = 4   | y = 5   |
| contr=0        | 0.0017 | 0.1097 | 0.4699 | 0.4013  | 0.0174  |
| contr=1        | 0.0056 | 0.1978 | 0.5207 | 0.2698  | 0.0062  |
| Difference 0→1 | 0.0039 | 0.0881 | 0.0508 | -0.1315 | -0.0112 |

<sup>6</sup>Toward the end of the survey questionnaire respondents were asked about the frequency of their visits to Turkey for various purposes, including for educational and work endeavours. Unfortunately, this part of the survey had a low response rate and could not be used to determine the degree to which productive brain circulation is occurring on behalf of Turkey.

*Effect of Initial Intentions:*

Two dummy variables, *init\_UNSURE* and *init\_RETURN*, are included in the model to determine whether differences in the initial intention of the respondent prior to his/her venture abroad is important in determining his/her current intentions about returning to Turkey. The reference variable is “stay”. Both the “return” and “undecided” variables are negative and significant at the 1 percent significant level in the ordered probit model. Table 7.7 shows the marginal effects of initial return intentions with all other variables held at their mean values.

**Table 7.7 Marginal Effects of Initial Return Intentions, Professionals**

|                           | DRP    | DRNP   | RP     | RU      | DNR     |
|---------------------------|--------|--------|--------|---------|---------|
| Probabilities:            | y = 1  | y = 2  | y = 3  | y = 4   | y = 5   |
| init_STAY = 1             | 0.0001 | 0.0210 | 0.2509 | 0.6311  | 0.0968  |
| init_UNSURE = 1           | 0.0026 | 0.1371 | 0.4945 | 0.3536  | 0.0122  |
| init_RETURN = 1           | 0.0078 | 0.2317 | 0.5237 | 0.2324  | 0.0044  |
| Change in Probability:    |        |        |        |         |         |
| init_STAY → init_UNSURE   | 0.0025 | 0.1161 | 0.2436 | -0.2775 | -0.0846 |
| init_UNSURE → init_RETURN | 0.0052 | 0.0946 | 0.0292 | -0.1212 | -0.0078 |
| init_STAY → init_RETURN   | 0.0077 | 0.2107 | 0.2728 | -0.3987 | -0.0924 |

The probability of definitely returning ( $y = 1, 2$ ) increases by 0.22 for respondents with an initial intention to return compared to those with an initial return intention of staying abroad. The increase in the probability of definitely returning is lower (0.10) when the comparison group is those who are initially unsure about returning. The probability of being unlikely to return is quite high (0.63) for those whose initial intention is to stay in the host country. The probabilities of definitely not returning and of return being unlikely increases by 0.09 and 0.40 respectively, when respondents have initial “stay” intentions compared to those with initial return intentions. These figures suggest that the initial or prior intentions of individuals tend to shape their current intentions about whether to return to Turkey or not. This tendency, however, appears to be strongest for those with initial plans to remain abroad. These results may be reflecting the “self-fulfilling” tendency of prior intentions and expectations: e.g., those who start out more determined from the outset to make a career or succeed abroad will try harder to make this come true; they may also tend to try to protect themselves psychologically from setbacks or initial adjustment problems, and exhibit greater tolerance when they occur.

*Effect of Family Support and Marriage to Foreign Spouse:*

Respondents were asked about the degree of support (encouragement) that they received from their families (parents, wife, and children) in the initial decision to work or study abroad and in the decision to settle overseas permanently. Maximum likelihood testing procedures were performed to determine whether the ordered family support variables could be treated as interval<sup>7</sup>. On the basis of the LR test results for the ordered probit model and the Wald test results for the multinomial logit model<sup>8</sup>, *fam\_sup1* and *fam\_sup2* were included as interval variables in the models.

Family support for the initial decision (*fam\_sup1*) is negative and significant ( $\alpha = 0.01$ ) in the ordered probit model. This means that the probability of returning increases when there is support for the initial decision to go abroad. In the analysis of the previous chapter, it is clear that there is strong family support the initial decision to acquire overseas study or work experience for a majority of respondents. This variable may be indicative of the strength of ties to family in Turkey, which offers a possible explanation of the negative sign on the *fam\_sup1* coefficient and higher probability of return.

The second “family support” variable is a measure of how much encouragement the respondent believes that she/he would receive from her/his family for the decision to settle abroad permanently. The interpretation of the positive and statistically significant coefficient ( $\alpha = 0.01$ ) in the ordered probit model for the *fam\_sup2* variable is more clear-cut. Respondents with greater family encouragement in the decision to settle abroad permanently have a greater probability of not returning to Turkey. This outcome appears to validate the importance of family encouragement in the decision to migrate, especially for individuals coming from a traditional, family-oriented society such as Turkey. (This could be compared with other country studies that contain “family” variables).

---

<sup>7</sup> To illustrate: in performing the LR test, the model containing the ordinal variable *fam\_sup1* is compared to the model that includes both *fam\_sup1* and all but two of the categories of *fam\_sup1*. If the restricted model leads to a loss in information, then the ordinal variable cannot be treated as an interval variable (see Long and Freese, 2001: 268-9). Wald tests are performed instead for the multinomial logit model since only the restricted model is required, which considerably speeds up computation.

<sup>8</sup>Test results:

*fam\_sup1* (ordered probit model): LR  $\chi^2(2) = 5.16$ , Prob >  $\chi^2 = 0.0757$ ;  
*fam\_sup1* (multinomial logit model): Wald  $\chi^2(8) = 10.80$ , Prob >  $\chi^2 = 0.2133$   
*fam\_sup2* (ordered probit model): LR  $\chi^2(4) = 5.48$ , Prob >  $\chi^2 = 0.2414$ ;  
*fam\_sup2* (multinomial logit model): Wald  $\chi^2(16) = 20.84$ , Prob >  $\chi^2 = 0.1848$ .

**Table 7.8 Marginal Effect of Family Support and Marital Status**

|                                                | DRP        | DRNP       | RP         | RU         | DNR       |
|------------------------------------------------|------------|------------|------------|------------|-----------|
| Probabilities:                                 | y = 1      | y = 2      | y = 3      | y = 4      | y = 5     |
| <b>Initial family support</b>                  |            |            |            |            |           |
| fam_sup1                                       |            |            |            |            |           |
| marginal effect                                | 0.0019     | 0.0413     | 0.0206     | -0.0593    | -0.0045   |
| z-value                                        | (2.21)**   | (2.79)***  | (2.61)***  | (-2.82)*** | (-2.31)** |
| <b>Family support for permanent settlement</b> |            |            |            |            |           |
| fam_sup2                                       |            |            |            |            |           |
| marginal effect                                | -0.0016    | -0.0362    | -0.0181    | 0.0520     | 0.0039    |
| z-value                                        | (-3.11)*** | (-5.28)*** | (-4.25)*** | (5.43)***  | (3.49)**  |
| <b>Marriage to foreign spouse:</b>             |            |            |            |            |           |
| spousenat2=0                                   | 0.0042     | 0.1733     | 0.5138     | 0.3005     | 0.0081    |
| spousenat2=1                                   | 0.0012     | 0.0910     | 0.4465     | 0.4388     | 0.0226    |
| Difference 0→1                                 | -0.0030    | -0.0823    | -0.0673    | 0.1383     | 0.0145    |

Another important consideration is marriage to a foreign spouse, which is given by the dummy variable *spousenat2*. The sign of the coefficient on *spousenat2* in the ordered probit estimates is negative and statistically significant at the 1 percent significance level, indicating a lower intention of returning. The marginal effects of the family support variables and being married to a foreign spouse are presented in Table 7.7. Family support for permanent settlement and marriage to a foreign spouse decrease the probability of definitely returning by 0.037 and 0.085 respectively. Initial family support for overseas study or work, on the other hand, tends to increase definite return intentions by 0.04. As expected, marriage to a foreign spouse has a very large positive effect (0.14) on the probability of “being unlikely to return”, which is much larger than the effect of family support for settlement abroad (0.04).

#### *Effect of Parental Education:*

Differences in the social background of respondents, as reflected in the educational attainment of their parents, were found to be statistically insignificant in determining current return intentions. In the ordered probit estimates, “high school” was used as the reference educational attainment category for each parent. No significant relationships were found when the other categories of educational attainment are used as the reference. As a result, parental education levels were not included in the final model. Although parental

education levels are not important in determining the likelihood of return of respondents, it is clear that, as shown in Chapter Four, the socioeconomic background of individuals is important in determining who leaves Turkey for study and work opportunities in another country.

*Effects of the Initial Reasons for Going:*

Since initial return intentions appear to be important in determining current return intentions, the initial reasons for going overseas may also provide important information about who is planning to return and who is not. Only six of the possible twelve reasons presented to the respondents are found to have statistical significance. They are the ones included in the final model. Some of these factors become significant only when their interactions with certain variables such as *age*, *female* and *academic* are controlled for.

The results from the estimated ordered probit model indicate that respondents are more likely to return if their initial reason for going was any of the following: having a job requirement in Turkey (*whygo\_C*), prestige of overseas study (*whygo\_G*), or to join spouse (*whygo\_I*). The first two are statistically significant at the 10 percent and the last at the 1 percent significance level. A positive, significant ( $\alpha = 0.10$ ) coefficient for the interaction term between *female* and *whygo\_I* (*FxWHYGON*)<sup>9</sup> and between *female* and *whygo\_C* (*FxWHYGOC*)<sup>10</sup> indicates that these results hold for males. Male respondents are more likely to return if they initially went abroad as a requirement or to be with their spouses. The result for *whygo\_G* (the prestige of overseas study), on the other hand, is moderated by *age* (through a positive and significant coefficient of the term *AGExWHYGOG* at the 10 percent significance level) and strengthened if the respondent is working in academia (through a negative and significant coefficient of the term *ACADxWHYGOG* at the 5 percent significance level).

<sup>9</sup> The in-sample bivariate association between return intentions and *whygo\_C* as measured by the chi-square statistic  $\chi^2(4)$  is 1.84 (Pr = 0.76) for females and 8.68 (Pr = 0.07), even though a greater percentage of female respondents have indicated that their reason for going abroad is to be with their spouses (23.1 percent versus 8.2 percent).

<sup>10</sup> The percentage of females in the sample whose initial reason for going abroad was to fulfil a job requirement in Turkey is approximately the same as that for males (21.7 percent versus 22.6 percent). Interestingly, the chi-square statistic between return intentions and *whygo\_C* is significant only for males ( $\chi^2(4) = 41.57$ , Pr = 0.00), and there is a clear tendency (based on an examination of table percentages) for males who chose *whygo\_C* as their reason for going abroad to have stronger return inclination than those who did not.



As expected, respondents who left Turkey because of lifestyle preferences (*whygo\_H*) or due to political factors (*whygo\_K*) are not likely to indicate strong return plans. The coefficients of these variables are positive and statistically significant at the 5 percent and 10 percent significance levels respectively. Respondents who left because they found facilities and equipment for doing research in Turkey to be inadequate (*whygo\_F*) are also less likely to be returning (significant at 1 percent). Table 7.9 below presents the marginal effects of each reason on the probabilities of the return intention categories.

**Table 7.9 Marginal Effects of the Initial Reasons for Going**

|                                     | DRP<br>y = 1 | DRNP<br>y = 2 | RP<br>y = 3 | RU<br>y = 4 | DNR<br>y = 5 |
|-------------------------------------|--------------|---------------|-------------|-------------|--------------|
| <b>Probabilities:</b>               |              |               |             |             |              |
| <b>Job requirement in Turkey</b>    |              |               |             |             |              |
| whygo_C=0                           | 0.0033       | 0.1536        | 0.5048      | 0.3283      | 0.0101       |
| whygo_C=1                           | 0.0044       | 0.1760        | 0.5148      | 0.2970      | 0.0078       |
| Difference 0→1                      | 0.0011       | 0.0224        | 0.0100      | -0.0313     | -0.0023      |
| <b>Insufficient facilities, etc</b> |              |               |             |             |              |
| whygo_F=0                           | 0.0036       | 0.1595        | 0.5079      | 0.3197      | 0.0094       |
| whygo_F=1                           | 0.0028       | 0.1412        | 0.4973      | 0.3471      | 0.0117       |
| Difference 0→1                      | -0.0008      | -0.0183       | -0.0106     | 0.0274      | 0.0023       |
| <b>Prestige of study abroad</b>     |              |               |             |             |              |
| whygo_G=0                           | 0.0031       | 0.1481        | 0.5017      | 0.3364      | 0.0107       |
| whygo_G=1                           | 0.0036       | 0.1600        | 0.5082      | 0.3189      | 0.0094       |
| Difference 0→1                      | 0.0005       | 0.0119        | 0.0065      | -0.0175     | -0.0013      |
| <b>Lifestyle Preference</b>         |              |               |             |             |              |
| whygo_H=0                           | 0.0042       | 0.1728        | 0.5136      | 0.3012      | 0.0081       |
| whygo_H=1                           | 0.0024       | 0.1321        | 0.4908      | 0.3617      | 0.0130       |
| Difference 0→1                      | -0.0018      | -0.0407       | -0.0228     | 0.0605      | 0.0049       |
| <b>To be with spouse</b>            |              |               |             |             |              |
| whygo_I=0                           | 0.0032       | 0.1515        | 0.5037      | 0.3313      | 0.0103       |
| whygo_I=1                           | 0.0086       | 0.2420        | 0.5233      | 0.2221      | 0.0039       |
| Difference 0→1                      | 0.0054       | 0.0905        | 0.0196      | -0.1092     | -0.0064      |
| <b>Escape Political Environment</b> |              |               |             |             |              |
| whygo_K=0                           | 0.0040       | 0.1697        | 0.5124      | 0.3055      | 0.0084       |
| whygo_K=1                           | 0.0026       | 0.1366        | 0.4941      | 0.3544      | 0.0123       |
| Difference 0→1                      | -0.0014      | -0.0331       | -0.0183     | 0.0489      | 0.0039       |

Lifestyle preference has the greatest negative marginal effect on return intentions, followed by getting away from the political environment and insufficient facilities for conducting research in Turkey. The probability of not returning (y = 4 or 5) increases by 0.07 for those who have indicated lifestyle preference to be their reason for going abroad, compared to 0.05 for political reasons and 0.03 for insufficient facilities. Respondents who

indicated they went abroad to be with their spouse have the highest return intentions: the probability of choosing one of the “definitely return” categories increases by 0.096 (0.0054+0.0905), compared to 0.024 for those who went because of a job requirement in Turkey and 0.017 for those who went abroad to take advantage of study opportunities.

*Effect of Work, Social and Standard of Living Assessment:*

Respondents were asked to assess in general terms their personal work environment (e.g., job satisfaction), the social aspects of life (e.g., friendships, social relations) and standard of living in their current country of residence versus that in Turkey on a 5-point scale ranging from “much worse” to “much better” (see Section 6.2.9 for details). Work and standard of living assessments (*work\_assess* and *SOL\_assess*) are skewed toward the “better” or “much better” categories. These two variables are positively associated with lifestyle preferences. The distribution of the social assessment variable appears not to be as slanted toward extreme points, although it is tilted toward the “worse” categories. The *work\_assess* variable was not statistically significant and was therefore excluded from the model<sup>11</sup>. The coefficients of *social\_assess* and *SOL\_assess*<sup>12</sup> are positive and statistically significant at the 5 percent and 1 percent significance levels respectively, indicating a decrease in return intentions when more positive assessments are made about conditions abroad compared to Turkey.

The marginal effects are given in Table 7.10. It is clear that positive assessments of living conditions abroad lead to greater decreases in the probability of indicating return intentions than do positive assessment about social conditions abroad. Figures 7.5 and 7.6 give the cumulative probabilities associated with each value (1 to 5) that the *social\_assess* and *SOL\_assess* variables take on. Areas toward the bottom represent more definite plans and areas at the top represent more definite non-return intentions. These diagrams also show that standard of living assessments have a greater impact on return intentions.

<sup>11</sup> Wald test of significance:  $\chi^2(1) = 0.12$ , Prob >  $\chi^2 = 0.7321$ .

<sup>12</sup> The likelihood ratio test results for whether the ordinal variables can be treated as interval are as follows: *social\_assess*: LR  $\chi^2(4) = 2.95$ , Prob >  $\chi^2 = 0.5663$ ;

*SOL\_assess*: LR  $\chi^2(4) = 11.58$ , Prob >  $\chi^2 = 0.0207$ .

The likelihood ratio test results indicate that *social\_assess* can be used at the interval level, but treating *SOL\_assess* as an interval variable leads to loss of information. Despite this, both variables were included as interval variables in order to keep the model simple. This did not lead to a change in the qualitative results.

**Table 7.10 Marginal Effects of Social and Standard of Living Assessments**

| Probabilities:                       | DRP<br>y = 1         | DRNP<br>y = 2        | RP<br>y = 3          | RU<br>y = 4        | DNR<br>y = 5       |
|--------------------------------------|----------------------|----------------------|----------------------|--------------------|--------------------|
| <b>Social Assessment</b>             |                      |                      |                      |                    |                    |
| social_assess                        | -0.0011<br>(-2.09)** | -0.0237<br>(-2.42)** | -0.0118<br>(-2.29)** | 0.0340<br>(2.42)** | 0.0026<br>(2.25)** |
| <b>Standard of Living Assessment</b> |                      |                      |                      |                    |                    |
| SOL_assess                           | -0.0014<br>(-2.21)** | -0.0304<br>(-2.78)** | -0.0152<br>(-2.57)** | 0.0436<br>(2.79)** | 0.0033<br>(2.36)** |

Notes: Figures in parentheses are z-statistics. The table summarizes information from Table B.3 in Appendix B.

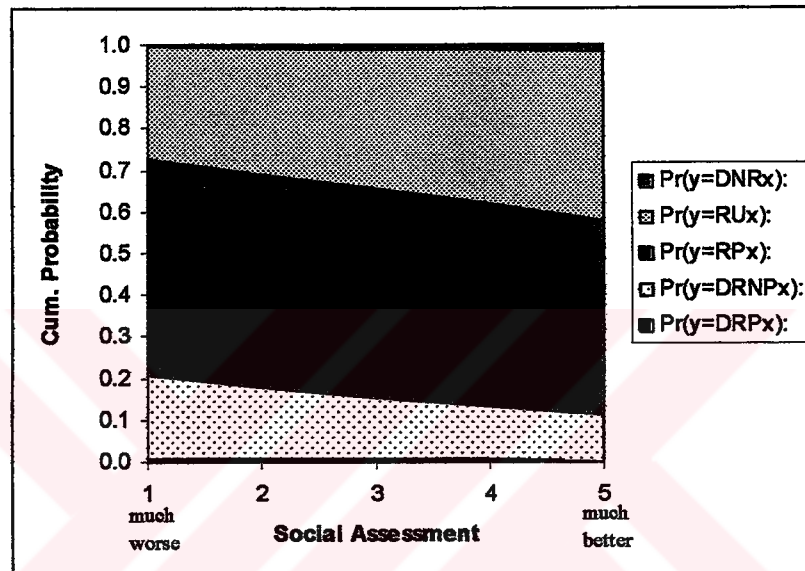


**Figure 7.5 Cumulative Probabilities: Social Assessment of Life Abroad**

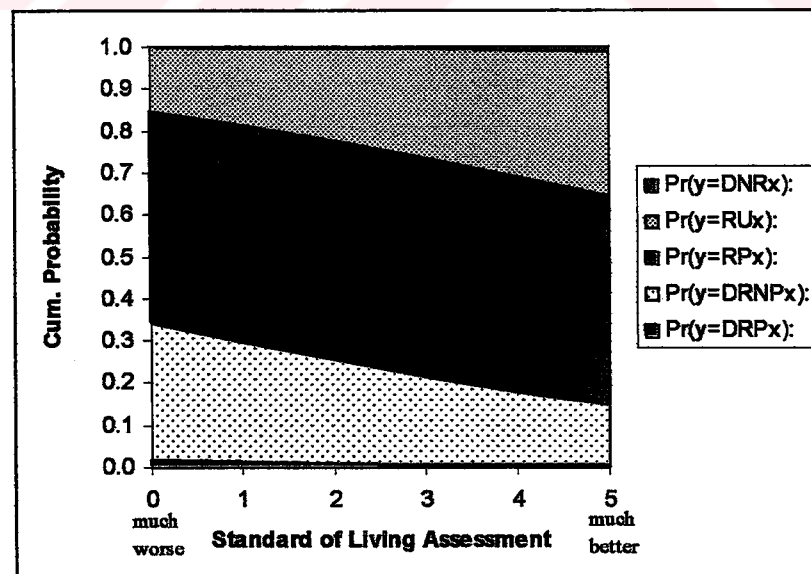


**Figure 7.6 Cumulative Probabilities: SOL Assessment of Life Abroad**

*Level and Location of Highest Degree:*

It is expected that higher levels of formal education received abroad (e.g., PhD level education), corresponding to a greater degree of country or institution-specific specialization, will result in a lower tendency for returning to Turkey.

While the highest degree held by the respondent has no significant effect on the return intentions of respondents, *where* the highest degree is received is statistically significant at the 1% significance level. Those who have received their highest degree from a Turkish university are more likely to indicate they will return than those whose highest degree is a foreign degree. Therefore, higher education received abroad, regardless of the level, is important in the decision to return or stay<sup>13</sup>. This also means that student non-return is a potentially more serious problem for Turkey.

Table 7.11 Marginal Effect of Highest Degree being a PhD from a Turkish University

|                | DRP    | DRNP   | RP     | RU      | DNR     |
|----------------|--------|--------|--------|---------|---------|
| Probabilities: | y = 1  | y = 2  | y = 3  | y = 4   | y = 5   |
| HDPHDxTUR=0    | 0.0033 | 0.1539 | 0.5050 | 0.3277  | 0.0100  |
| HDPHDxTUR=1    | 0.0126 | 0.2859 | 0.5163 | 0.1826  | 0.0025  |
| Difference 0→1 | 0.0093 | 0.1320 | 0.0113 | -0.1451 | -0.0075 |

*Effect of the Field of Study: Capital Intensive versus Non-Capital Intensive Fields*

According to Chen and Su (1995), students in capital-intensive fields (where a complementary relationship exists between the education received and the physical and social capital stock of the host country) will be less likely to return than students in non capital-intensive fields (such as law, sociology and the like). To test this, the highest degree fields were arranged into three groups: *HDnew1* (architecture, economics and administrative sciences); *HDnew2* (education, language, sociology, art) and *HDnew3* (engineering, mathematics, science and medicine). The reference category is *HDnew2*. In the ordered probit analysis, the coefficients on *HDnew1* and *HDnew3* are both positive and statistically significant at the 1 percent significance level, indicating that those in the “hard sciences” or more capital intensive fields (*HDnew3*), as defined by Chen and Su, are more

<sup>13</sup> The analysis was done with the dummies HD\_TUR (highest degree is from Turkey), FHD\_BS (highest degree is a foreign bachelors degree), FHD\_MS (highest degree is a foreign master's degree) and FHD\_PHD (highest degree is a foreign doctoral degree).

likely to stay abroad compared to those in education, language, and so on. However, the least likely to return are those who hold their highest degrees in architecture, economics or administrative sciences. Economic instability and the crisis environment in Turkey, which has had important repercussions in the banking and finance sectors, offers an explanation for this.

**Table 7.12 Marginal Effects of Fields of Study, Professionals**

|                                             | DRP     | DRNP    | RP      | RU      | DNR     |
|---------------------------------------------|---------|---------|---------|---------|---------|
| Probabilities:                              | y = 1   | y = 2   | y = 3   | y = 4   | y = 5   |
| HDnew2 = 1 (educ / lang / soc / art)        | 0.0063  | 0.2100  | 0.5225  | 0.2557  | 0.0054  |
| HDnew1 = 1 (arch / econ / admin)            | 0.0012  | 0.0907  | 0.4461  | 0.4393  | 0.0226  |
| HDnew3 = 1 (engin / math / science / medic) | 0.0029  | 0.1430  | 0.4985  | 0.3443  | 0.0114  |
| Change in Probability:                      |         |         |         |         |         |
| HDnew2 → HDnew1                             | -0.0051 | -0.1193 | -0.0764 | 0.1836  | 0.0172  |
| HDnew2 → HDnew3                             | -0.0034 | -0.0670 | -0.0240 | 0.0886  | 0.0060  |
| HDnew1 → HDnew3                             | 0.0017  | 0.0523  | 0.0524  | -0.0950 | -0.0112 |

#### *On-the-Job Training and Formal Training:*

One of the main arguments set forth by Chen and Su (1995) to explain the Taiwanese brain drain to Japan is on-the-job training. Training received on the job abroad after completing overseas studies is expected to instill skills that are given a higher premium in the country in which they are received. This wage differential, in turn, is supposed to favor the host country and keep foreign workers abroad. To test on-the-job training as a cause of brain drain directly, respondents were asked whether they have received informal on-the-job training at their current overseas jobs. Nearly 60 percent of respondents have received some on-the-job training, and for 10 percent, this training is specific to the organization and cannot be easily transferred to other organizations.

The following dummy variables were constructed: *OTJT1* (did not receive on-the-job training), *OTJT2* (general), *OTJT3* (specific to industry), and *OTJT4* (specific to organization). The signs on these variables were as expected. With “no on-the-job training” as the reference category, the coefficients of the “general”, “specific to industry” and “specific to organization” were positive but not statistically significant. This indicates that on-the-job training does not have explanatory power for differences in return intentions. On the other hand, formal training specific to the organization (represented by *FTr4*) is positive and statistically significant at the 10 percent level indicating that respondents who have

gone through formal specialized training are less likely to return. The marginal effects are given below in Table 7.13. The probability of not returning to Turkey ( $y = 4$  or  $5$ ) increases by 0.14 while the probability of definitely returning ( $y = 1$  or  $2$ ) falls by 0.08. Firm-specific training as a cause of brain drain is limited to a very small proportion of participants in the sample (3.8 percent).

**Table 7.13 Marginal Effect of Organization-Specific Formal Training**

|                | DRP     | DRNP    | RP      | RU      | DNR     |
|----------------|---------|---------|---------|---------|---------|
| Probabilities: | $y = 1$ | $y = 2$ | $y = 3$ | $y = 4$ | $y = 5$ |
| FTr4=0         | 0.0037  | 0.1618  | 0.5090  | 0.3164  | 0.0092  |
| FTr4=1         | 0.0012  | 0.0892  | 0.4439  | 0.4425  | 0.0231  |
| Difference 0→1 | -0.0025 | -0.0726 | -0.0651 | 0.1261  | 0.0139  |

#### *R&D Activities and Return Intentions:*

R&D activities may be grouped into three basic categories: basic research, applied research, and development (OECD, 1994). Respondents were asked what percentage of time they devoted to job-related activities that also included R&D. If respondents spent at least half their time on R&D activities, they were labeled R&D workers and placed in the R&D category. Again, a dummy variable was used: R&D (1 if R&D worker, 0 otherwise).

About 40 percent of those engaged in research and development activities are academicians ( $166/421 \times 100$ ). The R&D dummy variable was not significant at any conventional significance level. This is not an expected result since R&D activities are given a greater premium abroad and those engaged in R&D are expected to be less willing to return. The problem here may be how respondents interpreted the different job activities<sup>14</sup>.

#### *Academic vs. Non-Academic Professions:*

In the following analysis, “academic” refers to individuals who are teaching and/or doing research at a 4-year university or at research centers and medical schools affiliated with a 4-year university. Academicians make up 30 percent of the overseas labor force sample. A dummy variable, *academic2*, is used (1 for academic, 0 for non-academic) to

<sup>14</sup> The respondents were also asked if they had any patented inventions. A dummy variable ‘patent’ was constructed (1 = ‘has patent’; 0 = ‘does not have patent’) to determine whether return intentions for individuals with patents differed from those without. The coefficient for this variable was not statistically significant.



determine whether the return intentions of the academicians in the sample differ from the non-academic labor force. This variable is not found to be statistically significant, although it is an important modifier or interaction variable in the analysis of push and pull factors.

Table 7.14 Marginal Effect of Working in Academia or a Research Institution

|                | DRP     | DRNP    | RP      | RU     | DNR    |
|----------------|---------|---------|---------|--------|--------|
| Probabilities: | y = 1   | y = 2   | y = 3   | y = 4  | y = 5  |
| academic2=0    | 0.0041  | 0.1704  | 0.5127  | 0.3046 | 0.0083 |
| academic2=1    | 0.0020  | 0.1194  | 0.4798  | 0.3836 | 0.0153 |
| Difference 0→1 | -0.0021 | -0.0510 | -0.0329 | 0.0790 | 0.0070 |

#### *Effects of Various Push and Pull Factors:*

Income or wage differentials are cited as among the most important reasons for the brain drain. Many elaborate models of the brain drain found in the literature are based on explaining how this differential occurs. We use a relatively simple test of whether income differentials are important. To determine whether income differentials are important, we include a dummy variable that takes on the value 1 when a respondent indicates that a higher salary or wage is a “very important” or “important” reason for not returning or postponing returning to Turkey on a 5-point Likert scale. The disadvantage of this construct is that it is a subjective measure (for further elaboration see Section 7.3.1). The income variable was found to be statistically significant and therefore excluded from the final model.

Of the twelve “push” factors presented to participants, only four were found to be statistically significant: *pushC* (limited job opportunity in specialty), *pushD* (no opportunity for advanced training), *pushF* (lack of financial resources for business) and *pushK* (economic instability and uncertainty). Having limited job opportunities in specialization carries greater significance for those in academia or research-oriented institutions (given by dummy variable *academic2*). While the coefficient of *pushC* is not statistically significant, the coefficient of the interaction between *pushC* with *academic2* (*ACADxpushC*) is positive and significant at the 5 percent significance level. A significant interaction effect (at the 1 percent significance level) was found between having little or no opportunities for advanced training (*pushD*) and the *age* of participants (*AGExpushD*). Respondents who indicated that the lack of financial resources and opportunities for starting a business in

Turkey (*pushF*) was an important push factor for them are more likely to be returning. The coefficient on *pushF* is negative and significant at the 10 percent significance level. Economic instability and uncertainty, on the other hand, appears to have a strong negative effect on return intentions (statistically significant at 1 percent). The marginal effects on each of the significant push factors are presented in Table 7.15:

**Table 7.15 Marginal Effects of Various Push Factors**

|                                                            | DRP     | DRNP    | RP      | RU      | DNR     |
|------------------------------------------------------------|---------|---------|---------|---------|---------|
| Probabilities:                                             | y = 1   | y = 2   | y = 3   | y = 4   | y = 5   |
| <b>Limited job opportunity in specialty (academic2=1)</b>  |         |         |         |         |         |
| pushC=0                                                    | 0.0018  | 0.1121  | 0.4725  | 0.3968  | 0.0168  |
| pushC=1                                                    | 0.0013  | 0.0933  | 0.4497  | 0.4339  | 0.0218  |
| Difference 0→1                                             | -0.0005 | -0.0188 | -0.0228 | 0.0371  | 0.0050  |
| <b>No opportunity for advanced training</b>                |         |         |         |         |         |
| pushD=0                                                    | 0.0036  | 0.1613  | 0.5088  | 0.3171  | 0.0092  |
| pushD=1                                                    | 0.0030  | 0.1454  | 0.5000  | 0.3405  | 0.0111  |
| Difference 0→1                                             | -0.0006 | -0.0159 | -0.0088 | 0.0234  | 0.0019  |
| <b>Lack of financial resources for starting a business</b> |         |         |         |         |         |
| pushF=0                                                    | 0.0031  | 0.1494  | 0.5025  | 0.3344  | 0.0106  |
| pushF=1                                                    | 0.0046  | 0.1812  | 0.5165  | 0.2903  | 0.0074  |
| Difference 0→1                                             | 0.0015  | 0.0318  | 0.0140  | -0.0441 | -0.0032 |
| <b>Economic Instability</b>                                |         |         |         |         |         |
| pushK=0                                                    | 0.0086  | 0.2423  | 0.5233  | 0.2219  | 0.0039  |
| pushK=1                                                    | 0.0030  | 0.1462  | 0.5005  | 0.3393  | 0.0110  |
| Difference 0→1                                             | -0.0056 | -0.0961 | -0.0228 | 0.1174  | 0.0071  |

It is clear that the greatest negative effect on return intentions is due to economic instability and uncertainty: the probability of not returning ( $y = 4$  or  $5$ ) increases by 0.12 for those indicating that *pushK* was a “very important” or “important” push factor (which accounts for 85 percent of respondents in the sample). For those working in academic or research-oriented organizations, having no job opportunities in their specialization in Turkey increases the probability of not returning by 0.04. Having no advanced training opportunities increases the probability of non-return by 0.03 for the average respondent. However, this negative impact of *pushD* on return intentions is greater for older respondents (see Figure 7.7). On the other hand, the probability of definitely returning increases by 0.03 for those indicating that the lack of business opportunities in Turkey is an important push factor. This may be reflecting the fact that the percentage of non-academic

respondents who indicated *pushF* is an important factor is much greater than that of academics (33 percent versus 22 percent), who have a much higher non-return probability.

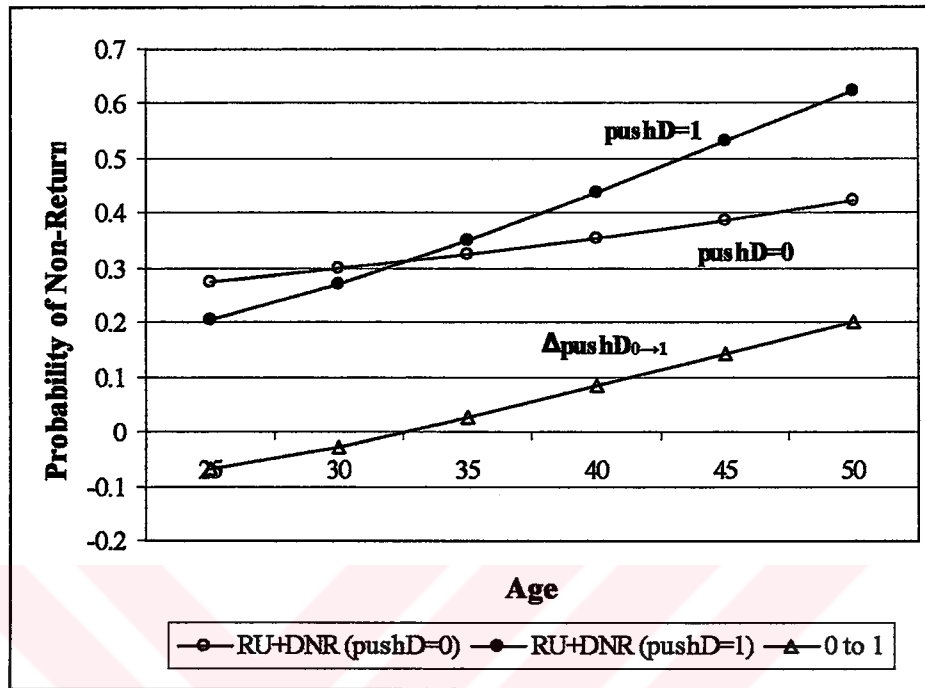


Figure 7.7 Effect of the Interaction between Age and Importance of Advanced Training Opportunities on the Probability of Not Returning ( $y = 4$  or  $5$ )

The number of significant pull factors is greater compared to the push factors. Eight of the twelve pull factors presented to participants are found to be statistically significant. Since respondents in the target group are residing outside Turkey, it is natural that factors in their immediate environment will have a greater impact on their current return intentions. Table 7.16 gives the marginal effects of the significant pull factors. The greatest negative impact on the probability of returning is from family considerations (*pullI* and *pullJ*), but there are gender differences. Spouse's job or preference appears to play a greater role in the stay decision of males. Greater opportunities for developing specialty (*pullE*), a more satisfying social and cultural life (*pullG*), proximity to research centers (*pullH*) and a more organized, ordered environment (*pullF*) follow. The other two pull factors—the need to finish or complete an overseas project (*pullK*) and other reasons (*pullL*) for male respondents—are associated with positive return intentions. For males, the effect of “other” factors is mainly that of wanting to return to complete military service in Turkey.

Table 7.16 Marginal Effects of Various Pull Factors

|                                                                   | DRP     | DRNP    | RP      | RU      | DNR     |
|-------------------------------------------------------------------|---------|---------|---------|---------|---------|
| Probabilities:                                                    | y = 1   | y = 2   | y = 3   | y = 4   | y = 5   |
| <b>Greater opportunity to develop specialty</b>                   |         |         |         |         |         |
| pullE=0                                                           | 0.0061  | 0.2062  | 0.5221  | 0.2600  | 0.0057  |
| pullE=1                                                           | 0.0028  | 0.1414  | 0.4975  | 0.3467  | 0.0116  |
| Difference 0→1                                                    | -0.0033 | -0.0648 | -0.0246 | 0.0867  | 0.0059  |
| <b>More organized, ordered environment</b>                        |         |         |         |         |         |
| pullF=0                                                           | 0.0051  | 0.1898  | 0.5189  | 0.2795  | 0.0067  |
| pullF=1                                                           | 0.0031  | 0.1499  | 0.5027  | 0.3337  | 0.0105  |
| Difference 0→1                                                    | -0.0020 | -0.0399 | -0.0162 | 0.0542  | 0.0038  |
| <b>More satisfying social / cultural life</b>                     |         |         |         |         |         |
| pullG=0                                                           | 0.0043  | 0.1756  | 0.5146  | 0.2976  | 0.0079  |
| pullG=1                                                           | 0.0019  | 0.1151  | 0.4756  | 0.3913  | 0.0162  |
| Difference 0→1                                                    | -0.0024 | -0.0605 | -0.0390 | 0.0937  | 0.0083  |
| <b>Proximity to research and innovation centers (academic2=1)</b> |         |         |         |         |         |
| pullH=0                                                           | 0.0029  | 0.1434  | 0.4988  | 0.3436  | 0.0113  |
| pullH=1                                                           | 0.0012  | 0.0904  | 0.4456  | 0.4401  | 0.0228  |
| Difference 0→1                                                    | -0.0017 | -0.0530 | -0.0532 | 0.0965  | 0.0115  |
| <b>Spouse's preference or job</b>                                 |         |         |         |         |         |
| pullI=0                                                           | 0.0049  | 0.1861  | 0.5179  | 0.2840  | 0.0070  |
| pullI=1                                                           | 0.0016  | 0.1075  | 0.4675  | 0.4055  | 0.0179  |
| Difference 0→1                                                    | -0.0033 | -0.0786 | -0.0504 | 0.1215  | 0.0109  |
| <b>Better educational opportunities for children</b>              |         |         |         |         |         |
| pullJ=0                                                           | 0.0050  | 0.1877  | 0.5184  | 0.2821  | 0.0069  |
| pullJ=1                                                           | 0.0019  | 0.1161  | 0.4767  | 0.3894  | 0.0159  |
| Difference 0→1                                                    | -0.0031 | -0.0716 | -0.0417 | 0.1073  | 0.0090  |
| <b>Need to finish / continue with current project</b>             |         |         |         |         |         |
| pullK=0                                                           | 0.0026  | 0.1370  | 0.4944  | 0.3537  | 0.0123  |
| pullK=1                                                           | 0.0149  | 0.3064  | 0.5103  | 0.1664  | 0.0021  |
| Difference 0→1                                                    | 0.0123  | 0.1694  | 0.0159  | -0.1873 | -0.0102 |
| <b>Other pull reason (male=1)</b>                                 |         |         |         |         |         |
| pullL=0                                                           | 0.0042  | 0.1731  | 0.5137  | 0.3009  | 0.0081  |
| pullL=1                                                           | 0.0148  | 0.3059  | 0.5105  | 0.1668  | 0.0021  |
| Difference 0→1                                                    | 0.0106  | 0.1328  | -0.0032 | -0.1341 | -0.0060 |

### *Effect of Difficulties Faced Abroad and Adjustment Factors*

The main difficulty with life abroad that was statistically significant ( $\alpha = 0.05$ ) in the empirical analysis is that of missing one's family in Turkey (*difabrdA*). The probability of returning ( $y = 1$  or  $2$ ) increases by 0.05 for those who indicate that missing family is one of the difficulties they have faces while abroad. "Missing family" was an important difficulty for a great proportion of respondents in the sample (83%). Previous experience and involvement in a Turkish student association also have a similar, but slightly greater impact on return intentions. The greater return intentions associated with these adjustment factors may be due to the fact that respondents who indicate they have had difficulties abroad also have to adjust compared to those who indicate they had no difficulties and therefore did not need to adjust.

**Table 7.17 Marginal Effects of Difficulties Faced Abroad and Adjustment Factors**

|                                                       | DRP<br>y = 1 | DRNP<br>y = 2 | RP<br>y = 3 | RU<br>y = 4 | DNR<br>y = 5 |
|-------------------------------------------------------|--------------|---------------|-------------|-------------|--------------|
| <b>Probabilities:</b>                                 |              |               |             |             |              |
| <b>Difficulty: missing family</b>                     |              |               |             |             |              |
| difabrdA=0                                            | 0.0020       | 0.1199        | 0.4803      | 0.3827      | 0.0152       |
| difabrdA=1                                            | 0.0039       | 0.1674        | 0.5115      | 0.3086      | 0.0086       |
| Difference 0→1                                        | 0.0019       | 0.0475        | 0.0312      | -0.0741     | -0.0066      |
| <b>Adjustment factor: previous experience</b>         |              |               |             |             |              |
| adj_A=0                                               | 0.0025       | 0.1327        | 0.4912      | 0.3608      | 0.0129       |
| adj_A=1                                               | 0.0055       | 0.1967        | 0.5204      | 0.2711      | 0.0063       |
| Difference 0→1                                        | 0.0030       | 0.0640        | 0.0292      | -0.0897     | -0.0066      |
| <b>Adjustment factor: Turkish-Student Association</b> |              |               |             |             |              |
| adj_C=0                                               | 0.0034       | 0.1557        | 0.5060      | 0.3251      | 0.0098       |
| adj_C=1                                               | 0.0070       | 0.2197        | 0.5234      | 0.2451      | 0.0049       |
| Difference 0→1                                        | 0.0036       | 0.0640        | 0.0174      | -0.0800     | -0.0049      |

### *Effect of Language of Instruction in High School*

The effect of foreign language high school instruction was looked at with the dummy variable *HSsciTUR*, which takes on a value of 1 when language instruction for science courses is Turkish. However, this variable is positively associated with difficulties faced abroad (*difabrdA*) and previous experience as an adjustment factor (*adj\_A*), as well as other factors. As a result it is statistically insignificant in the model. In a model with only gender, initial intentions and stay duration, *HSsciTUR* becomes statistically significant at the 5 percent level.

### *Effect of Last Impressions*

Return intentions may be shaped by the last impression from the latest trip to Turkey. In this section we consider the effect of the last visit made to Turkey on the return intentions of participants. A visit to Turkey made after a long period of time abroad may radically change an individual's perceptions about conditions in Turkey, either for the better or for the worse. Whatever the case, these personal observations lead to changes in the probability of returning. The probability of returning ( $y = 1$  or  $2$ ) decreases by about 0.04 for those who were negatively effected by their last trip to Turkey, and increases by 0.22 for those who were left with more positive impressions. From this, it appears that positive impressions appear to have a greater impact on the probability of returning.

The effect of the September 11, 2001 terrorist attacks in New York is also considered in this section. The effect, in general, is to increase return intentions (*sept11\_inc* is negative and statistically significant at the 5 percent significance level. The probability of returning ( $y = 1$  or  $2$ ) increases by 0.07. For a small minority of respondents, Sept.11 had the opposite effect on return intentions (*sept11\_dec* is not statistically significant and is therefore excluded from the final model). In one participant's opinion:

Experiencing first hand both the earthquake in Turkey and the 9/11 attacks in NYC, my determination of staying in the US has grown even stronger. The organization of the rescue efforts, the value to human life, the role of gov't and many other aspects that influence our lives directly are far superior in this country then my home country.

**Table 7.18 Marginal Effect of the Last Visit to Turkey and of September 11**

|                                                              | DRP<br>y = 1 | DRNP<br>y = 2 | RP<br>y = 3 | RU<br>y = 4 | DNR<br>y = 5 |
|--------------------------------------------------------------|--------------|---------------|-------------|-------------|--------------|
| <b>Probabilities:</b>                                        |              |               |             |             |              |
| <b>Last visit to Turkey<br/>decreased return intentions:</b> |              |               |             |             |              |
| lastvis1=0                                                   | 0.0040       | 0.1687        | 0.5120      | 0.3068      | 0.0085       |
| lastvis1=1                                                   | 0.0025       | 0.1337        | 0.4920      | 0.3590      | 0.0128       |
| Difference 0→1                                               | -0.0015      | -0.0350       | -0.0200     | 0.0522      | 0.0043       |
| <b>Last visit to Turkey<br/>increased return intentions:</b> |              |               |             |             |              |
| lastvis3=0                                                   | 0.0029       | 0.1435        | 0.4988      | 0.3434      | 0.0113       |
| lastvis3=1                                                   | 0.0204       | 0.3479        | 0.4934      | 0.1369      | 0.0014       |
| Difference 0→1                                               | 0.0175       | 0.2044        | -0.0054     | -0.2065     | -0.0099      |
| <b>Sept. 11 increased return<br/>intentions:</b>             |              |               |             |             |              |
| sept11_inc=0                                                 | 0.0033       | 0.1525        | 0.5043      | 0.3298      | 0.0102       |
| sept11_inc=1                                                 | 0.0070       | 0.2196        | 0.5234      | 0.2451      | 0.0049       |
| Difference 0→1                                               | 0.0037       | 0.0671        | 0.0191      | -0.0847     | -0.0053      |



### 7.5 Determinants of the Return Intentions of Turkish Students

The previous section examined the determinants of return intentions of Turkish nationals who are currently working abroad. In this section, the results of the empirical investigation for students are presented. The focus is on the return intentions of Turkish students studying at higher education institutions in different parts of the world. Much of the analyses presented in the previous section are in agreement with that of students; thus, a more brief treatment of the results will follow. The same estimation strategies and methodologies apply for the investigation of the return intentions of Turkish students.

#### *Gender and Age Effects:*

Unlike the results for the overseas working population, gender and age do not appear to be significant in explaining differences in return intentions for the overseas Turkish student population. The coefficients on the “female”, “age”, and “agesq” variables are not statistically significant at any of the conventional significance levels. This result continues to hold when the stay duration variable is excluded.

Table 7.19 Marginal Effect of Gender, Students

|                | <i>R_BS</i> | <i>R_IAS</i> | <i>R_NSAS</i> | <i>RP</i> | <i>RU</i> | <i>DNR</i> |
|----------------|-------------|--------------|---------------|-----------|-----------|------------|
| Probabilities: | y = 1       | y = 2        | y = 3         | y = 4     | y = 5     | y = 6      |
| <b>Gender</b>  |             |              |               |           |           |            |
| female=0       | 0.0007      | 0.0678       | 0.4523        | 0.3633    | 0.1141    | 0.0018     |
| female=1       | 0.0005      | 0.0532       | 0.4179        | 0.3867    | 0.1392    | 0.0026     |
| Difference 0→1 | -0.0002     | -0.0146      | -0.0344       | 0.0234    | 0.0251    | 0.0008     |

#### *Stay Duration:*

The stay duration variable is positive and statistically significant at the 1 per cent significance level. As the length of stay in the host country increases, the tendency to “not return to Turkey” also increases. This is as expected, since time helps overcome adjustment problems, if they exist. As time passes, ties to Turkey may weaken while ties to the country of study may strengthen (e.g. brain drain caused by marrying a national of the host country may increase, but this is tested with a separate variable). Figure 7.8 gives the marginal effects of different stay durations for each return intention category.

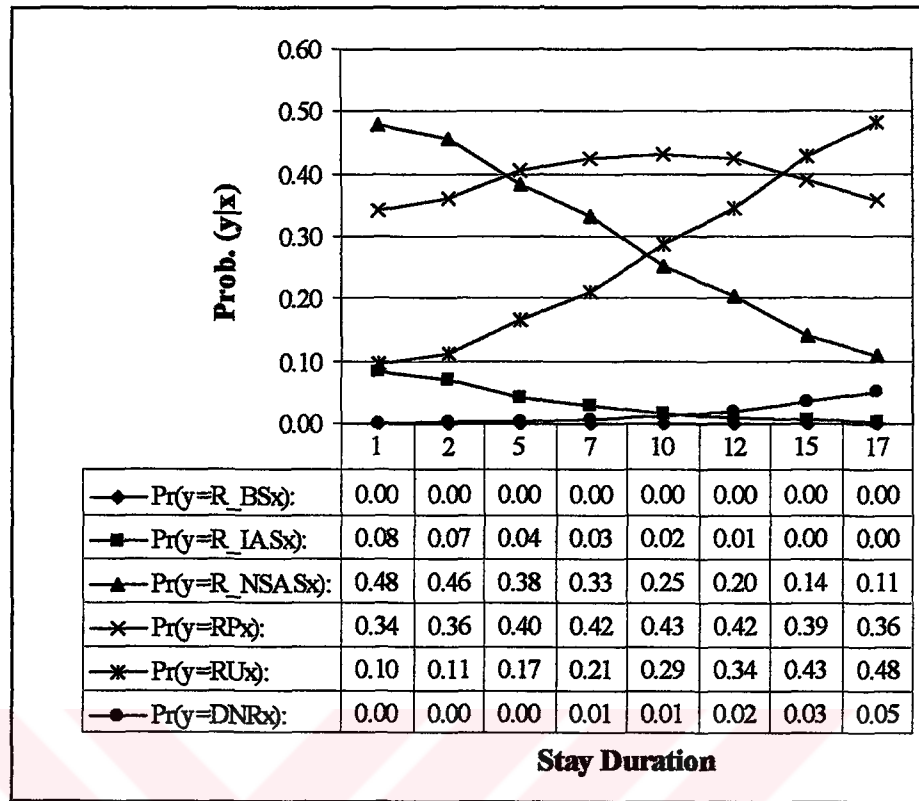


Figure 7.8 Effect of Stay Duration on Return Intentions, Students

*Notes:* R\_BS: return as soon as possible without completing studies; R\_IAS: return immediately after completing studies; R\_NSAS: definitely return but not soon after completing studies; RP: probably return RU: return unlikely; DNR: definitely not return

#### *Effect of Initial Intentions:*

Initial intentions about whether to return to Turkey prior to starting overseas studies are important in determining current return intentions. A little more than half the of the students sampled intended to return, while one out of every ten student intended not to return (stay in current country). The same dummy variables as in the previous section, INIT\_STAY and INIT\_UNSURE, are used in the model, the reference variable being the “intention to return”. The coefficients on both variables are positive and statistically significant ( $\alpha = 0.01$ ), which indicates that those who have indicated that they will “stay” in the current country or are “unsure” about returning are more likely to indicate that their current intention is to “not return”. The probability of not returning ( $y = 5, 6$ ) increases by 0.32 when initial intention changes from “stay” to “unsure” and by 0.38 when the change is

from “stay” to “return”. These large effects suggest that initial determination becomes an important factor in shaping current intentions for Turkish students.

**Table 7.20 Marginal Effects of Initial Return Intentions, Students**

|                           | <i>R_BS</i> | <i>R_IAS</i> | <i>R_NSAS</i> | <i>RP</i> | <i>RU</i> | <i>DNR</i> |
|---------------------------|-------------|--------------|---------------|-----------|-----------|------------|
| Probabilities:            | y = 1       | y = 2        | y = 3         | y = 4     | y = 5     | y = 6      |
| init_STAY = 1             | 0.0000      | 0.0039       | 0.1278        | 0.3785    | 0.4495    | 0.0402     |
| init_UNSURE = 1           | 0.0003      | 0.0426       | 0.3860        | 0.4038    | 0.1638    | 0.0036     |
| init_RETURN = 1           | 0.0017      | 0.1089       | 0.5132        | 0.3039    | 0.0715    | 0.0007     |
| Change in Probability:    |             |              |               |           |           |            |
| init_STAY → init_UNSURE   | 0.0003      | 0.0387       | 0.2582        | 0.0253    | -0.2857   | -0.0366    |
| init_UNSURE → init_RETURN | 0.0014      | 0.0663       | 0.1272        | -0.0999   | -0.0923   | -0.0029    |
| init_STAY → init_RETURN   | 0.0017      | 0.105        | 0.3854        | -0.0746   | -0.3780   | -0.0007    |

*Effect of Family Support:*

The student sample was also asked the degree that they felt that their families supported them in the initial decision to study abroad and whether they would support them in the decision to settle abroad permanently. For the initial decision to study abroad, three-quarters of the student sample indicated that their families were very supportive. In general, this initial support does not have any statistical significance with respect to the current intention to return. Compared to the initial decision to study abroad, family encouragement to settle abroad is considerably less, although it is still high (53% of the sample).

Initially, dummy variables for each category were included in the model as regressors. Since the first three categories “actively discourage”, “not very supportive” and “not sure” are not statistically different from each other, they are combined into the broader category FAMSUP2\_NS: “not supportive”, which is used as the reference category. The same is done for the “somewhat supportive” and “most likely supportive” categories since they are also not statistically different from each other. They are combined into a new “somewhat supportive” category: FAMSUP2\_SS. Only the “definitely not support” category is not changed (FAMSUP2\_DS). The signs on the FAMSUP2\_SS and FAMSUP2\_DS dummy variables are positive and statistically significant at the 5 percent and 1 percent significance level respectively. Greater family encouragement to settle abroad results in a greater tendency to indicate non-return intentions, and vice versa. The marginal effects of the family support variables are given below. Compared to respondents whose families are not supportive (NS), the likelihood of not returning (y = 5 or 6) increases by

0.04 for those whose families are somewhat supportive (SS), and by 0.08 for those whose families are definitely supportive (DS).

**Table 7.21 Marginal Effects of the Family Support Variables, Students**

|                        | <i>R_BS</i> | <i>R_IAS</i> | <i>R_NSAS</i> | <i>RP</i> | <i>RU</i> | <i>DNR</i> |
|------------------------|-------------|--------------|---------------|-----------|-----------|------------|
| Probabilities:         | y = 1       | y = 2        | y = 3         | y = 4     | y = 5     | y = 6      |
| FAMSUP2_NS=1           | 0.0012      | 0.0921       | 0.4931        | 0.3270    | 0.0856    | 0.0010     |
| FAMSUP2_SS=1           | 0.0006      | 0.0616       | 0.4387        | 0.3732    | 0.1239    | 0.0021     |
| FAMSUP2_DS=1           | 0.0003      | 0.0411       | 0.3808        | 0.4061    | 0.1679    | 0.0038     |
| Change in Probability: |             |              |               |           |           |            |
| NS to SS               | -0.0006     | -0.0305      | -0.0544       | 0.0462    | 0.0383    | 0.0011     |
| SS to DS               | -0.0003     | -0.0205      | -0.0579       | 0.0329    | 0.044     | 0.0017     |
| NS to DS               | -0.0009     | -0.051       | -0.1123       | 0.0791    | 0.0823    | 0.0028     |

#### *Effects of Parents' Education:*

Parents' educational levels were included in the ordered probit model as possible socioeconomic background indicators for the respondents. A dummy variable was constructed for each level of education and different levels of education were used as reference to determine whether any significant differences existed in the return intentions of students with different family backgrounds. None of the parents' education level dummies were statistically significant except for the master's level for fathers' educational attainment ( $\alpha = 0.05$ ). Again, as for the working population sample, there was no *a priori* reason to believe that we would find significant effects for these two social background variables. As shown in the previous chapter, the student sample also comes from highly educated backgrounds. Three-quarters of female students and two-thirds of male students have fathers who possess a bachelor's or higher degree. These are the same percentages as for the working population sample. Mothers' educational attainments, on the other hand, are slightly higher for the student sample (51% vs. 47% for female respondents and 41% vs. 34% for male respondents).

#### *Effect of Academic Conditions:*

Students were asked to compare their academic environments in their current country of study to that in Turkey. The great majority (close to 90 per cent) of students indicated that academic conditions were either "better" or "much better". A dummy variable was constructed for each assessment category, and only the "much worse" category appeared statistically significant at the 5 per cent significance level with reference to the other

categories. However, only two individuals chose the “much worse” category, and when this category was chosen as the reference, none of the other categories were statistically significant. This indicates that the academic assessment variables do not have any explanatory power and may be excluded from the model.

#### *Effect of Social Conditions:*

In the previous section, social environment was found to be important in explaining differences in return intentions for the working population. Hence, it is expected that this will be true for the student sample as well. A third of respondents have indicated that their current social environment is “neither better nor worse” than it was in Turkey, and a significant number (43 per cent) indicate that it is “worse” or “much worse”.

The above categories above were reduced to three (not counting the “don’t know” category) by combining the “worse” and “much worse” categories, and the “better” and “much better” categories. With “much worse” as the reference category, both the “neither better nor worse” and “better” categories are positive and statistically significant at the 1 per cent significance level. When the reference category is “much better”, both the “neither better nor worse” and “worse” dummy variables are negative and statistically significant, at the the 5 per cent and 1 per cent significance levels respectively. As before, the social environment is found to be an important determinant of current return intentions. Those who are less satisfied with their social conditions abroad are more likely to indicate that they will return.

#### *Standard of Living Assessment:*

Students were also asked to assess their standard of living using the same scale as above. The distribution of responses is tilted toward the “much better” end of the scale. Since the coefficients of the “much better” and “better” dummy variables are not statistically different from each other, they are combined. Similarly, the first four categories can also be combined into a single category because they are statistically insignificant with respect to each other. This latter variable is used as the reference. The coefficient of the “standard of living is better” variable (*SOL\_B*) is positive and statistically significant at the 5 percent significance level. Not surprisingly, once again, students who assess their standard of living abroad as being better or much better than in Turkey show greater intention to stay (not return).

Table 7.22 Marginal Effects of Social and Standard of Living Assessments, Students

|                                                             | <i>R_BS</i> | <i>R_IAS</i> | <i>R_NSAS</i> | <i>RP</i> | <i>RU</i> | <i>DNR</i> |
|-------------------------------------------------------------|-------------|--------------|---------------|-----------|-----------|------------|
| Probabilities:                                              | y = 1       | y = 2        | y = 3         | y = 4     | y = 5     | y = 6      |
| <b>Social Assessment: Worse or Much Worse</b>               |             |              |               |           |           |            |
| soc_W=0                                                     | 0.0004      | 0.0458       | 0.3964        | 0.3986    | 0.1555    | 0.0032     |
| soc_W=1                                                     | 0.0011      | 0.0882       | 0.4877        | 0.3325    | 0.0893    | 0.0011     |
| Difference 0→1                                              | 0.0007      | 0.0424       | 0.0913        | -0.0661   | -0.0662   | -0.0021    |
| <b>Standard of Living Assessment: Better or Much Better</b> |             |              |               |           |           |            |
| SOL_B=0                                                     | 0.0009      | 0.0776       | 0.4708        | 0.3482    | 0.1011    | 0.0014     |
| SOL_B=1                                                     | 0.0005      | 0.0557       | 0.4245        | 0.3826    | 0.1343    | 0.0024     |
| Difference 0→1                                              | -0.0004     | -0.0219      | -0.0463       | 0.0344    | 0.0332    | 0.0010     |

*Turkish Student Association Membership:*

More than half the students responding to the survey belong to a Turkish student association or society (TSA) at their institution of study (see the Table below). Membership in these cultural associations turns out to be an important determinant of return intentions. The coefficient of the dummy variable for membership (TSA\_member) is negative and statistically significant at the 1 per cent significance level, indicating that students who are members of TSAs are more likely to have return intentions. This probably reflects a preference on the part of TSA members to be with fellow nationals compared to non-members and is possibly an indication of stronger “cultural ties” to Turkey.

If a student is not a member of a TSA, this is because of personal choice or because no TSA exists. Not being a member by choice and not being a member because no TSA exists were not statistically different from each other and were, therefore, used combined as the reference category.

Table 7.23 Marginal Effect of Turkish Student Association Membership, Students

|                                               | <i>R_BS</i> | <i>R_IAS</i> | <i>R_NSAS</i> | <i>RP</i> | <i>RU</i> | <i>DNR</i> |
|-----------------------------------------------|-------------|--------------|---------------|-----------|-----------|------------|
| Probabilities:                                | y = 1       | y = 2        | y = 3         | y = 4     | y = 5     | y = 6      |
| <b>Turkish Student Association membership</b> |             |              |               |           |           |            |
| TSA_member=0                                  | 0.0004      | 0.0511       | 0.4121        | 0.3901    | 0.1435    | 0.0020     |
| TSA_member=1                                  | 0.0008      | 0.0709       | 0.4583        | 0.3586    | 0.1098    | 0.0016     |
| Difference 0→1                                | 0.0004      | 0.0198       | 0.0462        | -0.0315   | -0.0337   | -0.0004    |



### *Effects of the Field of Study:*

In the previous section on the return intentions of Turkish professionals, the Chen and Su (1995) hypothesis that on-the-job training causes “brain drain” was tested. Chen and Su used a dummy for capital-dependent disciplines, which they determined to be medicine, engineering and business. In their econometric analysis, they found that capital dependent disciplines suffered more from brain drain than non-capital dependent disciplines. The same dummy variable for capital-dependent disciplines is constructed in our analysis to see if the same result will hold for the sample of Turkish students currently studying abroad. This dummy variable turned out to be statistically insignificant<sup>15</sup>.

### *Effect of the Initial Reasons for Going*

The initial reasons for pursuing overseas studies also determine who is more likely to return immediately after completing their studies (Table 7.24). The greatest positive marginal effect on the probability of returning immediately after finishing studies is when the main reason why respondents have gone abroad is to be with their spouse or families: the probability of returning immediately increases by 0.11. When there is compulsory service or job requirement—such as when higher education institutions in Turkey require foreign degrees before they grant tenure positions—the probability of returning immediately increases by 0.03. This is one of the important “push” factors that cause many who are contemplating academic careers in Turkey to go abroad to get foreign higher level degrees. While the probability of return increases when respondents have left because of a job requirement, many do not have immediate return plans. Given that stay duration affects the probability of returning negatively, many are not expected to return, especially if they find good positions abroad. According to one participant:

Having gone through graduate programs both at METU and Northeastern, I can easily say that METU had a much better program. Most of my grad coursework at Northeastern was at the level of METU undergrad. I suspect this is the case for most US universities. Given this fact, it's remarkable that METU forces (or at least forced in 1995) its assistants to get degrees in the US. It's no surprise that METU graduates get the best jobs in the US.

---

<sup>15</sup> A dummy variable for each discipline, in turn, was also used in the model to determine whether certain fields of study are more prone to brain drain than other. The disciplines are “architecture”, “economic and administrative sciences”, “engineering and technical sciences”, “education sciences”, “language and literature”, “math and natural science”, “medicine”, “social sciences”, and “arts”. None were found to be statistically significant from each other except for econ./admin. and engin./tech. with education at the 5 per cent significance level.

Table 7.24 Marginal Effects of the Reasons for Going Abroad, Students

|                                                                         | <i>R_BS</i> | <i>R_LAS</i> | <i>R_NSAS</i> | <i>RP</i> | <i>RU</i> | <i>DNR</i> |
|-------------------------------------------------------------------------|-------------|--------------|---------------|-----------|-----------|------------|
| Probabilities:                                                          | y = 1       | y = 2        | y = 3         | y = 4     | y = 5     | y = 6      |
| <b>Learn / improve language skills</b>                                  |             |              |               |           |           |            |
| whygo_A=0                                                               | 0.0005      | 0.0580       | 0.4302        | 0.3789    | 0.1300    | 0.0023     |
| whygo_A=1                                                               | 0.0008      | 0.0742       | 0.4646        | 0.3535    | 0.1054    | 0.0015     |
| Difference 0→1                                                          | 0.0003      | 0.0162       | 0.0344        | -0.0254   | -0.0246   | -0.0008    |
| <b>Job requirement in Turkey</b>                                        |             |              |               |           |           |            |
| whygo_C=0                                                               | 0.0004      | 0.0503       | 0.4099        | 0.3913    | 0.1452    | 0.0028     |
| whygo_C=1                                                               | 0.0010      | 0.0814       | 0.4771        | 0.3426    | 0.0967    | 0.0013     |
| Difference 0→1                                                          | 0.0006      | 0.0311       | 0.0672        | -0.0487   | -0.0485   | -0.0015    |
| <b>Insufficient facilities for research</b>                             |             |              |               |           |           |            |
| whygo_F=0                                                               | 0.0007      | 0.0662       | 0.4487        | 0.3660    | 0.1166    | 0.0018     |
| whygo_F=1                                                               | 0.0005      | 0.0542       | 0.4204        | 0.3851    | 0.1372    | 0.0025     |
| Difference 0→1                                                          | -0.0002     | -0.0120      | -0.0283       | 0.0191    | 0.0206    | 0.0007     |
| <b>Prestige and advantages of international study</b>                   |             |              |               |           |           |            |
| whygo_G=0                                                               | 0.0005      | 0.0549       | 0.4222        | 0.3840    | 0.1359    | 0.0025     |
| whygo_G=1                                                               | 0.0006      | 0.0638       | 0.4437        | 0.3697    | 0.1202    | 0.0019     |
| Difference 0→1                                                          | 0.0001      | 0.0089       | 0.0215        | -0.0143   | -0.0157   | -0.0006    |
| <b>Lifestyle preference</b>                                             |             |              |               |           |           |            |
| whygo_H=0                                                               | 0.0007      | 0.0684       | 0.4533        | 0.3625    | 0.1134    | 0.0017     |
| whygo_H=1                                                               | 0.0003      | 0.0446       | 0.3927        | 0.4005    | 0.1585    | 0.0034     |
| Difference 0→1                                                          | -0.0004     | -0.0238      | -0.0606       | 0.0380    | 0.0451    | 0.0017     |
| <b>To be with spouse / family</b>                                       |             |              |               |           |           |            |
| whygo_I=0                                                               | 0.0005      | 0.0562       | 0.4257        | 0.3818    | 0.1333    | 0.0024     |
| whygo_I=1                                                               | 0.0038      | 0.1629       | 0.5495        | 0.2407    | 0.0429    | 0.0003     |
| Difference 0→1                                                          | 0.0033      | 0.1067       | 0.1238        | -0.1411   | -0.0904   | -0.0021    |
| <b>Get away from political environment</b>                              |             |              |               |           |           |            |
| whygo_K=0                                                               | 0.0009      | 0.0767       | 0.4691        | 0.3497    | 0.1022    | 0.0014     |
| whygo_K=1                                                               | 0.0002      | 0.0301       | 0.3376        | 0.4221    | 0.2043    | 0.0057     |
| Difference 0→1                                                          | -0.0007     | -0.0466      | -0.1315       | 0.0724    | 0.1021    | 0.0043     |
| <b>Reason for choosing current institution: job opportunities</b>       |             |              |               |           |           |            |
| DC_E=0                                                                  | 0.0008      | 0.0715       | 0.4596        | 0.3576    | 0.1089    | 0.0016     |
| DC_E=1                                                                  | 0.0003      | 0.0399       | 0.3767        | 0.4080    | 0.1712    | 0.0040     |
| Difference 0→1                                                          | -0.0005     | -0.0316      | -0.0829       | 0.0504    | 0.0623    | 0.0024     |
| <b>Reason for choosing current institution: same location as spouse</b> |             |              |               |           |           |            |
| DC_F=0                                                                  | 0.0007      | 0.0676       | 0.4518        | 0.3637    | 0.1144    | 0.0018     |
| DC_F=1                                                                  | 0.0001      | 0.0270       | 0.3227        | 0.4259    | 0.2177    | 0.0066     |
| Difference 0→1                                                          | -0.0006     | -0.0406      | -0.1291       | 0.0622    | 0.1033    | 0.0048     |

The other reasons for pursuing foreign studies abroad that have a positive effect on return intentions are when respondents go abroad in order to improve their language skills or if they want to take advantage of the prestige and opportunities associated with overseas studies. International diplomas are an important signal to employees in Turkey and those with foreign degrees are more likely to get accepted or promoted. Foreign degrees, therefore, increase the employability of individuals in Turkey, which is a factor that has a positive effect on return intentions. Language skills are also given a premium by Turkish employers.

When respondents go abroad to get away from the political environment, or due to lifestyle preferences, or because they find the facilities and equipment in Turkey to do research insufficient, they are very unlikely to return. The probability of not returning ( $y = 5$  or  $6$ ) increases by 0.11 for those who left due to political reasons, by 0.05 for those who left due to a lifestyle preference, and 0.02 for those who left due to insufficient facilities for research. If students choose their current institution of study because of the job opportunities they are given or to be in the same location as their spouse, the probability of non-return increases by 0.06 and 0.11, respectively. Interestingly, the effect of family considerations can have quite different effects on the intention of returning.

#### *Effect of Difficulties Faced Abroad and Adjustment Factors:*

Just as in the professionals case, the probability of definitely returning increases when the psychic costs associated with being in a foreign country are high. When employment prospects abroad are dim, the probability of returning immediately after completing studies increases by 0.03 (Table 7.25). When respondents indicate that they had to adjust to their environment (which is implied when they choose certain factors such as previous experience as important in adjusting), the probability of returning also increases. While Turkish friends at current institution of study may be important for easing adjustment, those who indicated that this was an important adjustment factor for them are more likely to be returning. This may also be an indication of strong ties to Turkish community and to Turkey for some.

#### *Effects of Compulsory Academic Service and Plans for Academic Career*

As expected, students who finance their studies with national scholarships that have a compulsory academic service requirement are more likely to be returning immediately after completing their studies. The probability of returning immediately is 0.05 for those

without a compulsory academic service requirement, and 0.17 for those who have this requirement. While the marginal effect between these two groups appears to be large (0.12), what is worrisome is that the probability of returning immediately is not higher. Non-returning students are an indication that the scholarships are not as successful as they can be. Those who are planning an academic career are also more likely to have return intentions. Despite the difficulties within the higher education system in Turkey, universities provide greater opportunities for employment compared to other sectors, especially in the recent economic crisis environment where many university graduates face the prospect of being unemployed.

**Table 7.25 Marginal Effects of Difficulties Abroad and Adjustment Factors, Students**

|                                                          | <i>R_BS</i> | <i>R_IAS</i> | <i>R_NSAS</i> | <i>RP</i> | <i>RU</i> | <i>DNR</i> |
|----------------------------------------------------------|-------------|--------------|---------------|-----------|-----------|------------|
| Probabilities:                                           | y = 1       | y = 2        | y = 3         | y = 4     | y = 5     | y = 6      |
| <b>Adjustment factor: previous experience</b>            |             |              |               |           |           |            |
| adj_A=0                                                  | 0.0005      | 0.0548       | 0.4221        | 0.3841    | 0.1360    | 0.0025     |
| adj_A=1                                                  | 0.0009      | 0.0772       | 0.4701        | 0.3488    | 0.1015    | 0.0014     |
| Difference 0→1                                           | 0.0004      | 0.0224       | 0.048         | -0.0353   | -0.0345   | -0.0011    |
| <b>Adjustment factor: Turkish friends at institution</b> |             |              |               |           |           |            |
| adj_F=0                                                  | 0.0005      | 0.0536       | 0.4188        | 0.3861    | 0.1385    | 0.0026     |
| adj_F=1                                                  | 0.0007      | 0.0688       | 0.4541        | 0.3619    | 0.1128    | 0.0017     |
| Difference 0→1                                           | 0.0002      | 0.0152       | 0.0353        | -0.0242   | -0.0257   | -0.0009    |
| <b>Difficulties faced while abroad: unemployment</b>     |             |              |               |           |           |            |
| difabrdF=0                                               | 0.0006      | 0.0606       | 0.4363        | 0.3749    | 0.1256    | 0.0021     |
| difabrdF=1                                               | 0.0013      | 0.0925       | 0.4936        | 0.3264    | 0.0852    | 0.0010     |
| Difference 0→1                                           | 0.0007      | 0.0319       | 0.0573        | -0.0485   | -0.0404   | -0.0011    |

**Table 7.26 Marginal Effects of Compulsory Academic Service and Plans for an Academic Career, Students**

|                                                       | <i>R_BS</i> | <i>R_IAS</i> | <i>R_NSAS</i> | <i>RP</i> | <i>RU</i> | <i>DNR</i> |
|-------------------------------------------------------|-------------|--------------|---------------|-----------|-----------|------------|
| Probabilities:                                        | y = 1       | y = 2        | y = 3         | y = 4     | y = 5     | y = 6      |
| <b>Respondent plans to work in academia</b>           |             |              |               |           |           |            |
| academic_b=0                                          | 0.0003      | 0.0409       | 0.3802        | 0.4064    | 0.1684    | 0.0038     |
| academic_b=1                                          | 0.0007      | 0.0694       | 0.4554        | 0.3609    | 0.1119    | 0.0017     |
| Difference 0→1                                        | 0.0004      | 0.0285       | 0.0752        | -0.0455   | -0.0565   | -0.0021    |
| <b>Respondent has compulsory academic requirement</b> |             |              |               |           |           |            |
| compulsory=0                                          | 0.0004      | 0.0481       | 0.4033        | 0.3950    | 0.1503    | 0.0030     |
| compulsory=1                                          | 0.0039      | 0.1658       | 0.5505        | 0.2377    | 0.0418    | 0.0003     |
| Difference 0→1                                        | 0.0035      | 0.1177       | 0.1472        | -0.1573   | -0.1085   | -0.0027    |

### *Effects of Various Push and Pull Factors:*

Two push factors were important in determining return intentions for students: being away from research centers / recent advances and finding the cultural or social life to be less than satisfying in Turkey. The negative impact of finding the cultural and social life in Turkey less satisfying is slightly less for those contemplating academic careers (0.07 compared to 0.10). The marginal impact of being away from research centers and recent advances on the probability of not returning is 0.04.

The pull factors that significantly affect the return intentions of students are a higher income level in the host country (pullA), a more ordered and organized life (pullF), and spouse's preference or job (pullI). The greatest negative impact on return intentions are due to family considerations, followed by income levels and a more ordered lifestyle. The marginal impact on each return intention category is given in Table 7.28. The importance of salary levels for students contemplating an academic career is confirmed by the following observation.

From talking with students who decide to stay here rather than go back to Turkey, the primary reason is financial. Very able PhD graduates who can become excellent faculty in Turkey, most of the time decide on even a mediocre job here (which will not satisfy them in the long run) rather than become a faculty member in Turkey with the current salaries. If Turkey does not improve the living standards of University faculty ... the price paid will be incalculable. Here in US the best go into academia, there it looks like it is the people who either have money or could not find anything else (most of the time). The first thing the country should do is to invest in [the] education of the new generation.

### *Effect of Last Impressions:*

For professionals, the last impression from the latest trip to Turkey has an important impact on return intentions. The same is true for students. The last visit to Turkey changes an individual's perceptions about conditions in Turkey. The probability of returning ( $y = 1$  or  $2$ ) decreases by about 0.04 for those who were negatively effected by their last trip to Turkey, and increases by 0.05 for those who were left with more positive impressions. The effect of the September 11, 2001 terrorist attacks in New York is given by *sept11\_inc*. The effect of Sept. 11 is to increase return intentions. The probability of returning ( $y = 1$  or  $2$ ) increases by 0.04 which is less than that of professionals (0.07).

Table 7.27 Marginal Effects of Various Push Factors, Students

|                                                                           | <i>R_BS</i> | <i>R_IAS</i> | <i>R_NSAS</i> | <i>RP</i> | <i>RU</i> | <i>DNR</i> |
|---------------------------------------------------------------------------|-------------|--------------|---------------|-----------|-----------|------------|
| Probabilities:                                                            | y = 1       | y = 2        | y = 3         | y = 4     | y = 5     | y = 6      |
| <b>Push factor: being away from research centers and recent advances</b>  |             |              |               |           |           |            |
| pushE=0                                                                   | 0.0009      | 0.0765       | 0.4688        | 0.3499    | 0.1024    | 0.0014     |
| pushE=1                                                                   | 0.0005      | 0.0528       | 0.4169        | 0.3873    | 0.1399    | 0.0026     |
| Difference 0→1                                                            | -0.0004     | -0.0237      | -0.0519       | 0.0374    | 0.0375    | 0.0012     |
| <b>Push factor: less than satisfying cultural / social life in Turkey</b> |             |              |               |           |           |            |
| <i>non-academic</i> (academic_b=0)                                        |             |              |               |           |           |            |
| pushG=0                                                                   | 0.0004      | 0.0473       | 0.4011        | 0.3962    | 0.1519    | 0.0031     |
| pushG=1                                                                   | 0.0001      | 0.0222       | 0.2968        | 0.4306    | 0.2421    | 0.0083     |
| Difference 0→1                                                            | -0.0003     | -0.0251      | -0.1043       | 0.0344    | 0.0902    | 0.0052     |
| <i>academic</i> (academic_b=1)                                            |             |              |               |           |           |            |
| pushG=0                                                                   | 0.0010      | 0.0803       | 0.4753        | 0.3442    | 0.0979    | 0.0013     |
| pushG=1                                                                   | 0.0003      | 0.0408       | 0.3798        | 0.4066    | 0.1687    | 0.0038     |
| Difference 0→1                                                            | -0.0007     | -0.0395      | -0.0955       | 0.0624    | 0.0708    | 0.0025     |

Table 7.28 Marginal Effects of Various Pull Factors, Students

|                                                            | <i>R_BS</i> | <i>R_IAS</i> | <i>R_NSAS</i> | <i>RP</i> | <i>RU</i> | <i>DNR</i> |
|------------------------------------------------------------|-------------|--------------|---------------|-----------|-----------|------------|
| Probabilities:                                             | y = 1       | y = 2        | y = 3         | y = 4     | y = 5     | y = 6      |
| <b>Pull factor: higher level of income in host country</b> |             |              |               |           |           |            |
| pullA=0                                                    | 0.0012      | 0.0920       | 0.4929        | 0.3272    | 0.0857    | 0.0010     |
| pullA=1                                                    | 0.0005      | 0.0542       | 0.4206        | 0.385     | 0.1371    | 0.0025     |
| Difference 0→1                                             | -0.0007     | -0.0378      | -0.0723       | 0.0578    | 0.0514    | 0.0015     |
| <b>Pull factor: more organized, ordered environment</b>    |             |              |               |           |           |            |
| pullF=0                                                    | 0.0011      | 0.0855       | 0.4835        | 0.3366    | 0.0922    | 0.0012     |
| pullF=1                                                    | 0.0005      | 0.0557       | 0.4243        | 0.3827    | 0.1344    | 0.0024     |
| Difference 0→1                                             | -0.0006     | -0.0298      | -0.0592       | 0.0461    | 0.0422    | 0.0012     |
| <b>Pull factor: spouse's preference or job</b>             |             |              |               |           |           |            |
| pullI=0                                                    | 0.0008      | 0.0718       | 0.4601        | 0.3572    | 0.1085    | 0.0016     |
| pullI=1                                                    | 0.0002      | 0.0340       | 0.3544        | 0.4167    | 0.1898    | 0.0049     |
| Difference 0→1                                             | -0.0006     | -0.0378      | -0.1057       | 0.0595    | 0.0813    | 0.0033     |



**Table 7.29 Marginal Effects of the Last Visit to Turkey and Sept. 11, Students**

|                                      | <i>R_BS</i> | <i>R_LAS</i> | <i>R_NSAS</i> | <i>RP</i> | <i>RU</i> | <i>DNR</i> |
|--------------------------------------|-------------|--------------|---------------|-----------|-----------|------------|
| Probabilities:                       | y = 1       | y = 2        | y = 3         | y = 4     | y = 5     | y = 6      |
| <b>Last visit to Turkey</b>          |             |              |               |           |           |            |
| <b>decreased return intentions</b>   |             |              |               |           |           |            |
| lastvis1=0                           | 0.0009      | 0.0764       | 0.4687        | 0.3501    | 0.1025    | 0.0014     |
| lastvis1=1                           | 0.0003      | 0.0377       | 0.3687        | 0.4113    | 0.1778    | 0.0043     |
| Difference 0→1                       | -0.0006     | -0.0387      | -0.1000       | 0.0612    | 0.0753    | 0.0029     |
| <b>Last visit to Turkey</b>          |             |              |               |           |           |            |
| <b>increased return intentions</b>   |             |              |               |           |           |            |
| lastvis3=0                           | 0.0005      | 0.0579       | 0.4300        | 0.3791    | 0.1302    | 0.0023     |
| lastvis3=1                           | 0.0017      | 0.1100       | 0.5143        | 0.3025    | 0.0707    | 0.0007     |
| Difference 0→1                       | 0.0012      | 0.0521       | 0.0843        | -0.0766   | -0.0595   | -0.0016    |
| <b>Effect of Sept. 11: increased</b> |             |              |               |           |           |            |
| <b>return intentions</b>             |             |              |               |           |           |            |
| sept11_inc=0                         | 0.0005      | 0.0573       | 0.4284        | 0.3801    | 0.1314    | 0.0023     |
| sept11_inc=1                         | 0.0014      | 0.0973       | 0.4999        | 0.3197    | 0.0808    | 0.0009     |
| Difference 0→1                       | 0.0009      | 0.0400       | 0.0715        | -0.0604   | -0.0506   | -0.0014    |

## 7.6 Concluding Remarks

The impact of various factors on the “probability of not returning” and on the “probability of returning” are presented in order of importance in Tables 7.30-7.33. In both the students and professionals groups, the greatest positive impact on the probability of not returning occurs when the initial return intention is to stay compared to those who initially intended to return. Family considerations such as marriage to a foreign spouse and family support for settling abroad are also influential in non-return.

Stay duration, work experience in the host country and specialized training are all found to have significant negative impacts on the return intentions of Turkish professionals. In addition, work experience in Turkey after obtaining a PhD abroad increases the likelihood of not returning. Among the push and pull factors, economic instability has the greatest deterrent effect on return. Female participants and those in academe are also less likely to be returning in the professionals group.

The results for Turkish students studying abroad suggest that family considerations, lifestyle factors, higher salaries and the political environment are prominent in non-return intentions. On the other hand, the compulsory academic service requirement has a positive

effect on return intentions, although many of those who intend to return are not planning to return immediately after completing their studies.

Table 7.30 Factors that have the Greatest Negative Impact on Return Intentions, Professionals

| Variable                                                                | Marginal<br>Effect on<br>Prob(y =4 or 5) |
|-------------------------------------------------------------------------|------------------------------------------|
| Initial return intention is to stay versus return                       | 0.4911                                   |
| Initial return intention is to stay versus unsure                       | 0.3621                                   |
| Highest Degree: Arch/Econ/Admin versus Educ/Lang/Soc/Art                | 0.2008                                   |
| First full time job after getting foreign degree is in Turkey           | 0.1824                                   |
| Married to foreign spouse                                               | 0.1528                                   |
| Received organization-specific formal training                          | 0.1400                                   |
| Initial return intention is unsure versus return                        | 0.1290                                   |
| Push Factor: economic instability                                       | 0.1245                                   |
| Pull Factor: better educational opportunities for children              | 0.1163                                   |
| Gender: female                                                          | 0.1086                                   |
| Pull Factor: proximity to research centers                              | 0.1080                                   |
| Pull Factor: more satisfying social / cultural life                     | 0.1020                                   |
| Highest Degree: Engineer/Math/Science/Medicine versus Educ/Lang/Soc/Art | 0.0946                                   |
| Pul Factor: greater opportunity to develop specialty                    | 0.0926                                   |
| Academic and research related occupation                                | 0.0860                                   |
| No work experience in Turkey                                            | 0.0782                                   |
| Reason for going: lifestyle preference                                  | 0.0654                                   |
| Pull Factor: more organized, ordered environment                        | 0.0580                                   |
| Last visit decreased return intention                                   | 0.0565                                   |
| Family support for settling abroad (1 point increase)                   | 0.0559                                   |
| Reason for going: get away from political environment                   | 0.0528                                   |
| Standard of living assessment of life abroad (1 point increase)         | 0.0469                                   |
| Push Factor: limited job opportunity in specialty                       | 0.0421                                   |
| Social assessment of life abroad (1 point increase)                     | 0.0366                                   |
| Reason for going: insufficient facilities, equipment for research       | 0.0297                                   |
| Push factor: no opportunity for advanced training                       | 0.0253                                   |

Table 7.31 Factors that have the Greatest Positive Impact on Return Intentions, Professionals

| Variable                                                                                 | Marginal<br>Effect on<br>Prob(y=1 or 2) |
|------------------------------------------------------------------------------------------|-----------------------------------------|
| Last visit increased return intention                                                    | 0.2219                                  |
| Initial intention is to return versus to stay                                            | 0.2184                                  |
| Need to finish / continue with current project                                           | 0.1817                                  |
| Other pull reason (male=1) (e.g. military service requirement)                           | 0.1434                                  |
| Respondent has a PhD from a Turkish university                                           | 0.1413                                  |
| Initial intention is unsure versus to stay                                               | 0.1186                                  |
| Initial intention is to return versus unsure                                             | 0.0998                                  |
| Reason for going: to be with spouse, family                                              | 0.0959                                  |
| Active in contributions to Turkey during stay abroad                                     | 0.0920                                  |
| September 11 increased return intentions                                                 | 0.0708                                  |
| Adjustment factor: Turkish Student Association                                           | 0.0676                                  |
| Adjustment factor: previous experience                                                   | 0.0670                                  |
| Highest degree field is in Engineering/Math/Science/Medicine versus Arch/Economics/Admin | 0.0540                                  |
| Difficulty faced while abroad: missing family                                            | 0.0494                                  |
| Received family support for initial overseas venture                                     | 0.0432                                  |
| Lack of financial resources for business                                                 | 0.0333                                  |
| Reason for going: job requirement in Turkey                                              | 0.0235                                  |
| Reason for going: prestige and advantages of study abroad                                | 0.0124                                  |

Table 7.32 Factors that have the Greatest Negative Impact on Return Intentions, Students

| <b>Variable</b>                                                                    | <b>Marginal<br/>Effect on<br/>Prob(y =5 or 6)</b> |
|------------------------------------------------------------------------------------|---------------------------------------------------|
| Initial return intention is to stay versus return                                  | 0.3787                                            |
| Initial return intention is to stay versus unsure                                  | 0.3223                                            |
| Reason for choosing current institution of study: job opportunities                | 0.1081                                            |
| Reason for going: get away from political environment                              | 0.1064                                            |
| Push factor: less than satisfying cultural or social life in Turkey (non-academic) | 0.0954                                            |
| Initial return intention is unsure versus return                                   | 0.0952                                            |
| Pull factor: spouse's preference or job                                            | 0.0846                                            |
| Family support for settlement abroad: definitely versus not supportive             | 0.0785                                            |
| Last visit decreased return intention                                              | 0.0782                                            |
| Reason for choosing current institution of study: same location as spouse          | 0.0647                                            |
| Pull factor: higher salaries in host country                                       | 0.0529                                            |
| Reason for going: lifestyle preference                                             | 0.0468                                            |
| Family support for settlement abroad: definitely versus somewhat supportive        | 0.0457                                            |
| Pull Factor: more organized, ordered environment                                   | 0.0434                                            |
| Family support for settlement abroad: somewhat versus not supportive               | 0.0394                                            |
| Push factor: being away from research centers and recent advances                  | 0.0387                                            |
| Standard of living assessment: better or much better                               | 0.0342                                            |
| Gender: female                                                                     | 0.0259                                            |
| Reason for going: insufficient facilities, equipment for research                  | 0.0213                                            |

Table 7.33 Factors that Have the Greatest Positive Impact on Return Intentions, Students

| <b>Variable</b>                                                  | <b>Marginal<br/>Effect on<br/>Prob(y =1,2,3)</b> |
|------------------------------------------------------------------|--------------------------------------------------|
| Initial intention is to return versus to stay                    | 0.4921                                           |
| Initial intention is unsure versus to stay                       | 0.2972                                           |
| Compulsory academic service                                      | 0.2684                                           |
| Reason for going: to be with spouse                              | 0.2338                                           |
| Initial intention is to return versus unsure                     | 0.1949                                           |
| Last visit increased return intention                            | 0.1376                                           |
| Social assessment of life abroad: worse or much worse            | 0.1344                                           |
| September 11 increased return intentions                         | 0.1124                                           |
| Respondent has plans for an academic career                      | 0.1041                                           |
| Reason for going: job requirement in Turkey                      | 0.0989                                           |
| Difficulties abroad: unemployment                                | 0.0899                                           |
| Adjustment factor: previous experience                           | 0.0708                                           |
| Turkish Student Association member                               | 0.0664                                           |
| Reason for going: learn / improve language skills                | 0.0509                                           |
| Adjustment factor: Turkish friends at institution                | 0.0507                                           |
| Reason for going: prestige and advantages of international study | 0.0305                                           |

## **CHAPTER 8**

### **CONCLUSIONS**

This study deals with skilled migration from a developing country perspective. The first part of the study brings up to date both the theoretical and the policy debate on the impact of skilled migration on the sending economies. In economic models of migration, skilled labor mobility is treated in a similar way as physical capital movements. In an open economy setting, under perfect capital mobility, capital will flow to where it will earn a higher rate of return. Similarly, skilled migration is believed to be the result of differences in the rates of return awarded to skills or educational attainment levels in different countries, as measured by the wage rate. According to neoclassical theory, higher wages signal excess demand for skilled workers and skilled workers respond by relocating to where they will earn a higher income. Migration changes the relative quantities of skilled workers in both the sending and receiving countries and as a result alters their rate of return so that wage differentials disappear in the long run. This will then eliminate migratory movements motivated purely for economic reasons. Wage differentials, however, are not disappearing as predicted by the neoclassical theory of migration. Instead, they appear to be quite persistent in spite of the large volume of skilled migration from the developing countries.

The theoretical brain drain models considered in the thesis offer different perspectives on the reasons for the wage differential between sending and receiving countries. They all adopt the view that wages are determined by the marginal productivity of individuals and that wage differentials provide the main motivation for migration. The Kwok-Leland model of asymmetric information provides an alternative theory of the wage differentials existing between host and source countries. The argument is that host firms have an advantage over home firms in terms of their knowledge about the true productivities of students completing their studies in the host country that enables them to

give the appropriate level of income to each student. Home firms, on the other hand, can offer only the average wage level of the returning students. Another explanation for the persistence of income differentials is the higher social capital stock (physical and human) existing in developed countries. Since educated workers complement both physical and human capital in production, they are more productive and earn higher wages in locations where physical and human capital are relatively more abundant. Miyagiwa's model of the brain drain is based on such "agglomeration economies" in which there is increasing returns to the accumulation of human capital. Wong's model of learning-by-doing offers a slightly different explanation for the wage differential that is based on the greater cumulative base of "experience" in the host country, which leads to higher productivity levels for those working and therefore taking part in the production process in the host country. An increase in work experience through learning on the job in the host country increases the productivity and salaries of individuals. Chen and Su, on the other hand, propose a slightly different potential explanation for student non-return based on-the-job training. In their model, the education received in the host country is complementary to the social capital stock of the host country. Education received abroad thus increases the productivity of individuals much more in the host country than in the home country.

The second part of the thesis provided an evaluation of the findings of the survey on the return intentions of Turkish students and Turkish professionals. The majority of Turkish students responding to our survey are single, male, studying in the engineering and technical fields, holding a degree from a university in Turkey with English instruction, and having parents who are highly educated. The most cited reason for studying abroad is the perception that a better quality education will be received at the foreign institution of study, based on the institution's reputation, ranking of the program or the presence of an academic thesis supervisor in the case of master's or doctorate level students. Professionals are, on average, slightly older than the student respondents and have a longer length of stay. A significant proportion of them are married and the proportion of female respondents is lower. A much greater majority have earned degrees in the engineering and technical sciences.

The most important reason for not returning or delaying return appears to be the uncertainty created by the February 2001 economic crisis, which has also hit the educated segment of the population. Many university-educated individuals fear that they will not be



able to find employment upon their return to Turkey and therefore choose to stay abroad for a period of time to acquire work experience. More than three-quarters of respondents in both surveys cited economic instability and uncertainty as a “very important” push factor. Thus, the economic crisis combined with existing problems of unemployment or underemployment in certain fields appears to be a prominent factor in delaying return. The crisis has also prompted many students to seek either jobs or study opportunities abroad. The increasing demand for these types of graduates in the United States has made the US a popular destination for recent graduates, although the job market has tightened in the US. For professionals lower income levels, which is among the most often cited reasons for brain drain from developing to developed countries, appears to be less important than other “push” factors such as bureaucratic obstacles. For students, higher income in the host countries does not appear to exert as great a “pull” as opportunities for advancement in the chosen occupation or for further development and training in specialization in terms of the number of respondents marking this factor as important. This emphasis may be due to the higher number of doctoral level students answering the survey.

The models estimated in the ordered probit analysis are based on the human capital theory of migration, which predicts that individuals will migrate when the net present value of benefits from migration is positive. Wage differentials between the host and source countries provide the main motivation for moving to a foreign country. According to human capital theory, the difference in the expected foreign and domestic income levels is the key determinant of skilled migration. Since *expected* income is the relevant variable, employment opportunities and labor market conditions both at home and abroad play an important role in the perceptions of economic opportunity held by skilled individuals. While the income differential is an important consideration (marked as “very important” or “important”) for a majority of respondents in both survey groups, higher salary levels in the host country are found to be statistically significant in determining the return intentions of only Turkish students studying abroad.

Family considerations, not surprisingly, have considerable weight in the mobility decisions of the survey participants. In some cases, remaining abroad is not simply a matter of earning a higher salary or enjoying better work conditions. Marriage to a foreign spouse is obviously an important reason for not returning. For others, however, concern over childrens’ adaptation to the highly competitive education system in Turkey may also

dominate the return decision. In both the student and professionals survey groups, family support for the decision to settle abroad is found to be an important factor determining return intentions.

Female respondents appear less inclined to be returning to Turkey than male respondents. In general, the parental education levels of female participants are greater than that of males indicating that they come from a higher socio-economic background. This may be indicative of a more selective migration process working in the case of females. Some female participants have indicated that they enjoy greater freedom in lifestyle choice abroad than they do in Turkey, which may also be an important factor in the non-return decision.

Information on past mobility patterns of the respondents reveal important information about the dynamics of return intentions: For example, respondents with no previous work experience in Turkey were more likely to indicate return intentions than those who had some work experience. This suggests that dissatisfaction with the work environment in Turkey and the ability to compare workplaces and work situations decreases the likelihood of return. The length of stay abroad is also another important determinant of return intentions. As expected, return intentions weaken with the length of stay. Initial return intentions (the intentions at the beginning of the stay abroad) are positively associated with current return intentions. However, this association is weaker when the initial intention is to return and the length of stay increases.

In general, respondents appear to be satisfied with economic conditions in their host countries but indicate that they find social life “lacking”. In spite of this dissatisfaction with social life, nearly a quarter of all respondents are not considering returning to Turkey. One third of those who are considering returning to Turkey are planning to do so within 2 to 5 years, and another third are planning to do so within 5 to 10 years. There is a high probability that delaying return could in time come to mean “no return”. Taking this fact into consideration, one could surmise that the number of students who will never return to Turkey could reach significant proportions.

Respondents’ comments have also been important in understanding the various motivations in the decision to return to Turkey or stay abroad. Compulsory military service has been given both as a “push factor” in the decision to go abroad and as a reason for non-

return. A considerable number of male respondents have indicated “delaying compulsory military service” as a reason for pursuing an overseas degree. Those who have not completed their military service regard long-term military service as an “interruption” causing a “time loss” in education and career. As a result, many go abroad or delay returning in order to fulfill the requirements of short-term military service. For some this constitutes the first step toward settling in a foreign country, since it means that they are starting their professional careers abroad and adapting to life and work conditions in their country of work. As well, some of those who have entered into working life abroad delay returning to Turkey because they fear the uncertainty of finding employment. Many respondents have cited the unfavorable conditions created by the February 2001 economic crisis as an example.

Some of those who have settled abroad, or who plan to, say that they will continue with their lives abroad without cutting their ties to Turkey and act as a sort of “cultural bridge” between their native country and their country of destination. This indicates that although the return potential for these individuals may not be very high, their value as both cultural diplomats and mediums for information and technology transfer between Turkey and their resident countries should make them an important target group for Turkish policymakers. Turkish academic advisors abroad, for example, help ease the transition to a foreign university for many students.

In Turkey, the academic brain drain appears to be particularly troubling, since the number of universities in Turkey has grown rapidly over the last decade in response to the growing social demand for higher education created by demographic pressures. This has created the problem of staffing the newly formed universities. While the compulsory academic service requirement of government-sponsored overseas scholarships was planned as a way to meet part of this need, non-returning scholarship recipients have become a major concern. One of the most common views expressed in the survey by government-sponsored research assistants is the perceived lack of value given to science and to academics in Turkey. Some respondents have indicated that, as a result of this, they fear they will find themselves in an “unproductive environment” if they return to Turkey. Others have stated that “there is a point where money is no object” and that they would be willing to work for lower wages in Turkey provided that they are “valued and respected”.

Have the state investments in higher education, through the national scholarship program, gone to waste? The number of returning students is not the best measure to assess this. Even if all of the government-sponsored students were to return, there is indication that the advanced overseas training they received will not be put to efficient use, especially in the newly-established state universities that lack facilities, equipment and other important resources. Several government-sponsored research assistants have expressed the fear that they will be devoting most of their time in teaching activities at the undergraduate level with little opportunity to do research and develop their knowledge. The current needs of the expanding higher education system seem to be favoring a teaching role for the returning government-sponsored students, and this has led to some disillusionment and lack of motivation among the scholarship recipients. The Higher Education Council has also begun to question the value of sending so many students for overseas studies. As a result, the number of YÖK scholarship recipients has been reduced, and greater emphasis is currently placed on producing new academicians internally through the graduate programs of the established universities in Turkey. However, this requires that a greater amount of resources be devoted to the development of graduate programs. In turn, a greater amount of public investment in higher education is required if undergraduate programs are not to be compromised by a shift of teaching staff to graduate level studies.

State universities in Turkey, like many in the developing world, are unable to compete with the scale of research funding, provision of resources and incomes offered by universities in leader countries. Public universities are in danger of losing their best researchers and teaching staff to the private universities in Turkey and to universities abroad. The recent economic crises, however, have led to serious cutbacks in university funding that were already inadequate before the crises. It is also well known that university salaries especially at the state universities are inadequate and lead to moonlighting and extra teaching activities.

Newly established departments are small in terms of the number of full-time staff they employ and often have to resort to using research assistants as lecturers in order to make up for shortages in teaching staff. Cutting edge, innovative research cannot be expected from these universities until they mature as institutions, and without a research agenda devoted to specific research problems that is complementary to the needs of indigenous industry and local conditions. While the return of overseas academicians may

create the right atmosphere for positive changes toward institution building and the development of a national research agenda, there may be valid concern that returning scholars are simply “importing the host country’s agenda” (Kreimer, 2003).

The recent brain drain from Turkey should not be looked at solely in terms of an employment problem created by the conditions of the economic crises and ensuing uncertainties. Turkey must take seriously the need to develop and expand research and development activities and create opportunities for the transfer of skills and training for which so much investment has been undertaken. What is promising is that a great number of survey respondents have indicated their willingness to return even if some progress is made toward creating the right environment for research and better career development opportunities.

#### ***Further Research:***

The current survey research on Turkey’s brain drain involved collecting information from an Internet-based survey on the return intentions of individuals. This information was then used to examine various characteristics of the respondents and to determine the importance of different factors in the decision to return to Turkey or stay in the current country of residence. The study combined a mixture of inductive and deductive methods in the analysis of the determinants of return intentions.

One of the limitations of the survey study is that it deals with return intentions rather than actual behavior. The return intentions of individuals who were studying or working abroad at the time of the survey may not be realized, no matter how certain respondents may have been in their plans about returning or staying. Returning also does not guarantee a permanent settlement in Turkey, since new opportunities and new circumstances can arise at any time and radically alter previous plans. Many of the theoretical contributions to the migration literature treat the migration decision as a single, once-and-for-all decision. The new literature on the brain drain, on the other hand, emphasizes the positive aspects of migration for developing countries, including return migration and brain circulation. The dynamics of migration in developing countries suggest however that many who return to their home countries have difficulties re-adapting and as a result may decide to settle abroad permanently if they can find the opportunity. This pattern is also found in the current survey where work experience in Turkey after studying abroad is found to be an

important factor contributing to non-return. The reason is that work experience in Turkey allows individuals to compare work environments and conditions in Turkey and very often these comparisons have a negative effect on return intentions.

Answers to many questions about mobility can be found through micro level studies. The present study can be extended by following up on some of the participants and seeing whether their return intentions have turned to reality and for what reasons. It is also useful to examine mobility patterns within specific occupations or specialties in order to obtain a better understanding of the concerns within specific occupation groups. The database obtained from the survey study can be integrated into a long term study for studying the career paths and mobility patterns of highly educated individuals from Turkey. In addition to the questionnaire responses, information on educational and career mobility may be supplemented from various sources some of which may be available directly from the Internet, such as curriculum vita data.





## REFERENCES

- Adams, W. (1968) *The Brain Drain*, New York: The Macmillan Company.
- Aghion, Phillipe and Peter Howitt (1998) *Endogenous Growth Theory*, Cambridge, MA: The MIT Press.
- Agresti, A. (1984) *Analysis of Ordinal Categorical Data*, New York: John Wiley & Sons.
- Akerlof, G. A. (1970) "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism," *Quarterly Journal of Economics*, 84, 488-500.
- Alesina, A. and D. Rodrik (1994) "Distributive Politics and Economic Growth," *Quarterly Journal of Economics*, 109(2), 465-90.
- Arrow, K. J. (1962) "The Economic Implications of Learning by Doing," *Review of Economic Studies*, 29, 155-173.
- Baldwin, G. B. (1970) "Brain Drain or Overflow?" *Foreign Affairs*, 48(2), 358-72.
- Banerjee, A. V. (1992) "A Simple Model of Herd Behavior," *Quarterly Journal of Economics*, 107(3), 797-817.
- Barro, R. J. and J.-W. Lee (2000) "International Data on Educational Attainment: Updates and Implications," Harvard University CID Working Paper No. 42, Data Appendix, <http://www.cid.harvard.edu/ciddata/ciddata.html>.
- Bauer, T., G. S. Epstein and I. N. Gang (2000) "What are Migration Networks?" IZA Discussion Paper No. 200, Bonn, Germany: Institute for the Study of Labor.
- Bauer, T., G. S. Epstein and I. N. Gang (2002a) "Herd Effects or Migration Networks? The Location Choice of Mexican Immigrants in the US," IZA Discussion Paper No. 551, Bonn, Germany: Institute for the Study of Labor.
- Bauer, Thomas, Gil S. Epstein and Ira N. Gang (2002b) "Enclaves, Language and the Location Choice of Migrants," IZA Discussion Paper No. 558, Bonn, Germany: Institute for the Study of Labor.
- Becker, G. S. (1993) *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*, Third Edition, Chicago and London: The University of Chicago Press.

- Becker, Gary S., Kevin M. Murphy and Robert Tamura (1990) "Human Capital, Fertility, and Economic Growth," *Journal of Political Economy*, 98(5), S12-S37.
- Becker, S. O., A. Ichino, and G. Peri (2003) "How Large is the 'Brain Drain' from Italy," CESifo Working Paper No. 839, [http://papers.ssrn.com/abstract\\_id=378522](http://papers.ssrn.com/abstract_id=378522)
- Beine, M., F. Docquier and H. Rapoport (2001) "Brain Drain and Economic Growth: Theory and Evidence," *Journal of Development Economics*, 64, 275-289.
- Berry, R. A. and R. Soligo (1969) "Some Welfare Aspects of International Migration," *Journal of Political Economy*, 77, 778-94.
- Bhagwati, Jagdish and Koichi Hamada (1974) "The Brain Drain, International Integration of Markets for Professionals and Unemployment: A Theoretical Analysis," *Journal of Development Economics*, 1, 19-42.
- Bhagwati, Jagdish and Carlos Rodriguez (1975) "Welfare-Theoretical Analysis of the Brain Drain," *Journal of Development Economics*, 2, 195-221.
- Blau, Francine D., Lawrence M. Kahn, Joan Y. Moriarty and Andre Portela Souza (2002) "The Role of the Family in Immigrants' Labor-Market Activity: Evidence from the United States," NBER Working Paper No. 9051, Cambridge, MA: National Bureau of Economic Research (<http://www.nber.org/papers/w9051>).
- Blomqvist, Ake G. (1986) "International Migration of Educated Manpower and Social Rates of Return to LDCs," *International Economic Review*, 27(1), 165-174.
- Carrington, William J. and Enrica Detragiache (1998) "How Big is the Brain Drain?," IMF Working Paper WP/98/102, New York: International Monetary Fund.
- Carrington, William J. and Enrica Detragiache (1999) "How Extensive is the Brain Drain?," *Finance and Development*, 46-49. (Reprinted as Carrington, W. J. and E. Detragiache (1999) "International Migration and the 'Brain Drain'", *The Journal of Social, Political and Economic Studies*, 24(2), 163-71.
- Cervantes, M. and D. Guellec (2002) "The Brain Drain: Old Myths, New Realities," *OECD Observer*, published on the internet on May 7, 2002.
- Chang, P. and Z. Deng (1992) "The Chinese Brain Drain and Policy Options," *Studies in Comparative International Development*, 27(1), 44-60.
- Chen, Been-Lon (2003) "An Inverted-U Relationship Between Inequality and Long-Run Growth," *Economics Letters*, 78, 205-212.
- Chen, T.-J. and H.-Y. Su (1995) "On-the-Job Training as a Cause of Brain Drain," *Weltwirtschaftliches Archiv*, 131(3), 526-41.

- Cheng, Lucie and Philip Q. Yang (1998) "Global Interaction, Global Inequality, and Migration of the Highly Trained to the United States," *International Migration Review*, 32(3), 626-653.
- Choi, Hyaeweol (1999) "Shifting Human Resources in South Korean Science and Technology," *Comparative Education Review*, 43(2), 212-32.
- Commander, S., M. Kangasniemi and L. A. Winters (2002) "The Brain Drain: Curse or Boon? A Survey of the Literature," paper prepared for the CEPR/NBER/SNS International Seminar on International Trade, Stockholm, 24-25 May, 2002.
- Coppel, Jonathan, Jean-Christophe Dumont and Ignazio Visco (2001) "Trends in Immigration and Economic Consequences," Economics Department Working Paper No. 284, Paris: Organisation for Economic Co-operation and Development.
- Cortés, C. (ed.) (1980) *The Latin American Brain Drain to the United States*, New York: Arno Press.
- Cumhuriyet Gazetesi* (2000) "Beyin Göçü: Araştırma Görevlisi Azalıyor," (Brain Drain: The Number of Research Assistants is Declining), 14.01.2000.
- Cumhuriyet Gazetesi* (2001) "Yüksek Sefalet," (Higher Poverty), 16.07.2001.
- Davis, Donald R. And David E. Weinstein (2002) "Technological Superiority and the Losses from Migration," NBER Working Paper No. W8971, Cambridge, MA: National Bureau of Economic Research, <http://www.nber.org/papers/w8971.pdf>.
- Davies, James B. And Ian Wooton (1992) "Income Inequality and International Migration," *The Economic Journal*, 102, 789-802.
- Dayıoğlu, M. and Z. Kasnakoğlu (1997) "Kentsel kesimde kadın ve erkeklerin işgücüne katılımları ve kazanç farklılıkları", (Labour force participation of men and women in urban Turkey and earnings inequality between genders), *METU Studies in Development*, Vol. 24, No. 3, pp. 329-361.
- Desai, Mihir A., Devesh Kapur and John McHale (2001) "The Fiscal Impact of the Brain Drain: Indian Emigration to the U.S.," paper prepared for the Third Annual NBER-NCAER Conference, 17-18 December.
- Drinkwater, Stephen, Paul Levine and Emanuela Lotti (2002) "The Economic Impact of Migration: A Survey," paper prepared for the 2nd Workshop of the Fifth Framework Programme Project 'European Enlargement: The Impact of East-West Migration on Growth and Employment,' Vienna, 6-7 December.
- Dos Santos, Manon Domingues and Fabien Postel-Vinay (2003) "Migration as a Source of Growth: The Perspective of a Developing Country," *Journal of Population Economics*, 16, 161-175.
- Dündar, H. and D. R. Lewis (1999) "Equity, quality and efficiency effects of reform in Turkish higher education," *Higher Education Policy*, 12, 343-66.

- Eicher, Theo and Cecilia Garcia-Penalosa (2001) "Inequality and Growth: The Dual Role of Human Capital in Development," *Journal of Development Economics*, 66, 173-97.
- Eldridge, Robert Huyck (1966) "Emigration and the Turkish Balance of Payments," *Middle East Journal*, 20, 296-316.
- Ellerman, D. (2003) "Policy Research on Migration and Development," World Bank Policy Research Working Paper No. 3117, Washington, D.C.: The World Bank, August 2003.
- Epstein, G. S. (2002) "Informational Cascades and Decision to Migrate," IZA Discussion Paper No. 445 Bonn, Germany: Institute for the Study of Labor.
- Ekonomist*, "En Büyük Arz-Talep Açığı Hemşirelikte" (The Supply-Demand Gap is Greatest in Nursing), 30 Temmuz 2000.
- Eliasson, G. (2000) "Industrial Policy, Competence Blocs and the Role of Science in Economic Development," *Journal of Evolutionary Economics*, 10, 217-241.
- Ermisch, J. and M. Francesconi (2001) "Family Matters: Impacts of Family Background on Educational Attainments," *Economica*, 68, 137-156.
- Faist, Thomas (2000) *The Volume and Dynamics of International Migration and Transnational Social Spaces*, Oxford and New York: Oxford University Press.
- Fan, C. S. and O. Stark (2002) "Addition through Depletion: The Brain Drain as a Catalyst of Human Capital Formation and Economic Betterment," Royal Economic Society Annual Conference 2003, 192, Royal Economic Society.
- Findlay, Allan M. And Emma Stewart (2002) "Skilled Labour Migration from Developing Countries: Annotated Bibliography," International Migration Papers No. 55, International Migration Programme, ILO.
- Galor, Oded and Joseph Zeira (1993) "Income Distribution and Macroeconomics," *Review of Economic Studies*, 60, 35-52.
- Galor, Oded and Daniel Tsiddon (1996) "Income Distribution and Growth: the Kuznets Hypothesis Revisited," *Economica*, 63, S103-S117.
- Galor, O. and D. Tsiddon (1997) "Technological Progress, Mobility, and Economic Growth," *The American Economic Review*, 87(3), 363-82.
- Godfrey, E. M. (1970) "The Brain Drain from Low-Income Countries," *The Journal of Development Studies*, 6(3), 235-47.
- Goss, E. P. and C. Paul (1986) "Age and Work Experience in the Decision to Migrate," *The Journal of Human Resources*, 21(3), 397-405.

- Görün, F. (1996) "Higher Education and Unemployment in Turkey," in Tuncer Bulutay (ed.) *Education and the Labour Market in Turkey: Proceedings of a Seminar Held in Ankara*, 19 April 1996, Ankara: State Institute of Statistics.
- Greene, William H. (1997) *Econometric Analysis*, 3rd Edition, London, UK: Prentice-Hall International.
- Greenwood, Michael J. (1983) "The Economics of Mass Migration from Poor to Rich Countries," *The American Economic Review*, Papers and Proceedings, 73(2), 173-7.
- Greenwood, Michael J. and John M. McDowell (1991) "Differential Economic Opportunity, Transferability of Skills, and Immigration to the United States and Canada," *The Review of Economics and Statistics*, 73(4), 612-23.
- Grubel, H. B. and A. D. Scott (1966a) "The International Flow of Human Capital," *American Economic Review*, Papers and Proceedings, 56(2), 268-274.
- Grubel, Herbert B. and Anthony D. Scott (1966b) "The Immigration of Scientists and Engineers to the United States, 1949-61," *Journal of Political Economy*, 74, 368-378.
- Haque, N. U. and S. Kim (1994) "Human Capital Flight: Impact of Migration on Income and Growth," IMF Working Paper WP/94/155, New York: International Monetary Fund.
- Haque, N. U. and M. Ali Khan (1997) "Institutional Development: Skill Transference Through a Reversal of 'Human Capital Flight' or Technical Assistance, IMF Working Paper WP/97/89, New York: International Monetary Fund.
- Hamada, K. (1975) "Efficiency, Equality, Income Taxation and the Brain Drain," *Journal of Development Economics*, 2, 281-7.
- Hamada, Koichi (1977) "Taxing the Brain Drain: A Global Point of View," in Jagdish N. Bhagwati (ed.) *The New International Economic Order: The North-South Debate*, Cambridge, MA: The MIT Press, 125-55.
- Hamada, K. and J. Bhagwati (1975) "Domestic Distortions, Imperfect Information and the Brain Drain," *Journal of Development Economics*, 2, 265-79.
- Harris, John R. And Michael P. Todaro (1970) "Migration, Unemployment and Development: A Two-Sector Analysis," *American Economic Review*, 60, 126-42.
- Helmenstein, C. and Y. Yegorov (2000) "The Dynamics of Migration in the Presence of Chains," *Journal of Dynamics and Control*, 24, 307-323.
- Hekmati, M. (1973) "Non-Returning Foreign Students: Why Do They Not Return Home?," *Die Dritte Welt*, 2(1), 25-43.
- Hoch, Paul K. (1987) "Migration and the Generation of New Scientific Ideas," *Minerva: A Review of Science, Learning and Policy*, 25(3), 209-237.

- Huang, W.-C. (1988) "An Empirical Analysis of Foreign Student Brain Drain to the United States," *Economics of Education Review*, 7(2), 231-243.
- IIE (various years) *Open Doors: Report on International Educational Exchange*, New York, NY: Institute of International Education. (<http://www.opendoors.org>)
- IIE (2001) *Open Doors 2001: Report on International Educational Exchange*, New York, NY: Institute of International Education.
- Iredale, Robyn (1999) "The Need to Import Skilled Personnel: Factors Favouring and Hindering its International Mobility," *International Migration*, 37(1), 89-120.
- Işığışık, Ö. (2002) "Türkiye'de yaşanan son ekonomik krizlerin sosyo-ekonomik sonuçları: Kriz işsizliği ve beyin göçü", (The socioeconomic results of the last two economic crises in Turkey: Crisis unemployment and brain drain), [www.isguc.org/calhay\\_beyingocu.php](http://www.isguc.org/calhay_beyingocu.php).
- Jaffe, A. B. (1989) "Real Effects of Academic Research," *American Economic Review*, 79, 957-70.
- Johnson, H. G. (1965) "The Economics of the 'Brain Drain': The Canadian Case," *Minerva*, Spring, 299-311.
- Johnson, H. G. (1967) "Some Economic Aspects of the Brain Drain," *The Pakistan Development Review*, 7(3), 379-441.
- Johnson, H. G. (1968) "An 'Internationalist' Model," in W. Adams (ed.) *The Brain Drain*, New York: The Macmillan Company.
- Johnson, Harry G. (1972) "Labour Mobility and the Brain Drain", in Gustav Ranis (ed.) *The Gap between Rich and Poor Nations*, New York: St. Martin's Press, 380-91.
- Jolly, Richard and Dudley Seers (1972) "The Brain Drain and the Development Process", in Gustav Ranis (ed.) *The Gap between Rich and Poor Nations*, New York: St. Martin's Press, 365-79.
- Kao, C. and J. W. Lee (1973) "An Empirical Analysis of China's Brain Drain to the United States," *Economic Development and Cultural Change*, 21(3), 500-13.
- Kaya, M. (2002) "Beyin göçü / erozyonu" (Brain drain / erosion), Technology Research Centre Report, Eskişehir: Osmangazi University, Eskişehir, November 5, 2002.
- Katz, E. and O. Stark (1984) "Migration and Asymmetric Information: Comment," *American Economic Review*, 74, 533-534.
- Kepenek, Yakup and Nurhan Yentürk (2000) *Türkiye Ekonomisi*, İstanbul: Remzi Kitabevi.
- Khadria, Binod (1999) *The Migration of Knowledge Workers: Second-Generation Effects of India's Brain Drain*, London: Sage Publications.



- Kim, Jinyoung (1998) "Economic Analysis of Foreign Education and Students Abroad," *Journal of Development Economics*, 56, 337-65.
- Kwok, V. and H. Leland (1982) "An Economic Model of the Brain Drain," *American Economic Review*, 72(1), 91-100.
- Kwok, V. and H. Leland (1984) "Migration and Asymmetric Information: Reply," *American Economic Review*, 74, 535.
- Koç, İsmet and Işıl Onan (2001) "The Impact of Remittances of International Migrants on the Standard of Living of the Left-Behind Families in Turkey," paper presented at IUSSP XXIVth General Population Conference in Salvador de Bahia, Brazil, August 18-24 ([http://www.iussp.org/Brazil2001/s20/S26\\_03\\_Koc.pdf](http://www.iussp.org/Brazil2001/s20/S26_03_Koc.pdf)).
- Kunze, A. (2002) "The Timing of Careers and Human Capital Depreciation," IZA Discussion Paper No. 509, Bonn, Germany: Institute for the Study of Labor.
- Kurtuluş, B. (1999) *Amerika Birleşik Devletleri'ne Türk Beyin Göçü* (Turkish Brain Drain to the United States), İstanbul: Alfa Basım Yayım Dağıtım.
- Kuznets, Simon (1955) "Economic Growth and Income Inequality," *American Economic Review*, 45(1), 1-28.
- Lambooy, Jan G. (1997) "Knowledge Production, Organisation and Agglomeration Economies," *GeoJournal*, 41(4), 293-300.
- Laudel, G. (2003) "Studying the Brain Drain: Can Bibliometric Methods Help?" *Scientometrics*, 57(2), 215-37.
- Liao, T. F. (1994) *Interpreting Probability Models: Logit, Probit, and Other Generalized Linear Models*, Sage University Paper series on Quantitative Applications in the Social Sciences, 07-101, Thousand Oaks, CA: Sage.
- Lien, D.-H. D. (1987a) "Economic Analysis of Brain Drain," *Journal of Development Economics*, 25, 33-43.
- Lien, D.-H. D. (1987b) "Asymmetric Information and Multi-Stage Brain Drain," *Economics Letters*, 23(3), 305-309.
- Lien, Da-Hsiang Donald (1988) "Appropriate Scientific Research and Brain Drain: A Simple Model," *Journal of Development Economics*, 29, 77-87.
- Long, J. S. and J. Freese (2001) *Regression Models for Categorical Dependent Variables Using Stata*, College Station, TX: Stata Press.
- Lowell, B. L. and A. M. Findlay (2001) "Migration of Highly Skilled Persons from Developing Countries: Impact and Policy Responses," draft report prepared for the International Labour Office (ILO), Geneva, June 1, 2001.

- Lucas, R. E. Jr. (1975) "The Supply-of-Immigrants Function and Taxation of Immigrants' Incomes," *Journal of Development Economics*, 2, 289-308.
- Lucas, R. E. Jr. (1988) "On the Mechanics of Economic Development," *Journal of Monetary Economics*, 22, 3-42.
- Lundahl, Mats (1985) "Brain Drain, Illegal Migration and Capital Exports from Less Developed Countries: A Neoclassical Approach," *Economics Letters*, 17(3), 277-280.
- MacWilliams, B. (2000) "Turkey's old-fashioned distance education draws the largest student body on earth: Anadolu University uses radio, TV, and (gulp) mailed material to educate a rural population," *The Chronicle of Higher Education*, September 22.
- Maddala, G. S. (1983) *Limited-Dependent and Qualitative Variables in Econometrics*, Econometric Society Monographs, Cambridge: Cambridge University Press.
- Mahroum, Sami (1999) "Highly Skilled Globetrotters: The International Migration of Human Capital," paper presented at OECD Workshop on Science and Technology Labour Markets, 17 May, (<http://www.oecd.org/pdf/M000014000/M00014667.pdf>).
- Maresová, Jarmila (1999) "Labor Migration to Austria: Czech and Slovak Temporary Workers in Vienna," in *Paradigms and Contentions, IWM Junior Visiting Fellows Conferences*, Volume 7, Vienna.
- Massey, Douglas S., Joaquin Arango, Graeme Hugo, Ali Kouaouci, Adela Pellegrino and J. Edward Taylor (1993) "Theories of International Migration: A Review and Appraisal," *Population and Development Review*, 19(3), 431-66.
- Massey, Douglas S., Joaquin Arango, Graeme Hugo, Ali Kouaouci, Adela Pellegrino and J. Edward Taylor (1994) "An Evaluation of International Migration Theory: The North American Case," *Population and Development Review*, 20(4), 699-752.
- Mattoo, A. and A. Carzaniga (eds.) (2003) *Moving People to Deliver Services*, Oxford: Oxford University Press and the World Bank.
- Meyer, J.-B. and M. Brown (1999) "Scientific Diasporas: A New Approach to the Brain Drain," Management of Social Transformations Discussion Paper No. 41, paper prepared for the World Conference on Science, UNESCO-ICSU, Budapest, Hungary, 26 June-1 July.
- McCormick, Barry and Jackline Wahba (2000) "Overseas Employment and Remittances to a Dual Economy," *The Economic Journal*.
- McCulloch, Rachel and Janet L. Yellen (1975) "Consequences of a Tax on the Brain Drain for Unemployment and Inequality in Less Developed Countries," *Journal of Development Economics*, 2, 249-64.

- Milanovic, Branko (2002) "True World Income Distribution, 1988 and 1993: First Calculation Based on Household Surveys Alone," *The Economic Journal*, 112, 51-92.
- Ministry of Foreign Affairs, "Turks Living Abroad", Ankara: Republic of Turkey Ministry of Foreign Affairs (<http://www.mfa.gov.tr/grupa/ac/acb/default1.htm>; accessed 19.11.2000).
- Mincer, Jacob (1962) "On-the-Job Training: Costs, Returns, and Some Implications," *Journal of Political Economy*, Supplement, 70(5), 50-79.
- Mincer, Jacob (1978) "Family Migration Decisions," *Journal of Political Economy*, 86(5), 749-73.
- Miyagiwa, K. (1991) "Scale Economies in Education and the Brain Drain Problem," *International Economic Review*, 32(3), 743-59.
- Mountford, A. (1997) "Can a Brain Drain be Good for Growth in the Source Economy?" *Journal of Development Economics*, 53, 287-303.
- Myers, Robert G. (1972) *Education and Emigration: Study Abroad and the Migration of Human Resources*, New York: David McKay Company, Inc.
- National Science Board (2002b), *Science and Engineering Indicators – 2002. Volume 2: Appendix Tables*, Arlington, VA: National Science Foundation.
- Naumova, T. V. (1998) "Russia's 'Brain Drain'," *Russian Social Science Review*, 39(2), 49-56.
- Niessen, Jan (2002) "International Mobility in a Globalising World," paper presented at the ACP-EU Joint Parliamentary Assembly Workshop on Migration and Development, Capetown, 20 March.
- Niland, J. R. (1970) *The Asian Engineering Brain Drain: A Study of International Relocation into the United States from India, China, Korea, Thailand and Japan*, D. C. Heath and Company, Lexington, Massachusetts.
- NSF (1997) *Survey of Doctorate Recipients*, Arlington, VA: National Science Foundation, Division of Science Resources Studies.
- OECD (1994) *Proposed Standard Practice for Surveys of Research and Experimental Development: "Frascati Manual 1993"*, The Measurement of Scientific and Technological Activities Series, Paris: Organization for Economic Co-operation and Development.
- OECD (1998a) *Human Capital Investment: An International Comparison*, Paris: Organization for Economic Co-operation and Development.
- OECD (1998b) *Trends in International Migration*, Paris: Organization for Economic Co-operation and Development.

- Oğuzkan, T. (1971) *Yurt Dışında Çalışan Doktoralı Türkler: Türkiye'den Başka Ülkelere Yüksek Seviyede Eleman Göçü Üzerinde Bir Araştırma* (Turks with Doctorate Degrees Working Abroad: An Investigation of the Migration of Highly Skilled Workers from Turkey to Other Countries), Ankara: Orta Doğu Teknik Üniversitesi.
- Oğuzkan, T. (1975) "The Turkish Brain Drain: Migration of Tendencies among Doctoral Level Manpower," in R. E. Krane (ed.) *Manpower Mobility Across Cultural Boundaries: Social, Economic and Legal Aspects, The Case of Turkey and West Germany*, Leiden, Netherlands: E.J. Brill.
- Oni, Bankolé (2000) "Capacity Building and Brain Drain in Nigerian Universities," The Regional Conference on Brain Drain and Capacity Building in Africa, Addis Ababa, 22 - 24 February.
- Pampel, F. C. (2000) *Logistic Regression: A Primer*, Sage University Paper series on Quantitative Applications in the Social Sciences, 07-132, Thousand Oakes, CA: Sage.
- Partridge, Mark D. (1997) "Is Inequality Harmful for Growth: Comment," *The American Economic Review*, 87(5), 1019-32.
- Patinkin, D. (1968) "A 'Nationalist' Model," in W. Adams (ed.) *The Brain Drain*, New York: The Macmillan Company.
- Persson, Torsten and Guido Tabellini (1994) "Is Inequality Harmful for Growth?" *The American Economic Review*, 84(3), 600-21.
- Poot, Jacques (1996) "Information, Communication and Networks in International Migration Systems," *The Annals of Regional Science*, 30, 55-73.
- Ranis, Gustav (ed.) (1972) *The Gap Between Rich and Poor Nations*, New York: St. Martin's Press.
- Rauch, James E. (1991) "Reconciling the Pattern of Trade with the Pattern of Migration," *American Economic Review*, 81(4), 775-96.
- Rea, L. M. and R. A. Parker (1997) *Designing and Conducting Survey Research: A Comprehensive Guide*, Second Edition, San Francisco: Jossey-Bass Publishers.
- Regets, Mark C. (2001) "Research and Policy Issues in High-Skilled International Migration: A Perspective with Data from the United States," IZA Discussion Paper No. 366, Bonn, Germany: Institute for the Study of Labor.
- Riley, John G. (1975) "Competitive Signalling," *Journal of Economic Theory*, 10, 174-186.
- Rodriguez, Carlos Alfredo (1975) "Brain Drain and Economic Growth: A Dynamic Model," *Journal of Development Economics*, 2, 223-47.

- Russell, Sharon Stanton (1995) "International Migration: Implications for the World Bank," Human Resources Development and Operations Policy Working Paper HROWP 54, Washington, DC: The World Bank, ([http://www.worldbank.org/html/extdr/hnp/hddflash/workp/wp\\_00054.html](http://www.worldbank.org/html/extdr/hnp/hddflash/workp/wp_00054.html)) \*
- SAMP (South African Migration Project) (2000) *Losing our Minds: Skills Migration and the South African Brain Drain*, Cape Town, South Africa: Idasa Publishers.
- Schelling, T. C. (1978) *Micromotives and Macrobehavior*, New York and London: W. W. Norton & Company.
- Schott, Thomas (1998) "Ties between Center and Periphery in the Scientific World-System: Accumulation of Rewards, Dominance and Self-Reliance in the Center," *Journal of World-Systems Research*, 4: 112-44.
- Schultz, T. Paul (1998) "Inequality in the Distribution of Personal Income in the World: How it is Changing and Why," *Journal of Population Economics*, 11(3), 307-44.
- Şenses, F. (1994) "Labour market response to structural adjustment and institutional pressures: The Turkish case," *METU Studies in Development*, 21(3), 405-48.
- SIS (1996) *Statistical Indicators 1923-1996*, Publication No. 1883, Ankara: State Institute of Statistics, Republic of Turkey.
- SIS (2002) *2001 Statistical Yearbook of Turkey*, Publication No. 2690, Ankara: State Institute of Statistics, Republic of Turkey.
- SIS (2003) *2000 Census of Population: Social and Economic Characteristics of the Population*, Publication No. 2759, Ankara: State Institute of Statistics, Republic of Turkey.
- Sjaastad, L. A. (1962) "The Costs and Returns of Human Migration," *Journal of Political Economy*, 70(5), 80-93.
- Solimano, Andrés (2001) "International Migration and the Global Economic Order: An Overview," Policy Research Working Paper No. 2720, Washington, DC: The World Bank, ([econ.worldbank.org/files/2728\\_wps2720.pdf](http://econ.worldbank.org/files/2728_wps2720.pdf)). \*
- Solow, R.M. (1957) "Technical Change and the Aggregate Production Function," *Review of Economics and Statistics*, 47, 312-320.
- SPO (2000) *Sekizinci Beş Yıllık Kalkınma Planı, 2001-2005* (Eighth Five-Year Development Plan, 2001-2005), Ankara: State Planning Organization.
- Stark, O. and D. E. Bloom (1985) "The New Economics of Labor Migration," *American Economic Review, Papers and Proceedings*, 75(2), 173-178.
- Stark, O., C. Helmenstein and A. Prskawetz (1997) "A Brain Gain with a Brain Drain," *Economics Letters*, 55, 227-234.



- Stark, O., C. Helmenstein and A. Prskawetz (1998) "Human Capital Depletion, Human Capital Formation, and Migration: A Blessing or a Cure?" *Economics Letters*, 60, 363-367.
- Stark, O. and Y. Wang (1999) "Externalities, Human Capital Formation, and Corrective Migration Policy," ZEF Discussion Papers on Development Policy No. 11, Bonn: Center for Development Research, Bonn University.
- Stark, O. and Y. Wang (2002a) "Inducing Human Capital Formation: Migration as a Substitute for Subsidies," *Journal of Public Economics*, 86, 29-46.
- Stark, Oded and You Qiang Wang (2002b) "Migration Dynamics," *Economics Letters*, 76, 159-64.
- Straubhaar, Thomas (1986) "The Determinants of Workers' Remittances: The Case of Turkey," *Weltwirtschaftliches Archiv*, 122(4), 728-40.
- Straubhaar, Thomas (2000) "International Mobility of the Highly Skilled: Brain Gain, Brain Drain or Brain Exchange," HWWA Discussion Paper No. 88, Hamburg Institute of International Economics.
- Tansel, A. (1994), "Wage employment, earnings and returns to schooling for men and women in Turkey", *Economics of Education Review*, 13(4), 305-320.
- Tansel, A. (1999) "Türkiye ve Seçilmiş Ülkelerde Eğitimin Getirisi", (Returns to education in Turkey and selected countries), *METU Studies in Development*, 26(3-4), 473-491.
- Tansel, A. (2002a) "Determinants of School Attainment of Boys and Girls in Turkey: Individual, Household and Community Factors," *Economics of Education Review*, 21(5), 455-470.
- Tansel, A. (2002b) "Economic development and female labour force participation in Turkey: Time series evidence and cross province estimates," in T. Bulutay (ed.) *Employment of Women*, Ankara: State Institute of Statistics, 111-51.
- Tansel, Aysıt (2002c) "General versus vocational high schools and labour market outcomes in Turkey," in İ. Sirageldin (Ed.), *Human Capital: Population Economics in the Middle East*, Cairo: American University in Cairo and Economic Research Forum, 258-72.
- Tansel, A. and F. Bircan (2002) "Demand for schooling and private tutoring in Turkey," paper presented at the VI. ERC/METU International Conference on Economics, September 12-14, Ankara.
- Tansel, Aysıt and Nil Demet Güngör (1997) "The Educational Attainment of Turkey's Labor Force: A Comparison Across Provinces and Over Time," *METU Studies in Development*, 24(4), 531-47.
- Tunali, İnsan (2000) "Rationality of Migration," *International Economic Review*, 41(4), 893-920.



- Tunali, İnsan (2003) "Rationality of Migration," in İsmail Sirageldin (ed.) *Human Capital: Population Economics in the Middle East*, Cairo: American University in Cairo Press.
- U.S. Congress, House of Representatives (1967) *The Brain Drain into the United States of Scientists, Engineers, and Physicians*, A Staff Study for the Research and Technical Programs Subcommittee of the Committee on Government Operations, 90<sup>th</sup> Congress, 1<sup>st</sup> Session, July 1967.
- U.S. Congress, House of Representatives (1968a) *The Brain Drain of Scientists, Engineers, and Physicians from the Developing Countries into the United States*, Hearing before a Subcommittee on Government Operations, 90<sup>th</sup> Congress, 2<sup>nd</sup> Session, January 23, 1968.
- U.S. Congress, House of Representatives (1968b) *Scientific Brain Drain from the Developing Countries*, Twenty-Third Report by the Committee on Government Operations, House Report No. 1215, Union Calendar No. 474, 90<sup>th</sup> Congress, 2<sup>nd</sup> Session, March 28, 1968.
- Valdés, Benigno (1999) *Economic Growth: Theory, Empirics and Policy*, Cheltenham, UK: Edward Elgar.
- Vidal, J.-P. (1998) "The Effect of Emigration on Human Capital Formation," *Journal of Population Economics*, 11, 589-900.
- Vogler, M. and R. Rotte (2000) "The Effects of Development on Migration: Theoretical Issues and New Empirical Evidence," *Journal of Population Economics*, 13, 458-508.
- Watanabe, S. (1969) "The Brain Drain from Developing to Developed Countries," *International Labour Review*, 99(4), 401-33.
- Winters, L. A., T. L. Walmsley, Z. K. Wang, and R. Grynberg (2003) "Liberalising Temporary Movement of Natural Persons: An Agenda for the Development Round," *World Economy*, 26, 1137-61, <http://ssrn.com/abstract=443784>.
- Wong, K. (1995) "International Labor Migration," Chapter 14 in *International Trade in Goods and Factor Mobility*, Cambridge, MA: The MIT Press.
- Wong, K. and C. K. Yip (1999) "Education, Economic Growth, and the Brain Drain," *Journal of Economic Dynamics and Control*, 23, 699-726.
- World Bank (2000) "Scientific and Technical Manpower Development in India," Report No. 20416-IN, Education Sector Unit, South Asia Region, Washington, DC: The World Bank.
- Yoon, B.-S. L. (1992) "Reverse Brain Drain in South Korea: State-led Model," *Studies in Comparative International Development*, 27(1), 4-26.

- YÖK (2001) *Yükseköğretim Kurumu Faaliyet Raporu* (Activities Report of the Higher Education Council), Ankara: Higher Education Council.
- YÖK (2003) *Yükseköğretim Kurumu Faaliyet Raporu* (Activities Report of the Higher Education Council), Ankara: Higher Education Council.
- Zang, Wei-Bin (1990) "Brain Drain and Economic Cycles with International Migration: A Case of Minimum Wage in the Unskilled Sector," *Journal of Development Economics*, 32, 191-203.
- Zweig, D. and Changhai, C. (1995) *China's Brain Drain to the United States: Views of Overseas Chinese Students and Scholars in the 1990s*, China Research Monograph, Institute of East Asian Studies, University of California, Berkeley, CA.
- Zweimüller, Josef (2000) "Inequality, Redistribution, and Economic Growth," *Empirica*, 27: 1-20.



## APPENDIX A

### SUPPLEMENTARY TABLES FOR CHAPTER SIX

**Table A.1 Respondents by Age and Gender (%)**

| <i>Professionals</i>      |           |           |            | <i>Students</i>    |           |           |            |
|---------------------------|-----------|-----------|------------|--------------------|-----------|-----------|------------|
|                           | Male      | Female    | Total      |                    | Male      | Female    | Total      |
| Age                       | (n = 879) | (n = 345) | (n = 1224) | Age                | (n = 676) | (n = 427) | (n = 1103) |
| 18-20                     | ...       | ...       | ...        | 18-20              | 2.8       | 2.6       | 2.7        |
| 21-25                     | 4.6       | 7.5       | 5.4        | 21-25              | 34.8      | 33.0      | 34.1       |
| 26-30                     | 27.5      | 39.7      | 31.0       | 26-30              | 46.5      | 50.1      | 47.9       |
| 31-35                     | 26.5      | 24.9      | 26.1       | 31-35              | 13.8      | 12.2      | 13.2       |
| 36-40                     | 13.4      | 8.7       | 12.1       | 36-40              | 1.8       | 1.4       | 1.6        |
| 41-45                     | 8.8       | 8.1       | 8.6        | 41-45              | 0.4       | 0.7       | 0.5        |
| 46-50                     | 8.0       | 6.4       | 7.5        | 46-50              | ...       | ...       | ...        |
| 50+                       | 11.3      | 4.6       | 9.4        | 50+                | ...       | ...       | ...        |
| $\chi^2(6) = 33.31^{***}$ |           |           |            | $\chi^2(5) = 2.06$ |           |           |            |

Notes: \*\*\*p < 0.001, \*\*p < 0.005, \*p < 0.010 for the chi-square test of independence. Cell percentages sum to 100 across columns.

**Table A.2 Marital Status of Respondents**

| <i>Marital Status</i>                       | <i>Professionals</i> |          | <i>Students</i> |          |
|---------------------------------------------|----------------------|----------|-----------------|----------|
|                                             | <i>n</i>             | <i>%</i> | <i>n</i>        | <i>%</i> |
| Never Married                               | 414                  | 35.1     | 777             | 70.9     |
| Divorced / Separated / Widowed              | 72                   | 6.1      | 22              | 2.0      |
| Married                                     | 692                  | 58.7     | 297             | 27.1     |
| <i>Spouse's Nationality = Turkish</i>       | 422                  | 35.8     | 254             | 23.2     |
| <i>Spouse's Nationality = Foreign</i>       | 190                  | 16.1     | 25              | 2.3      |
| <i>Spouse's Nationality = Dual Citizen</i>  | 80                   | 6.8      | 12              | 1.1      |
| <i>Spouse's Nationality = Not Indicated</i> | ...                  | ...      | 6               | 0.5      |
| Total                                       | 1178                 | 100.0    | 1096            | 100.0    |

Note: There are 46 missing responses in the professionals and 7 missing responses in the student survey.

**Table A.3 Stay Duration of Respondents by Gender (%)**

| Stay Duration        | Male      | Female    | Total      |
|----------------------|-----------|-----------|------------|
| <i>Professionals</i> | (n = 879) | (n = 345) | (n = 1224) |
| < 1 year             | 10.4      | 8.1       | 9.7        |
| 1 - 5 years          | 32.7      | 46.1      | 36.4       |
| 6 - 10 years         | 25.0      | 24.1      | 24.8       |
| 11 - 15 years        | 11.3      | 9.0       | 10.6       |
| 15 - 20 years        | 5.2       | 3.5       | 4.7        |
| 20 - 25 years        | 9.0       | 6.4       | 8.3        |
| 25 - 30 years        | 4.3       | 1.7       | 3.6        |
| > 30 years           | 2.2       | 1.2       | 1.9        |
| <i>Students</i>      | (n = 676) | (n = 427) | (n = 1103) |
| < 6 months           | 9.9       | 12.7      | 11.0       |
| 6 - 12 months        | 12.9      | 11.7      | 12.4       |
| 1 - 2 years          | 26.6      | 29.0      | 27.6       |
| 3 - 4 years          | 29.4      | 26.0      | 28.1       |
| 5 - 6 years          | 13.0      | 15.2      | 13.9       |
| ≥ 7 years            | 8.1       | 5.4       | 7.1        |

*Note:* Cell percentages sum to 100 across columns.

**Table A.4 Respondents by Country of Residence**

| Country         | ISO Code | Freq. | %    |
|-----------------|----------|-------|------|
| <i>Students</i> |          |       |      |
| United States   | USA      | 944   | 85.6 |
| Canada          | CAN      | 40    | 3.6  |
| United Kingdom  | GBR      | 39    | 3.5  |
| Germany         | DEU      | 22    | 2    |
| Japan           | JPN      | 13    | 1.2  |
| France          | FRA      | 9     | 0.8  |
| Australia       | AUS      | 8     | 0.7  |
| Austria         | AUT      | 8     | 0.7  |
| Belgium         | BEL      | 6     | 0.5  |
| Finland         | FIN      | 5     | 0.5  |
| Netherlands     | NLD      | 4     | 0.4  |
| Switzerland     | CHE      | 3     | 0.3  |
| Italy           | ITA      | 1     | 0.1  |
| Spain           | ESP      | 1     | 0.1  |
| Total           |          | 1103  | 100  |

Table A.4 continued

| Country              | ISO Code | Freq. | %    |
|----------------------|----------|-------|------|
| <i>Professionals</i> |          |       |      |
| United States        | USA      | 856   | 69.9 |
| Canada               | CAN      | 75    | 6.1  |
| Germany              | DEU      | 62    | 5.1  |
| United Kingdom       | GBR      | 48    | 3.9  |
| Australia            | AUS      | 34    | 2.8  |
| Belgium              | BEL      | 25    | 2    |
| Switzerland          | CHE      | 24    | 2    |
| Netherlands          | NLD      | 23    | 1.9  |
| France               | FRA      | 18    | 1.5  |
| Austria              | AUT      | 10    | 0.8  |
| United Arab Emirates | ARE      | 9     | 0.7  |
| Japan                | JPN      | 8     | 0.7  |
| Finland              | FIN      | 7     | 0.6  |
| Saudi Arabia         | SAU      | 5     | 0.4  |
| Italy                | ITA      | 3     | 0.3  |
| Hungary              | HUN      | 2     | 0.2  |
| Kazakhstan           | KAZ      | 2     | 0.2  |
| Norway               | NOR      | 2     | 0.2  |
| Sweden               | SWE      | 2     | 0.2  |
| Algeria              | DZA      | 1     | 0.1  |
| China                | CHN      | 1     | 0.1  |
| Ireland              | IRL      | 1     | 0.1  |
| Israel               | ISR      | 1     | 0.1  |
| Malaysia             | MYS      | 1     | 0.1  |
| Mexico               | MEX      | 1     | 0.1  |
| Romania              | ROM      | 1     | 0.1  |
| Singapore            | SGP      | 1     | 0.1  |
| South Africa         | ZAF      | 1     | 0.1  |
| Total                |          | 1224  | 100  |

Table A.5. Respondents by Father's Occupation

| Father's Occupation                             | Total    |       | Students |       | Professionals |       |
|-------------------------------------------------|----------|-------|----------|-------|---------------|-------|
|                                                 | <i>n</i> | %     | <i>n</i> | %     | <i>n</i>      | %     |
| Scientific, Technical and Related Professions   | 1144     | 50.4  | 548      | 50.3  | 596           | 50.5  |
| Architect, engineer or related professionals    | 356      | 15.7  | 189      | 17.4  | 167           | 14.1  |
| Science and technology professionals            | 44       | 1.9   | 16       | 1.5   | 28            | 2.4   |
| Health professionals                            | 152      | 6.7   | 65       | 6.0   | 87            | 7.4   |
| Other health-related workers (e.g., nurses)     | 4        | 0.2   | 1        | 0.1   | 3             | 0.3   |
| Legal, business or public service professionals | 254      | 11.2  | 107      | 9.8   | 147           | 12.4  |
| Academicians                                    | 129      | 5.7   | 66       | 6.1   | 63            | 5.3   |
| Teachers – pre, primary or secondary            | 123      | 5.4   | 72       | 6.6   | 51            | 4.3   |
| Teachers – other                                | 62       | 2.7   | 28       | 2.6   | 34            | 2.9   |
| Culture, media or sports professionals          | 11       | 0.5   | 4        | 0.4   | 7             | 0.6   |
| Administrators, managers .....                  | 267      | 11.8  | 149      | 13.7  | 118           | 10.0  |
| Clerks, secretaries, other admin. workers ..... | 32       | 1.4   | 17       | 1.6   | 15            | 1.3   |
| Sales or related workers .....                  | 32       | 1.4   | 17       | 1.6   | 15            | 1.3   |
| Services workers .....                          | 68       | 3.0   | 28       | 2.6   | 40            | 3.4   |
| Trades, crafts, arts and related workers .....  | 177      | 7.8   | 85       | 7.8   | 92            | 7.8   |
| Armed forces occupations .....                  | 154      | 6.8   | 57       | 5.2   | 97            | 8.2   |
| Other .....                                     | 386      | 17.0  | 183      | 16.8  | 203           | 17.2  |
| Not known .....                                 | 10       | 0.4   | 5        | 0.5   | 5             | 0.4   |
| Total (valid responses)                         | 2270     | 100.0 | 1089     | 100.0 | 1181          | 100.0 |
| Missing Responses                               | 66       |       | 14       |       | 52            |       |



Table A.6. Respondents by Mother's Occupation

| Mother's Occupation                             | Total    |       | Students |       | Professionals |       |
|-------------------------------------------------|----------|-------|----------|-------|---------------|-------|
|                                                 | <i>n</i> | %     | <i>n</i> | %     | <i>n</i>      | %     |
| Scientific, Technical and Related Professions   | 784      | 34.8  | 402      | 37.1  | 382           | 32.7  |
| Architect, engineer or related professionals    | 81       | 3.6   | 53       | 4.9   | 28            | 2.4   |
| Science and technology professionals            | 12       | 0.5   | 5        | 0.5   | 7             | 0.6   |
| Health professionals                            | 111      | 4.9   | 57       | 5.3   | 54            | 4.6   |
| Other health-related workers (e.g., nurses)     | 27       | 1.2   | 15       | 1.4   | 12            | 1.0   |
| Legal, business or public service professionals | 72       | 3.2   | 31       | 2.9   | 41            | 3.5   |
| Academicians                                    | 58       | 2.6   | 35       | 3.2   | 23            | 2.0   |
| Teachers – pre, primary or secondary            | 299      | 13.3  | 153      | 14.1  | 146           | 12.5  |
| Teachers – other                                | 116      | 5.1   | 51       | 4.7   | 65            | 5.6   |
| Culture, media or sports professionals          | 8        | 0.4   | 2        | 0.2   | 6             | 0.5   |
| Administrators, managers .....                  | 87       | 3.9   | 41       | 3.8   | 46            | 3.9   |
| Clerks, secretaries, other admin. workers ..... | 44       | 2.0   | 23       | 2.1   | 21            | 1.8   |
| Sales or related workers .....                  | 9        | 0.4   | 4        | 0.4   | 5             | 0.4   |
| Services workers .....                          | 20       | 0.9   | 9        | 0.8   | 11            | 0.9   |
| Trades, crafts, arts and related workers .....  | 32       | 1.4   | 18       | 1.7   | 14            | 1.2   |
| Armed forces occupations .....                  | 1        | 0.0   | 1        | 0.1   | 0             | 0.0   |
| Other .....                                     | 168      | 7.5   | 86       | 7.9   | 82            | 7.0   |
| Homemaker .....                                 | 1106     | 49.1  | 499      | 46.0  | 607           | 51.9  |
| Not known .....                                 | 2        | 0.1   | 1        | 0.1   | 1             | 0.1   |
| Total (valid responses)                         | 2253     | 100.0 | 1084     | 100.0 | 1169          | 100.0 |
| Missing Responses                               | 74       |       | 19       |       | 55            |       |

Table A.7 Language of Instruction in High School, Science and Social Science Courses (%)

| Language of Instruction | Professionals ( <i>n</i> = 1224) |        | Students ( <i>n</i> = 1103) |        |
|-------------------------|----------------------------------|--------|-----------------------------|--------|
|                         | Science                          | Social | Science                     | Social |
| Turkish                 | 44.6                             | 94.3   | 43.8                        | 96.2   |
| English                 | 44.0                             | 3.8    | 47.4                        | 2.8    |
| French                  | 4.9                              | 1.2    | 2.7                         | 0.5    |
| German                  | 6.2                              | 0.5    | 5.9                         | 0.5    |
| Italian                 | 0.3                              | 0.3    | 0.2                         | 0.0    |

Note: Cell percentages sum to 100 across columns.

Table A.8 Bachelor's Degree Institutions of Respondents

| Students           |          |       | Professionals              |          |       |
|--------------------|----------|-------|----------------------------|----------|-------|
| Alma Mater         | <i>n</i> | %     | Alma Mater                 | <i>n</i> | %     |
| Orta Doğu Teknik   | 318      | 32.9  | Orta Doğu Teknik           | 410      | 33.5  |
| Boğaziçi           | 169      | 17.5  | Boğaziçi                   | 207      | 16.9  |
| Bilkent            | 108      | 11.2  | Foreign University         | 141      | 11.5  |
| İstanbul Teknik    | 62       | 6.4   | İstanbul Teknik            | 137      | 11.2  |
| İstanbul           | 43       | 4.5   | Bilkent                    | 71       | 5.8   |
| Ankara             | 41       | 4.2   | İstanbul                   | 53       | 4.3   |
| Foreign University | 35       | 3.6   | Hacettepe                  | 51       | 4.2   |
| Hacettepe          | 34       | 3.5   | Ankara                     | 29       | 2.4   |
| Marmara            | 28       | 2.9   | Marmara                    | 23       | 1.9   |
| Yıldız Teknik      | 16       | 1.7   | Ege                        | 22       | 1.8   |
| Dokuz Eylül        | 15       | 1.6   | Yıldız Teknik              | 19       | 1.6   |
| Koç                | 15       | 1.6   | Dokuz Eylül                | 10       | 0.8   |
| Çukurova           | 12       | 1.2   | Gazi                       | 6        | 0.5   |
| Ege                | 11       | 1.1   | Doğu Akdeniz               | 4        | 0.3   |
| Gazi               | 10       | 1.0   | Koç                        | 4        | 0.3   |
| Uludağ             | 7        | 0.7   | Mimar Sinan                | 4        | 0.3   |
| Anadolu            | 6        | 0.6   | Anadolu                    | 3        | 0.3   |
| Akdeniz            | 3        | 0.3   | Atatürk                    | 3        | 0.3   |
| Gaziantep          | 3        | 0.3   | Çukurova                   | 3        | 0.3   |
| Karadeniz Teknik   | 3        | 0.3   | Uludağ                     | 3        | 0.3   |
| Osmangazi          | 3        | 0.3   | Deniz Harp                 | 2        | 0.2   |
| Selçuk             | 3        | 0.3   | Hava Harp                  | 2        | 0.2   |
| Abant İzzet Baysal | 2        | 0.2   | Işık                       | 2        | 0.2   |
| Balıkesir          | 2        | 0.2   | Karadeniz Teknik           | 2        | 0.2   |
| Çanakkale          | 2        | 0.2   | Kocaeli                    | 2        | 0.2   |
| Galatasaray        | 2        | 0.2   | Abant İzzet Baysal         | 1        | 0.1   |
| İnönü              | 2        | 0.2   | Akdeniz                    | 1        | 0.1   |
| Atatürk            | 1        | 0.1   | Dicle                      | 1        | 0.1   |
| Başkent            | 1        | 0.1   | Fırat                      | 1        | 0.1   |
| Çankaya            | 1        | 0.1   | İktisadi ve Ticari İlimler | 1        | 0.1   |
| Işık               | 1        | 0.1   | Kadir Has                  | 1        | 0.1   |
| Kocaeli            | 1        | 0.1   | Kara Harp                  | 1        | 0.1   |
| Mimar Sinan        | 1        | 0.1   | Mersin                     | 1        | 0.1   |
| Niğde              | 1        | 0.1   | Osmangazi                  | 1        | 0.1   |
| Polis Akademisi    | 1        | 0.1   | Zonguldak Karaelmas        | 1        | 0.1   |
| Sabancı            | 1        | 0.1   |                            |          |       |
| Sakarya            | 1        | 0.1   |                            |          |       |
| Samsun 19 Mayıs    | 1        | 0.1   |                            |          |       |
| Hava Harp          | 1        | 0.1   |                            |          |       |
| Total              | 967      | 100.0 | Total                      | 1223     | 100.0 |
| Not indicated      | 26       |       | Not indicated              | 1        |       |

Table A.9. Detailed Undergraduate Fields of Students with Bachelor's Degrees

| Bachelor's Degree Fields                                 | <i>n</i>   | %           |
|----------------------------------------------------------|------------|-------------|
| <b>Architecture and City Planning, Total</b> .....       | <b>16</b>  | <b>1.6</b>  |
| Architecture                                             | 7          | 0.7         |
| City and Urban Planning                                  | 9          | 0.9         |
| <b>Economic and Administrative Sciences, Total</b> ..... | <b>179</b> | <b>18.0</b> |
| Business Administration                                  | 44         | 4.4         |
| Economics                                                | 74         | 7.5         |
| Finance                                                  | 2          | 0.2         |
| International Relations                                  | 31         | 3.1         |
| Political Science and Public Administration              | 25         | 2.5         |
| International Trade                                      | 3          | 0.3         |
| <b>Educational Sciences, Total</b> .....                 | <b>60</b>  | <b>6.0</b>  |
| Art Education                                            | 2          | 0.2         |
| Curriculum Planning                                      | 1          | 0.1         |
| Educational Sciences                                     | 2          | 0.2         |
| Elementary Education                                     | 3          | 0.3         |
| Foreign Languages Education                              | 12         | 1.2         |
| Physical Education and Sport                             | 4          | 0.4         |
| Science and Mathematics Education                        | 25         | 2.5         |
| Social Sciences Education                                | 1          | 0.1         |
| Special Education                                        | 2          | 0.2         |
| Music Education                                          | 1          | 0.1         |
| Counselling                                              | 3          | 0.3         |
| Education, field not specified                           | 4          | 0.4         |
| <b>Engineering and Technical Sciences, Total</b> .....   | <b>504</b> | <b>50.8</b> |
| Agricultural Sciences / Agricultural Engineering         | 13         | 1.3         |
| Aeronautical / Aerospace Engineering                     | 10         | 1.0         |
| Biomedical Engineering                                   | 1          | 0.1         |
| Chemical Engineering                                     | 38         | 3.8         |
| Civil Engineering                                        | 41         | 4.1         |
| Computer Science                                         | 15         | 1.5         |
| Computer Engineering                                     | 34         | 3.4         |
| Electric-Electronic Engineering                          | 134        | 13.5        |
| Engineering Sciences                                     | 1          | 0.1         |
| Environmental Engineering                                | 18         | 1.8         |
| Food Engineering                                         | 13         | 1.3         |
| Forestry                                                 | 4          | 0.4         |
| Geological Engineering                                   | 2          | 0.2         |
| Geomatic Engineering (Geodesy/Photogrammetry)            | 2          | 0.2         |
| Geophysics Engineering                                   | 2          | 0.2         |
| Industrial Engineering                                   | 50         | 5.0         |
| Maritime Eng. (Naval Arch., Ship Building, Marine Eng.)  | 1          | 0.1         |
| Mechanical Engineering                                   | 72         | 7.3         |
| Metallurgical and Materials Engineering                  | 20         | 2.0         |
| Mining Engineering                                       | 7          | 0.7         |
| Nuclear Engineering                                      | 3          | 0.3         |
| Petroleum and Natural Gas Engineering                    | 9          | 0.9         |

Table A.9 continued

| Bachelor's Degree Fields                        | <i>n</i>   | %            |
|-------------------------------------------------|------------|--------------|
| Physics Engineering                             | 2          | 0.2          |
| Textiles Engineering                            | 2          | 0.2          |
| Engineering Management                          | 4          | 0.4          |
| Mathematical Engineering                        | 1          | 0.1          |
| Fishery Sciences and Engineering                | 1          | 0.1          |
| Engineering, field not specified                | 4          | 0.4          |
| <b>Language and Literature, Total</b> .....     | <b>15</b>  | <b>1.5</b>   |
| Turkish Language and Literature                 | 1          | 0.1          |
| Eastern Languages and Literatures               | 1          | 0.1          |
| Western Languages and Literatures               | 8          | 0.8          |
| Comparative Literature Studies                  | 1          | 0.1          |
| Interpretation/Translation                      | 4          | 0.4          |
| <b>Math and Natural Sciences, Total</b> .....   | <b>127</b> | <b>12.8</b>  |
| Astronomy and Space Sciences                    | 1          | 0.1          |
| Biology / Molecular Biology and Genetics        | 28         | 2.8          |
| Biochemistry                                    | 3          | 0.3          |
| Chemistry                                       | 24         | 2.4          |
| Mathematics                                     | 31         | 3.1          |
| Physics                                         | 37         | 3.7          |
| Statistics                                      | 3          | 0.3          |
| <b>Medical and Health Sciences, Total</b> ..... | <b>28</b>  | <b>2.8</b>   |
| Child Care and Development                      | 1          | 0.1          |
| Dentistry                                       | 3          | 0.3          |
| Medicine – General                              | 13         | 1.3          |
| Nursing                                         | 1          | 0.1          |
| Pharmacology and Pharmaceutical Sciences        | 5          | 0.5          |
| Sports Medicine                                 | 1          | 0.1          |
| Veterinary Sciences                             | 4          | 0.4          |
| <b>Social Sciences, Total</b> .....             | <b>48</b>  | <b>4.8</b>   |
| Communication                                   | 1          | 0.1          |
| Geography                                       | 1          | 0.1          |
| History                                         | 1          | 0.1          |
| Law                                             | 5          | 0.5          |
| Philosophy                                      | 4          | 0.4          |
| Public Relations                                | 1          | 0.1          |
| Psychology                                      | 14         | 1.4          |
| Social Work                                     | 1          | 0.1          |
| Sociology                                       | 16         | 1.6          |
| Tourism and Hotel Management                    | 2          | 0.2          |
| Social Sciences, field not specified            | 2          | 0.2          |
| <b>Arts, Total</b> .....                        | <b>5</b>   | <b>0.5</b>   |
| Music                                           | 3          | 0.3          |
| Radio, Television and Cinema                    | 2          | 0.2          |
| Discipline and field not specified              | 11         | 1.1          |
| <b>TOTAL</b>                                    | <b>993</b> | <b>100.0</b> |

Table A.10 Detailed Undergraduate Fields of Overseas Turkish Workforce

| Bachelor's Degree Fields                                  | Freq.      | %           |
|-----------------------------------------------------------|------------|-------------|
| <b>Architecture and City Planning, Total</b> .....        | <b>40</b>  | <b>3.3</b>  |
| Architecture                                              | 27         | 2.2         |
| City and Regional Planning                                | 5          | 0.4         |
| Industrial Design                                         | 5          | 0.4         |
| Interior Architecture and Environmental Design            | 3          | 0.3         |
| <b>Economic and Administrative Sciences, Total</b> .....  | <b>209</b> | <b>17.1</b> |
| Accounting                                                | 3          | 0.3         |
| Business Administration                                   | 85         | 6.9         |
| Economics                                                 | 81         | 6.6         |
| Econometrics                                              | 3          | 0.3         |
| Finance                                                   | 4          | 0.3         |
| International Relations                                   | 13         | 1.1         |
| Labour Economics and Industrial Relations                 | 1          | 0.1         |
| Political Science and Public Administration               | 15         | 1.2         |
| Economic and Administrative Sciences, field not specified | 4          | 0.3         |
| <b>Educational Sciences, Total</b> .....                  | <b>16</b>  | <b>1.3</b>  |
| Art Education                                             | 1          | 0.1         |
| Computer Education and Instructional Technology           | 3          | 0.3         |
| Educational Sciences                                      | 1          | 0.1         |
| Foreign Languages Education                               | 5          | 0.4         |
| Secondary Science and Mathematics Education               | 5          | 0.4         |
| Education, field not specified                            | 1          | 0.1         |
| <b>Engineering and Technical Sciences, Total</b> .....    | <b>774</b> | <b>63.2</b> |
| Agricultural Sciences / Agricultural Engineering          | 1          | 0.1         |
| Aeronautical and Aerospace Engineering                    | 18         | 1.5         |
| Biomedical Engineering                                    | 1          | 0.1         |
| Chemical Engineering                                      | 48         | 3.9         |
| Civil Engineering                                         | 61         | 5.0         |
| Communications Technologies                               | 4          | 0.3         |
| Computer Science                                          | 33         | 2.7         |
| Computer Engineering                                      | 88         | 7.2         |
| Electrical-Electronics Engineering                        | 249        | 20.3        |
| Engineering Sciences                                      | 2          | 0.2         |
| Environmental Engineering                                 | 13         | 1.1         |
| Food Engineering                                          | 7          | 0.6         |
| Forestry                                                  | 2          | 0.2         |
| Geological Engineering                                    | 10         | 0.8         |
| Industrial Engineering                                    | 86         | 7.0         |
| Maritime Engineering                                      | 3          | 0.3         |
| Mechanical Engineering                                    | 92         | 7.5         |
| Metallurgical and Materials Engineering                   | 10         | 0.8         |
| Mining Engineering                                        | 9          | 0.7         |
| Nuclear Engineering                                       | 2          | 0.2         |
| Petroleum and Natural Gas Engineering                     | 13         | 1.1         |
| Physics Engineering                                       | 4          | 0.3         |

Table A.10 continued

| Bachelor's Degree Fields                        | Freq.       | %          |
|-------------------------------------------------|-------------|------------|
| Textiles Engineering                            | 2           | 0.2        |
| Automotive Engineering                          | 4           | 0.3        |
| Management Engineering                          | 2           | 0.2        |
| Engineering, field not specified                | 10          | 0.8        |
| <b>Language and Literature, Total</b> .....     | <b>8</b>    | <b>0.7</b> |
| Ancient Languages and Cultures                  | 1           | 0.1        |
| Western Languages and Literatures               | 5           | 0.4        |
| Comparative Literature Studies                  | 2           | 0.2        |
| <b>Math and Natural Sciences, Total</b> .....   | <b>76</b>   | <b>6.2</b> |
| Biology / Molecular Biology and Genetics        | 10          | 0.8        |
| Biochemistry                                    | 4           | 0.3        |
| Chemistry                                       | 14          | 1.1        |
| Mathematics                                     | 22          | 1.8        |
| Physics                                         | 15          | 1.2        |
| Science – General                               | 2           | 0.2        |
| Statistics                                      | 7           | 0.6        |
| Math and Natural Sciences, field not specified  | 2           | 0.2        |
| <b>Medical and Health Sciences, Total</b> ..... | <b>54</b>   | <b>4.4</b> |
| Medicine – General                              | 47          | 3.8        |
| Pharmacology and Pharmaceutical Sciences        | 3           | 0.3        |
| Veterinary Sciences                             | 4           | 0.3        |
| <b>Social Sciences, Total</b> .....             | <b>44</b>   | <b>3.6</b> |
| Anthropology                                    | 1           | 0.1        |
| Archeology                                      | 3           | 0.3        |
| Art History                                     | 1           | 0.1        |
| Communication                                   | 1           | 0.1        |
| History                                         | 2           | 0.2        |
| Journalism                                      | 2           | 0.2        |
| Law                                             | 4           | 0.3        |
| Library Sciences                                | 1           | 0.1        |
| Linguistics                                     | 2           | 0.2        |
| Philosophy                                      | 3           | 0.3        |
| Public Relations                                | 2           | 0.2        |
| Psychology                                      | 11          | 0.9        |
| Social Work                                     | 1           | 0.1        |
| Sociology                                       | 3           | 0.3        |
| Tourism and Hotel Management                    | 7           | 0.6        |
| <b>Arts, Total</b> .....                        | <b>3</b>    | <b>0.2</b> |
| Fine Arts                                       | 1           | 0.1        |
| Graphic Arts                                    | 1           | 0.1        |
| Ceramic and Glass                               | 1           | 0.1        |
| <b>TOTAL</b>                                    | <b>1224</b> | <b>100</b> |



Table A.11 Current Program of Study by Gender, Students (%)

| Program              | Male<br>(n = 676)  | Female<br>(n = 427) | Total<br>(n = 1103) |
|----------------------|--------------------|---------------------|---------------------|
| Bachelors            | 11.0               | 10.5                | 10.8                |
| Masters              | 25.6               | 30.4                | 27.5                |
| Doctorate            | 57.7               | 55.0                | 56.7                |
| Postdoctorate        | 5.8                | 4.0                 | 5.1                 |
| Test of independence | $\chi^2(3) = 4.26$ |                     |                     |

Notes: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010; Cell percentages sum to 100 across columns; The bachelor's category includes three students pursuing an associate's degree and three students in the post-bachelor's certificate program; Five students in the post-master's certificate program are included in the master's category.

Table A.12 Highest Degree Planned by Gender, Students (%)

| Degree                     | Male<br>(n = 676)  | Female<br>(n = 427) | Total<br>(n = 1103) |
|----------------------------|--------------------|---------------------|---------------------|
| Doctorate                  | 74.9               | 74.0                | 74.5                |
| Masters                    | 22.5               | 23.9                | 23.0                |
| Bachelors                  | 2.1                | 0.9                 | 1.6                 |
| Post-Masters Certificate   | 0.4                | 0.5                 | 0.5                 |
| Post-Bachelors Certificate | 0.2                | 0.5                 | 0.3                 |
| Associates                 | 0.0                | 0.2                 | 0.1                 |
| Test of independence       | $\chi^2(5) = 4.89$ |                     |                     |

Notes: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010; Cell percentages sum to 100 across columns.

Table A.13 Living Accommodations by Study Program, Students (%)

| Living Accommodation | Bachelors<br>(n = 118) | Masters<br>(n = 300) | Doctorate<br>(n = 623) | Postdoc<br>(n = 56) | Total<br>(n = 1097) |
|----------------------|------------------------|----------------------|------------------------|---------------------|---------------------|
| Apartment            | 30.5                   | 47.3                 | 62.0                   | 67.9                | 54.9                |
| Room in apartment    | 44.9                   | 13.0                 | 5.0                    | 3.6                 | 11.4                |
| Dorm                 | 11.0                   | 13.3                 | 10.1                   | 16.1                | 11.4                |
| House                | 2.5                    | 2.3                  | 1.6                    | 1.8                 | 1.9                 |
| Room in house        | 5.1                    | 16.3                 | 13.0                   | 1.8                 | 12.5                |
| Other                | 5.9                    | 7.7                  | 8.4                    | 8.9                 | 7.9                 |

Notes: There are six missing responses; Cell percentages sum to 100 across columns.

Table A.14 Living On or Off Campus by Study Program (%)

| Program   | n    | On Campus? |      |
|-----------|------|------------|------|
|           |      | No         | Yes  |
| Bachelors | 119  | 51.3       | 48.7 |
| Masters   | 303  | 76.9       | 23.1 |
| Doctorate | 625  | 77.9       | 22.1 |
| Postdoc   | 56   | 82.1       | 17.9 |
| Total     | 1103 | 75.0       | 25.0 |

Note: Cell percentages sum to 100 across rows.

Table A.15 Current Field of Study by Gender, Students (%)

| Field                                | Male<br>(n = 674)         | Female<br>(n = 426) | Total<br>(n = 1100) |
|--------------------------------------|---------------------------|---------------------|---------------------|
| Engineering and Technical Sciences   | 53.1                      | 29.3                | 43.9                |
| Economic and Administrative Sciences | 24.2                      | 33.6                | 27.8                |
| Math and Natural Sciences            | 11.3                      | 11.7                | 11.5                |
| Social Sciences                      | 3.6                       | 11.3                | 6.6                 |
| Educational Sciences                 | 4.2                       | 7.3                 | 5.4                 |
| Medical and Health Sciences          | 1.9                       | 2.6                 | 2.2                 |
| Architecture and Urban Planning      | 0.7                       | 1.9                 | 1.2                 |
| Language and Literature              | 0.5                       | 1.4                 | 0.8                 |
| Arts                                 | 0.6                       | 0.9                 | 0.7                 |
| Test of independence                 | $\chi^2(8) = 77.09^{***}$ |                     |                     |

Notes: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010; Cell percentages sum to 100 across columns. There are three missing responses.

Table A.16 Students by Current Program and Field of Study (%)

| Field                                | Current Program             |                      |                        |                     |
|--------------------------------------|-----------------------------|----------------------|------------------------|---------------------|
|                                      | Bachelors<br>(n = 116)      | Masters<br>(n = 303) | Doctorate<br>(n = 625) | Postdoc<br>(n = 56) |
| Engineering and Technical Sciences   | 48.3                        | 37.0                 | 45.9                   | 50.0                |
| Economic and Administrative Sciences | 31.0                        | 44.6                 | 21.4                   | 1.8                 |
| Math and Natural Sciences            | 6.0                         | 2.3                  | 15.8                   | 23.2                |
| Educational Sciences                 | 1.7                         | 5.9                  | 6.1                    | 1.8                 |
| Social Sciences                      | 7.8                         | 7.6                  | 5.9                    | 5.4                 |
| Medical and Health Sciences          | 2.6                         | 0.0                  | 1.8                    | 17.9                |
| Architecture and Urban Planning      | 0.0                         | 1.3                  | 1.4                    | 0.0                 |
| Language and Literature              | 0.0                         | 1.0                  | 1.0                    | 0.0                 |
| Arts                                 | 2.6                         | 0.3                  | 0.6                    | 0.0                 |
| Test of Independence                 | $\chi^2(24) = 188.22^{***}$ |                      |                        |                     |

Notes: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010; Cell percentages sum to 100 across columns. There are three missing responses.

**Table A.17 Field of Study and Compulsory Academic Service Requirement (%)**

| Field                                | No<br>( <i>n</i> = 904)    | Yes<br>( <i>n</i> = 191) | Total<br>( <i>n</i> = 1100) |
|--------------------------------------|----------------------------|--------------------------|-----------------------------|
| Engineering and Technical Sciences   | 45.9                       | 34.6                     | 43.9                        |
| Economic and Administrative Sciences | 30.9                       | 13.1                     | 27.8                        |
| Math and Natural Sciences            | 11.2                       | 12.6                     | 11.4                        |
| Social Sciences                      | 6.5                        | 6.8                      | 6.6                         |
| Educational Sciences                 | 1.8                        | 22.5                     | 5.4                         |
| Medical and Health Sciences          | 1.9                        | 3.7                      | 2.2                         |
| Architecture and Urban Planning      | 0.6                        | 4.2                      | 1.2                         |
| Language and Literature              | 0.6                        | 2.1                      | 0.8                         |
| Arts                                 | 0.8                        | 0.5                      | 0.7                         |
| Test of independence                 | $\chi^2(8) = 173.32^{***}$ |                          |                             |

Notes: \*\*\**p* < 0.001, \*\**p* < 0.005, \**p* < 0.010; Cell percentages sum to 100 across columns; There are three missing responses.

**Table A.18 Work Destinations after Completion of Studies**

| Work Destination           | <i>n</i> | %     |
|----------------------------|----------|-------|
| <i>North America</i>       | 703      | 67.0  |
| USA                        | 667      | 63.6  |
| Canada                     | 33       | 3.2   |
| North America, unspecified | 3        | 0.3   |
| <i>Europe</i>              | 57       | 5.5   |
| Europe, unspecified        | 14       | 1.3   |
| Germany                    | 13       | 1.2   |
| Great Britain              | 12       | 1.1   |
| France                     | 6        | 0.6   |
| Belgium                    | 3        | 0.3   |
| Spain                      | 2        | 0.2   |
| Austria                    | 1        | 0.1   |
| Switzerland                | 1        | 0.1   |
| Denmark                    | 1        | 0.1   |
| Finland                    | 1        | 0.1   |
| Italy                      | 1        | 0.1   |
| Netherlands                | 1        | 0.1   |
| Portugal                   | 1        | 0.1   |
| Australia                  | 7        | 0.7   |
| Japan                      | 1        | 0.1   |
| Turkey                     | 263      | 25.1  |
| Do not know                | 18       | 1.7   |
| Total                      | 1049     | 100.0 |

Note: There are 54 missing responses.

Table A.19 Intended Organization Immediately after Completing Studies by Work Destination

| Organization                                         | USA      |       | Turkey   |       | Europe   |       |
|------------------------------------------------------|----------|-------|----------|-------|----------|-------|
|                                                      | <i>n</i> | %     | <i>n</i> | %     | <i>n</i> | %     |
| University – private                                 | 154      | 23.2  | 30       | 11.5  | 9        | 16.1  |
| University – public                                  | 91       | 13.7  | 161      | 61.9  | 13       | 23.2  |
| College / Tech. Inst. - private                      | 5        | 0.8   | 0        | 0.0   | 1        | 1.8   |
| College / Tech. Inst. - public                       | 4        | 0.6   | 0        | 0.0   | 0        | 0.0   |
| Pre / Primary / Secondary School - private           | 1        | 0.2   | 0        | 0.0   | 1        | 1.8   |
| Pre / Primary / Secondary School - public            | 4        | 0.6   | 0        | 0.0   | 0        | 0.0   |
| Government Department                                | 4        | 0.6   | 15       | 5.8   | 0        | 0.0   |
| Government Owned Corporation                         | 2        | 0.3   | 2        | 0.8   | 0        | 0.0   |
| Multinational Corporation                            | 132      | 19.8  | 17       | 6.5   | 17       | 30.4  |
| Other Private Sector Organization                    | 170      | 25.6  | 14       | 5.4   | 11       | 19.6  |
| Self-Employed in Incorp. Business / Practice / Farm  | 13       | 2.0   | 3        | 1.2   | 0        | 0.0   |
| Self-Employed in Non-Inc. Business / Practice / Farm | 2        | 0.3   | 2        | 0.8   | 0        | 0.0   |
| International Organization                           | 23       | 3.5   | 1        | 0.4   | 2        | 3.6   |
| Non-profit Organization                              | 5        | 0.8   | 1        | 0.4   | 0        | 0.0   |
| Armed Forces                                         | 0        | 0.0   | 1        | 0.4   | 0        | 0.0   |
| Not Sure                                             | 55       | 8.3   | 13       | 5.0   | 2        | 3.6   |
| Total                                                | 665      | 100.0 | 260      | 100.0 | 56       | 100.0 |

Table A.19 continued

| Organization                                         | Canada   |       | Other / Not Known |       | Total    |       |
|------------------------------------------------------|----------|-------|-------------------|-------|----------|-------|
|                                                      | <i>n</i> | %     | <i>n</i>          | %     | <i>n</i> | %     |
| University – private                                 | 5        | 15.6  | 8                 | 27.6  | 206      | 19.8  |
| University – public                                  | 4        | 12.5  | 7                 | 24.1  | 276      | 26.5  |
| College / Tech. Inst. - private                      | 2        | 6.3   | 0                 | 0.0   | 8        | 0.8   |
| College / Tech. Inst. - public                       | 1        | 3.1   | 0                 | 0.0   | 5        | 0.5   |
| Pre / Primary / Secondary School - private           | 0        | 0.0   | 0                 | 0.0   | 2        | 0.2   |
| Pre / Primary / Secondary School - public            | 0        | 0.0   | 1                 | 3.4   | 5        | 0.5   |
| Government Department                                | 0        | 0.0   | 0                 | 0.0   | 19       | 1.8   |
| Government Owned Corporation                         | 0        | 0.0   | 1                 | 3.4   | 5        | 0.5   |
| Multinational Corporation                            | 8        | 25.0  | 2                 | 6.9   | 176      | 16.9  |
| Other Private Sector Organization                    | 8        | 25.0  | 2                 | 6.9   | 205      | 19.7  |
| Self-Employed in Incorp. Business / Practice / Farm  | 0        | 0.0   | 0                 | 0.0   | 16       | 1.5   |
| Self-Employed in Non-Inc. Business / Practice / Farm | 0        | 0.0   | 0                 | 0.0   | 4        | 0.4   |
| International Organization                           | 1        | 3.1   | 2                 | 6.9   | 29       | 2.8   |
| Non-profit Organization                              | 1        | 3.1   | 0                 | 0.0   | 7        | 0.7   |
| Armed Forces                                         | 0        | 0.0   | 0                 | 0.0   | 1        | 0.1   |
| Not Sure                                             | 2        | 6.3   | 6                 | 20.7  | 78       | 7.5   |
| Total                                                | 32       | 100.0 | 29                | 100.0 | 1042     | 100.0 |

Note: There are 61 missing responses.

Table A.20 Intended Organization Five Years after Completing Studies by Work Destination

| Organization                                         | USA |       | Turkey |       | Europe |       |
|------------------------------------------------------|-----|-------|--------|-------|--------|-------|
|                                                      | n   | %     | n      | %     | n      | %     |
| University – private                                 | 164 | 25.2  | 52     | 20.5  | 10     | 17.9  |
| University – public                                  | 95  | 14.6  | 118    | 46.5  | 7      | 12.5  |
| College / Tech. Inst. - private                      | 6   | 0.9   | 0      | 0.0   | 0      | 0.0   |
| College / Tech. Inst. - public                       | 1   | 0.2   | 0      | 0.0   | 1      | 1.8   |
| Pre / Primary / Secondary School - private           | 1   | 0.2   | 0      | 0.0   | 0      | 0.0   |
| Government Department                                | 6   | 0.9   | 12     | 4.7   | 0      | 0.0   |
| Government Owned Corporation                         | 3   | 0.5   | 1      | 0.4   | 0      | 0.0   |
| Multinational Corporation                            | 102 | 15.6  | 12     | 4.7   | 16     | 28.6  |
| Other Private Sector Organization                    | 85  | 13.0  | 11     | 4.3   | 9      | 16.1  |
| Self-Employed in Inc. Business / Practice / Farm     | 42  | 6.4   | 9      | 3.5   | 3      | 5.4   |
| Self-Employed in Non-Inc. Business / Practice / Farm | 12  | 1.8   | 5      | 2.0   | 4      | 7.1   |
| International Organization                           | 28  | 4.3   | 6      | 2.4   | 2      | 3.6   |
| Non-profit Organization                              | 7   | 1.1   | 0      | 0.0   | 0      | 0.0   |
| Armed Forces                                         | 0   | 0.0   | 1      | 0.4   | 0      | 0.0   |
| Not Sure                                             | 100 | 15.3  | 27     | 10.6  | 4      | 7.1   |
| Total                                                | 652 | 100.0 | 254    | 100.0 | 56     | 100.0 |

Table A.20 continued

| Organization                                         | Canada |       | Other / Not Known |       | Total |       |
|------------------------------------------------------|--------|-------|-------------------|-------|-------|-------|
|                                                      | n      | %     | n                 | %     | n     | %     |
| University - private                                 | 9      | 27.3  | 10                | 34.5  | 245   | 23.9  |
| University - public                                  | 3      | 9.1   | 5                 | 17.2  | 228   | 22.3  |
| College / Tech. Inst. - private                      | 0      | 0.0   | 0                 | 0.0   | 6     | 0.6   |
| College / Tech. Inst. - public                       | 0      | 0.0   | 0                 | 0.0   | 2     | 0.2   |
| Pre / Primary / Secondary School - private           | 0      | 0.0   | 0                 | 0.0   | 1     | 0.1   |
| Government Department                                | 0      | 0.0   | 0                 | 0.0   | 18    | 1.8   |
| Government Owned Corporation                         | 0      | 0.0   | 1                 | 3.4   | 5     | 0.5   |
| Multinational Corporation                            | 7      | 21.2  | 1                 | 3.4   | 138   | 13.5  |
| Other Private Sector Organization                    | 7      | 21.2  | 4                 | 13.8  | 116   | 11.3  |
| Self-Employed in Inc. Business / Practice / Farm     | 1      | 3.0   | 1                 | 3.4   | 56    | 5.5   |
| Self-Employed in Non-Inc. Business / Practice / Farm | 1      | 3.0   | 0                 | 0.0   | 22    | 2.1   |
| International Organization                           | 1      | 3.0   | 0                 | 0.0   | 37    | 3.6   |
| Non-profit Organization                              | 1      | 3.0   | 0                 | 0.0   | 8     | 0.8   |
| Armed Forces                                         | 0      | 0.0   | 0                 | 0.0   | 1     | 0.1   |
| Not Sure                                             | 3      | 9.1   | 7                 | 24.1  | 141   | 13.8  |
| Total                                                | 33     | 100.0 | 29                | 100.0 | 1024  | 100.0 |

Note: There are 79 missing responses.

**Table A.21 Respondents by Standard Occupation Classification,  
Broad Groups**

| <b>Occupations</b>                               | <b>SOC<br/>Code</b> | <b><i>n</i></b> | <b>%</b>     |
|--------------------------------------------------|---------------------|-----------------|--------------|
| Management                                       | 11                  | 253             | 20.7         |
| Business and Financial Operations                | 13                  | 87              | 7.1          |
| Computer and Mathematical Science                | 15                  | 255             | 20.8         |
| Architecture and Engineering                     | 17                  | 234             | 19.1         |
| Life, Physical and Social Science                | 19                  | 83              | 6.8          |
| Community and Social Services                    | 21                  | 1               | 0.1          |
| Legal                                            | 23                  | 2               | 0.2          |
| Education, Training and Library                  | 25                  | 263             | 21.5         |
| Arts, Design, Entertainment, Sports and Media    | 27                  | 9               | 0.7          |
| Healthcare Practitioner and Technical            | 29                  | 19              | 1.6          |
| Healthcare Support                               | 31                  | 1               | 0.1          |
| Food Preparation and Service Related             | 35                  | 2               | 0.2          |
| Personal Care and Service                        | 39                  | 1               | 0.1          |
| Sales and Related                                | 41                  | 9               | 0.7          |
| Office and Administrative Support                | 43                  | 4               | 0.3          |
| Installation, Maintenance and Repair Occupations | 49                  | 1               | 0.1          |
| <b>Total</b>                                     |                     | <b>1224</b>     | <b>100.0</b> |



Table A.22 Respondents by Detailed Occupation Categories, SOC classification

| Occupation                                               | SOC code   | n  | %   |
|----------------------------------------------------------|------------|----|-----|
| Engineering Teachers, Postsecondary                      | 25-1032.00 | 95 | 7.8 |
| Computer Software Engineers                              | 15-1030.00 | 84 | 6.9 |
| General and Operations Managers                          | 11-1021.00 | 58 | 4.7 |
| Computer Programmers                                     | 15-1021.00 | 48 | 3.9 |
| Engineering Managers                                     | 11-9041.00 | 47 | 3.8 |
| Operations Research Analysts                             | 15-2031.00 | 45 | 3.7 |
| Business Teachers, Postsecondary                         | 25-1011.00 | 43 | 3.5 |
| Sales and Marketing Managers                             | 11-2020.00 | 40 | 3.3 |
| Electronics Engineers, Except Computer                   | 17-2072.00 | 38 | 3.1 |
| Financial Analysts                                       | 13-2051.00 | 34 | 2.8 |
| Computer Specialists, unclassified                       | 15-1000.00 | 34 | 2.8 |
| Mechanical Engineers                                     | 17-2141.00 | 33 | 2.7 |
| Economics Teachers, Postsecondary                        | 25-1063.00 | 33 | 2.7 |
| Management Analysts                                      | 13-1111.00 | 30 | 2.5 |
| Electrical Engineers                                     | 17-2071.00 | 29 | 2.4 |
| Civil Engineers                                          | 17-2051.00 | 25 | 2.0 |
| Computer and Information Systems Managers                | 11-3021.00 | 22 | 1.8 |
| Private Sector Executives                                | 11-1011.02 | 21 | 1.7 |
| Economists                                               | 19-3011.00 | 20 | 1.6 |
| Financial Managers                                       | 11-3031.00 | 19 | 1.6 |
| Computer Hardware Engineers                              | 17-2061.00 | 19 | 1.6 |
| Chemical Engineers                                       | 17-2041.00 | 16 | 1.3 |
| Industrial Engineers                                     | 17-2112.00 | 16 | 1.3 |
| Medical Scientists, Except Epidemiologists               | 19-1042.00 | 15 | 1.2 |
| Architects, Except Landscape and Naval                   | 17-1011.00 | 14 | 1.1 |
| Health Specialties Teachers, Postsecondary               | 25-1071.00 | 14 | 1.1 |
| Aerospace Engineers                                      | 17-2011.00 | 13 | 1.1 |
| Network and Computer Systems Administrators              | 15-1071.00 | 12 | 1.0 |
| Computer Science Teachers, Postsecondary                 | 25-1021.00 | 11 | 0.9 |
| Industrial Production Managers                           | 11-3051.00 | 10 | 0.8 |
| Computer Systems Analysts                                | 15-1051.00 | 10 | 0.8 |
| Mathematical Science Teachers, Postsecondary             | 25-1022.00 | 10 | 0.8 |
| Physics Teachers, Postsecondary                          | 25-1054.00 | 9  | 0.7 |
| Physicists                                               | 19-2012.00 | 8  | 0.7 |
| Biological Science Teachers, Postsecondary               | 25-1042.00 | 8  | 0.7 |
| Construction Managers                                    | 11-9021.00 | 7  | 0.6 |
| Physicians and Surgeons, All Other                       | 29-1069.99 | 7  | 0.6 |
| Natural Sciences Managers                                | 11-9121.00 | 6  | 0.5 |
| Business and Financial Operations Managers, unclassified | 13-0000.00 | 6  | 0.5 |
| Computer and Information Scientists, Research            | 15-1011.00 | 6  | 0.5 |
| Materials Engineers                                      | 17-2131.00 | 6  | 0.5 |
| Petroleum Engineers                                      | 17-2171.00 | 6  | 0.5 |
| Chemists                                                 | 19-2031.00 | 6  | 0.5 |
| Architecture Teachers, Postsecondary                     | 25-1031.00 | 6  | 0.5 |
| Medical and Health Services Managers                     | 11-9111.00 | 5  | 0.4 |
| Personal Financial Advisors                              | 13-2052.00 | 5  | 0.4 |
| Nuclear Engineers                                        | 17-2161.00 | 5  | 0.4 |
| Market Research Analysts                                 | 19-3021.00 | 5  | 0.4 |
| Political Science Teachers, Postsecondary                | 25-1065.00 | 5  | 0.4 |
| Secondary School Teachers, Except Special and Vocational | 25-2031.00 | 5  | 0.4 |

Table A.22 continued

| Occupation                                                     | SOC code   | <i>n</i> | %   |
|----------------------------------------------------------------|------------|----------|-----|
| Computer Software Engineers, Applications                      | 15-1031.00 | 4        | 0.3 |
| Statisticians                                                  | 15-2041.00 | 4        | 0.3 |
| Environmental Engineers                                        | 17-2081.00 | 4        | 0.3 |
| Political Scientists                                           | 19-3094.00 | 4        | 0.3 |
| Securities, Commodities, and Financial Services Sales Agents   | 41-3031.00 | 4        | 0.3 |
| Administrative Services Managers                               | 11-3011.00 | 3        | 0.3 |
| Education Administrators, Postsecondary                        | 11-9033.00 | 3        | 0.3 |
| Computer Software Engineers, Systems Software                  | 15-1032.00 | 3        | 0.3 |
| Mining and Geological Engineers, Including Mining Safety       | 17-2151.00 | 3        | 0.3 |
| Food Scientists and Technologists                              | 19-1012.00 | 3        | 0.3 |
| Biologists                                                     | 19-1020.01 | 3        | 0.3 |
| Clinical, Counseling, and School Psychologists                 | 19-3031.00 | 3        | 0.3 |
| Social Scientists and Related Workers, All Other               | 19-3099.99 | 3        | 0.3 |
| Area, Ethnic, and Cultural Studies Teachers, Postsecondary     | 25-1062.00 | 3        | 0.3 |
| Psychology Teachers, Postsecondary                             | 25-1066.00 | 3        | 0.3 |
| Graphic Designers                                              | 27-1024.00 | 3        | 0.3 |
| Obstetricians and Gynecologists                                | 29-1064.00 | 3        | 0.3 |
| Pediatricians, General                                         | 29-1065.00 | 3        | 0.3 |
| Sales Engineers                                                | 41-9031.00 | 3        | 0.3 |
| Advertising and Promotions Managers                            | 11-2011.00 | 2        | 0.2 |
| Treasurers, Controllers, and Chief Financial Officers          | 11-3031.01 | 2        | 0.2 |
| Purchasing Managers                                            | 11-3061.00 | 2        | 0.2 |
| Transportation, Storage, and Distribution Managers             | 11-3071.00 | 2        | 0.2 |
| Credit Analysts                                                | 13-2041.00 | 2        | 0.2 |
| Computer Support Specialists                                   | 15-1041.00 | 2        | 0.2 |
| Actuaries                                                      | 15-2011.00 | 2        | 0.2 |
| Biomedical Engineers                                           | 17-2031.00 | 2        | 0.2 |
| Biochemists and Biophysicists                                  | 19-1021.00 | 2        | 0.2 |
| Materials Scientists                                           | 19-2032.00 | 2        | 0.2 |
| Urban and Regional Planners                                    | 19-3051.00 | 2        | 0.2 |
| Biological Technicians                                         | 19-4021.00 | 2        | 0.2 |
| Lawyers                                                        | 23-1011.00 | 2        | 0.2 |
| English Language and Literature Teachers, Postsecondary        | 25-1123.00 | 2        | 0.2 |
| Foreign Language and Literature Teachers, Postsecondary        | 25-1124.00 | 2        | 0.2 |
| History Teachers, Postsecondary                                | 25-1125.00 | 2        | 0.2 |
| Philosophy and Religion Teachers, Postsecondary                | 25-1126.00 | 2        | 0.2 |
| Anesthesiologists                                              | 29-1061.00 | 2        | 0.2 |
| Psychiatrists                                                  | 29-1066.00 | 2        | 0.2 |
| Eligibility Interviewers, Government Programs                  | 43-6011.00 | 2        | 0.2 |
| Government Service Executives                                  | 11-1011.01 | 1        | 0.1 |
| Financial Managers, Branch or Department                       | 11-3031.02 | 1        | 0.1 |
| Human Resources Managers                                       | 11-3040.00 | 1        | 0.1 |
| Lodging Managers                                               | 11-9081.00 | 1        | 0.1 |
| Wholesale and Retail Buyers, Except Farm Products              | 13-1022.00 | 1        | 0.1 |
| Purchasing Agents, Except Wholesale, Retail, and Farm Products | 13-1023.00 | 1        | 0.1 |
| Compliance Officers, Except Agriculture, Construction, Health  | 13-1041.00 | 1        | 0.1 |
| Business Operations Specialists, All Other                     | 13-1199.99 | 1        | 0.1 |
| Accountants                                                    | 13-2011.01 | 1        | 0.1 |
| Auditors                                                       | 13-2011.02 | 1        | 0.1 |
| Budget Analysts                                                | 13-2031.00 | 1        | 0.1 |
| Insurance Underwriters                                         | 13-2053.00 | 1        | 0.1 |
| Loan Officers                                                  | 13-2072.00 | 1        | 0.1 |

Table A.22 continued

| Occupation                                                    | SOC code   | <i>n</i>    | %            |
|---------------------------------------------------------------|------------|-------------|--------------|
| Financial Specialists, All Other                              | 13-2099.99 | 1           | 0.1          |
| Network Systems and Data Communications Analysts              | 15-1081.00 | 1           | 0.1          |
| Landscape Architects                                          | 17-1012.00 | 1           | 0.1          |
| Surveyors                                                     | 17-1022.00 | 1           | 0.1          |
| Electrical and Electronic Engineering Technicians             | 17-3023.00 | 1           | 0.1          |
| Industrial Engineering Technicians                            | 17-3026.00 | 1           | 0.1          |
| Mechanical Engineering Technicians                            | 17-3027.00 | 1           | 0.1          |
| Foresters                                                     | 19-1032.00 | 1           | 0.1          |
| Environmental Scientists and Specialists, Including Health    | 19-2041.00 | 1           | 0.1          |
| Geoscientists, Except Hydrologists and Geographers            | 19-2042.00 | 1           | 0.1          |
| Geologists                                                    | 19-2042.01 | 1           | 0.1          |
| Life, Physical, and Social Science Technicians, All Other     | 19-4099.99 | 1           | 0.1          |
| Social and Human Service Assistants                           | 21-1093.00 | 1           | 0.1          |
| Chemistry Teachers, Postsecondary                             | 25-1052.00 | 1           | 0.1          |
| Anthropology and Archeology Teachers, Postsecondary           | 25-1061.00 | 1           | 0.1          |
| Education Teachers, Postsecondary                             | 25-1081.00 | 1           | 0.1          |
| Law Teachers, Postsecondary                                   | 25-1112.00 | 1           | 0.1          |
| Social Work Teachers, Postsecondary                           | 25-1113.00 | 1           | 0.1          |
| Graduate Teaching Assistants                                  | 25-1191.00 | 1           | 0.1          |
| Archivists, Curators, and Museum Technicians                  | 25-4010.00 | 1           | 0.1          |
| Museum Technicians and Conservators                           | 25-4013.00 | 1           | 0.1          |
| Librarians                                                    | 25-4021.00 | 1           | 0.1          |
| Library Technicians                                           | 25-4031.00 | 1           | 0.1          |
| Fine Artists, Including Painters, Sculptors, and Illustrators | 27-1013.01 | 1           | 0.1          |
| Commercial and Industrial Designers                           | 27-1021.00 | 1           | 0.1          |
| Fashion Designers                                             | 27-1022.00 | 1           | 0.1          |
| Exhibit Designers                                             | 27-1027.02 | 1           | 0.1          |
| Music Directors and Composers                                 | 27-2041.00 | 1           | 0.1          |
| News Analysts, Reporters and Correspondents                   | 27-3020.00 | 1           | 0.1          |
| Internists, General                                           | 29-1063.00 | 1           | 0.1          |
| Surgeons                                                      | 29-1067.00 | 1           | 0.1          |
| Psychiatric Aides                                             | 31-1013.00 | 1           | 0.1          |
| Cooks, Institution and Cafeteria                              | 35-2012.00 | 1           | 0.1          |
| Cooks, Restaurant                                             | 35-2014.00 | 1           | 0.1          |
| Flight Attendants                                             | 39-6031.00 | 1           | 0.1          |
| Sales and Related Occupation, unclassified                    | 41-0000.00 | 1           | 0.1          |
| Sales Representatives, Mechanical Equipment and Supplies      | 41-4011.05 | 1           | 0.1          |
| Customer Service Representatives                              | 43-4051.00 | 1           | 0.1          |
| Desktop Publishers                                            | 43-9031.00 | 1           | 0.1          |
| Automotive Service Technicians and Mechanics                  | 49-3023.00 | 1           | 0.1          |
| <b>Total</b>                                                  |            | <b>1224</b> | <b>100.0</b> |

Table A.23 Percentage of Time Spent on R&D Activities by Occupation (valid  $n = 1186$ )

| Occupation Group       | RD1  | RD2    | RD3    | RD4    | RD5     | Total |
|------------------------|------|--------|--------|--------|---------|-------|
|                        | <20% | 20-40% | 40-60% | 60-80% | 80-100% |       |
| Managerial             | 48.0 | 26.2   | 16.0   | 5.3    | 4.5     | 244   |
| Business / Finance     | 62.5 | 15.0   | 11.3   | 5.0    | 6.3     | 80    |
| Computer & Math        | 49.2 | 16.8   | 17.2   | 5.6    | 11.2    | 250   |
| Arch / Engineering     | 27.0 | 13.5   | 11.3   | 20.4   | 27.8    | 230   |
| Social & Life Sciences | 16.5 | 11.4   | 10.1   | 16.5   | 45.6    | 79    |
| Education              | 8.9  | 19.0   | 42.6   | 21.7   | 7.8     | 258   |
| Other                  | 64.4 | 24.4   | 6.7    | 0.0    | 4.4     | 45    |
| Total                  | 35.2 | 18.4   | 20.1   | 12.4   | 14.0    | 1,186 |

Notes: Cell percentages sum to 100 across rows;  $\chi^2(24) = 397.26^{***}$  where \*\*\* indicates significance at the 1 percent level.

Table A.24 Return Intentions and R & D Intensity of Job Activities (%) (valid  $n = 1186$ )

|                             | RD1           | RD2           | RD3           | RD4           | RD5           | Total          |
|-----------------------------|---------------|---------------|---------------|---------------|---------------|----------------|
|                             | <20%          | 20-40%        | 40-60%        | 60-80%        | 80-100%       |                |
| Return Intentions           | ( $n = 417$ ) | ( $n = 218$ ) | ( $n = 238$ ) | ( $n = 147$ ) | ( $n = 166$ ) | ( $n = 1186$ ) |
| Definitely return, plans    | 4.6           | 5.1           | 3.8           | 4.1           | 4.8           | 4.5            |
| Definitely return, no plans | 24.7          | 19.7          | 16.4          | 21.1          | 28.3          | 22.2           |
| Return probable             | 35.3          | 32.1          | 34.9          | 30.6          | 36.8          | 34.2           |
| Return unlikely             | 27.8          | 36.2          | 38.7          | 39.5          | 25.9          | 32.7           |
| Definitely not return       | 7.7           | 6.9           | 6.3           | 4.8           | 4.2           | 6.4            |
|                             | 100.0         | 100.0         | 100.0         | 100.0         | 100.0         | 100.0          |

Notes: Cell percentages sum to 100 across columns;  $\chi^2(16) = 23.95^*$  where \* indicates significance at the 10 percent level.

Table A.25 Full-Time Jobs in Turkey (#)

| Number of jobs | <i>n</i> | %     |
|----------------|----------|-------|
| None           | 384      | 31.4  |
| One            | 417      | 34.1  |
| Two            | 228      | 18.6  |
| Three or more  | 195      | 15.9  |
| Total          | 1224     | 100.0 |

Table A.26 Full-Time Jobs Abroad (#)

| Number of jobs | <i>n</i> | %     |
|----------------|----------|-------|
| One            | 520      | 42.9  |
| Two            | 357      | 29.5  |
| Three or more  | 334      | 27.6  |
| Total          | 1211     | 100.0 |

Table A.27 Number of Years Worked Abroad

| Years      | <i>n</i> | %     | Cum.  |
|------------|----------|-------|-------|
| 1_2        | 344      | 28.4  | 28.4  |
| 3_4        | 219      | 18.1  | 46.4  |
| 5_6        | 173      | 14.3  | 60.7  |
| 7_8        | 104      | 8.6   | 69.3  |
| 9_10       | 57       | 4.7   | 74.0  |
| 11_12      | 49       | 4.0   | 78.0  |
| 13_14      | 36       | 3.0   | 81.0  |
| 15_16      | 44       | 3.6   | 84.6  |
| 17_18      | 36       | 3.0   | 87.6  |
| 19_20      | 34       | 2.8   | 90.4  |
| 21_22      | 43       | 3.5   | 93.9  |
| 23_24      | 18       | 1.5   | 95.4  |
| 25_26      | 18       | 1.5   | 96.9  |
| 27_28      | 10       | 0.8   | 97.7  |
| 29_30      | 10       | 0.8   | 98.5  |
| 31 or more | 18       | 1.5   | 100.0 |
| Total      | 1213     | 100.0 |       |

Table A.28 Sector of Current Organization

| Sector             | <i>n</i> | %     |
|--------------------|----------|-------|
| Private            | 520      | 42.9  |
| Public             | 357      | 29.5  |
| Non-profit / other | 334      | 27.6  |
| Total              | 1211     | 100.0 |

Table A.29 Type of Organization

| Organization                                                | <i>n</i> | %     |
|-------------------------------------------------------------|----------|-------|
| Multinational Corporation - Headquarters in Current Country | 368      | 30.1  |
| University                                                  | 267      | 21.8  |
| Multinational Corporation - Headquarters in Third Country   | 177      | 14.5  |
| Other Incorporated Firm                                     | 162      | 13.2  |
| Non-incorporated firm or business                           | 49       | 4.0   |
| Research Center at a University                             | 41       | 3.4   |
| Other                                                       | 39       | 3.2   |
| Hospital / Medical Center                                   | 37       | 3.0   |
| International Organization (IMF, ILO, World Bank, etc.)     | 28       | 2.3   |
| National Government                                         | 27       | 2.2   |
| Multinational Corporation - Headquarters in Turkey          | 13       | 1.1   |
| Non-governmental organization                               | 7        | 0.6   |
| Local Government                                            | 6        | 0.5   |
| Secondary School                                            | 2        | 0.2   |
| College / Tech. Institute                                   | 1        | 0.1   |
| Total                                                       | 1224     | 100.0 |

Table A.30 Location Where Current Job was Found

| Location                     | <i>n</i> | %     |
|------------------------------|----------|-------|
| Current country of residence | 520      | 42.9  |
| Turkey                       | 357      | 29.5  |
| A Third Country              | 334      | 27.6  |
| Total                        | 1211     | 100.0 |



## APPENDIX B

Table B.1 Associations of Explanatory Variables with Return Intentions ( $\gamma$ ), Professionals

| Code                 | VARIABLE DEFINITIONS                                    | valid<br><i>n</i> | chisq  | df | Pr    | Sig. | gamma   |
|----------------------|---------------------------------------------------------|-------------------|--------|----|-------|------|---------|
| <i>female</i>        | Respondent is female                                    | 1224              | 13.39  | 4  | 0.010 | ***  | 0.1046  |
| <i>initial_int</i>   | Initial return intentions                               | 1224              | 232.17 | 8  | 0.000 | ***  | 0.5018  |
| <i>spouse_nat</i>    | Nationality of spouse                                   | 1178              | 122.70 | 16 | 0.000 | ***  |         |
| <i>spousenat1</i>    | Spouse's nationality: Turkish                           | 1178              | 11.11  | 4  | 0.025 | **   | -0.1390 |
| <i>spousenat2</i>    | Spouse's nationality: Foreign                           | 1178              | 86.67  | 4  | 0.000 | ***  | 0.5384  |
| <i>spousenat3</i>    | Spouse's nationality: Dual Citizen                      | 1178              | 12.69  | 4  | 0.013 | **   | 0.1983  |
| <i>spousenat4</i>    | Never married                                           | 1178              | 40.48  | 4  | 0.000 | ***  | -0.2739 |
| <i>spousenat5</i>    | Divorced/Separated/Widowed                              | 1178              | 5.11   | 4  | 0.276 | ns   |         |
| <i>fam_sup1</i>      | Family support for initial decision to go abroad        | 1176              | 26.32  | 12 | 0.010 | ***  | -0.1007 |
| <i>fam_sup2</i>      | Family support for permanent settlement                 | 1160              | 164.11 | 20 | 0.000 | ***  | 0.3405  |
| <i>work_assess</i>   | Assessment of work conditions                           | 1212              | 56.22  | 20 | 0.000 | ***  | 0.2067  |
| <i>social_assess</i> | Assessment of social conditions                         | 1218              | 129.83 | 20 | 0.000 | ***  | 0.3183  |
| <i>SOL_assess</i>    | Assessment of standard of living                        | 1217              | 93.82  | 20 | 0.000 | ***  | 0.3320  |
| <i>FTr_type</i>      | Skills transferability of formal training (4-point)     | 1213              | 8.87   | 12 | 0.714 | ns   |         |
| <i>FTr1</i>          | Formal training: none                                   | 1213              | 4.12   | 4  | 0.390 | ns   |         |
| <i>FTr2</i>          | Formal training: general                                | 1213              | 2.21   | 4  | 0.697 | ns   |         |
| <i>FTr3</i>          | Formal training: specific to industry                   | 1213              | 3.00   | 4  | 0.558 | ns   |         |
| <i>FTr4</i>          | Formal training: specific to organization               | 1213              | 2.78   | 4  | 0.595 | ns   |         |
| <i>OTJT_type</i>     | Skills transferability of on-the-job training (4-point) | 1218              | 11.40  | 12 | 0.495 | ns   |         |
| <i>OTJTtype1</i>     | On-the-job training: none                               | 1218              | 8.08   | 4  | 0.089 | +    | 0.0883  |
| <i>OTJTtype2</i>     | On-the-job training: general                            | 1218              | 5.17   | 4  | 0.271 | ns   |         |
| <i>OTJTtype3</i>     | On-the-job training: specific to industry               | 1218              | 2.76   | 4  | 0.598 | ns   |         |
| <i>OTJTtype4</i>     | On-the-job training: specific to organization           | 1218              | 0.70   | 4  | 0.951 | ns   |         |
| <i>lastvis</i>       | Effect of last visit to Turkey on returning (4-point)   | 1221              | 90.26  | 12 | 0.000 | ***  |         |
| <i>lastvis1</i>      | Last visit effect: Decreased return intentions          | 1221              | 24.60  | 4  | 0.000 | ***  | 0.1859  |
| <i>lastvis2</i>      | Last visit effect: No effect                            | 1221              | 3.64   | 4  | 0.456 | ns   |         |
| <i>lastvis3</i>      | Last visit effect: Increased return intentions          | 1221              | 75.01  | 4  | 0.000 | ***  | -0.5873 |
| <i>lastvis4</i>      | Last visit effect: Not Applicable                       | 1221              | 2.57   | 4  | 0.632 | ns   |         |
| <i>HD2</i>           | Highest degree held by respondent (3-point)             | 1224              | 23.98  | 8  | 0.002 | ***  |         |

Table B.1 continued

| Code              | VARIABLE DEFINITIONS                                       | valid<br><i>n</i> | chisq | df | Pr    | Sig. | gamma   |
|-------------------|------------------------------------------------------------|-------------------|-------|----|-------|------|---------|
| <i>bachelors</i>  | Highest degree: bachelors                                  | 1224              | 7.35  | 4  | 0.118 | ns   |         |
| <i>masters</i>    | Highest degree: masters                                    | 1224              | 7.19  | 4  | 0.126 | ns   |         |
| <i>doctorate</i>  | Highest degree: doctorate                                  | 1224              | 22.20 | 4  | 0.000 | ***  | 0.1890  |
| <i>HD_TUR</i>     | Highest degree is from Turkey                              | 1224              | 10.66 | 4  | 0.031 | *    | -0.1311 |
| <i>ForHD_PHD</i>  | Highest degree: doctorate from foreign university          | 1224              | 29.70 | 4  | 0.000 | ***  | 0.2411  |
| <i>FFTJ_where</i> | Location of first full-time job for foreign degree holders | 1219              | 47.33 | 20 | 0.001 | ***  | 0.0427  |
| <i>FFTJloc1</i>   | Same city and country where degree is conferred            | 1224              | 0.98  | 4  | 0.913 | ns   |         |
| <i>FFTJloc2</i>   | Same country, different city                               | 1224              | 11.93 | 4  | 0.018 | **   | 0.0138  |
| <i>FFTJloc3</i>   | Turkey                                                     | 1224              | 26.02 | 4  | 0.000 | ***  | 0.2847  |
| <i>FFTJloc4</i>   | A different country                                        | 1224              | 0.34  | 4  | 0.987 | ns   |         |
| <i>FFTJloc5</i>   | Last degree held is not a foreign degree                   | 1224              | 10.66 | 4  | 0.031 | *    | -0.1311 |
| <i>HSsci_TUR</i>  | Turkish instruction, high school science courses           | 1224              | 12.85 | 4  | 0.012 | **   | 0.1116  |
| <i>HSsoc_TUR</i>  | Turkish instruction, high school social science courses    | 1224              | 7.73  | 4  | 0.102 | ns   |         |
| <i>orgtype</i>    | TYPE OF ORGANIZATION                                       |                   |       |    |       |      |         |
| <i>academic2</i>  | Academic / Medical School / Research Center                | 1224              | 15.23 | 4  | 0.004 | ***  | 0.1466  |
| <i>publicserv</i> | Government / International Org / NGO / Other               | 1224              | 4.74  | 4  | 0.315 | ns   | 0.1519  |
| <i>privateorg</i> | Private Organization                                       | 1224              | 20.88 | 4  | 0.000 | ***  | -0.1793 |
| <i>JOBACTV1</i>   | Teaching                                                   | 1186              | 10.98 | 4  | 0.027 | *    |         |
| <i>JOBACTV2</i>   | Applied research                                           | 1186              | 1.50  | 4  | 0.827 | ns   |         |
| <i>JOBACTV3</i>   | Basic research                                             | 1186              | 2.23  | 4  | 0.693 | ns   |         |
| <i>JOBACTV4</i>   | Development                                                | 1186              | 5.08  | 4  | 0.279 | ns   |         |
| <i>JOBACTV5</i>   | Computer use, programming, system development              | 1186              | 4.16  | 4  | 0.384 | ns   |         |
| <i>JOBACTV6</i>   | Administrative, supervisory activities                     | 1186              | 4.03  | 4  | 0.401 | ns   |         |
| <i>JOBACTV7</i>   | Professional services                                      | 1186              | 0.84  | 4  | 0.933 | ns   |         |
| <i>JOBACTV8</i>   | Quality control, production management                     | 1186              | 2.02  | 4  | 0.732 | ns   |         |
| <i>JOBACTV9</i>   | Accounting, contracts                                      | 1186              | 1.54  | 4  | 0.820 | ns   |         |
| <i>JOBACTV10</i>  | Marketing, consumer services, public relations             | 1186              | 1.50  | 4  | 0.827 | ns   |         |
| <i>JOBACTV11</i>  | Other activities not defined above                         | 1186              | 1.70  | 4  | 0.791 | ns   |         |
| <i>JOBRandD</i>   | Research and Development (2+3+4)                           | 1186              | 1.94  | 4  | 0.746 | ns   |         |
| <i>DOM_ACTV1</i>  | Teaching                                                   | 1186              | 5.47  | 4  | 0.242 | ns   |         |
| <i>DOM_ACTV2</i>  | Applied research                                           | 1186              | 1.15  | 4  | 0.886 | ns   |         |
| <i>DOM_ACTV3</i>  | Basic research                                             | 1186              | 2.35  | 4  | 0.672 | ns   |         |

Table B.1 continued

| Code               | VARIABLE DEFINITIONS                                    | valid<br><i>n</i> | chisq | df | Pr    | Sig. | gamma   |
|--------------------|---------------------------------------------------------|-------------------|-------|----|-------|------|---------|
| <i>DOM_ACTIV4</i>  | Development                                             | 1186              | 1.83  | 4  | 0.768 | ns   |         |
| <i>DOM_ACTIV5</i>  | Computer use, programming,<br>system development        | 1186              | 4.56  | 4  | 0.336 | ns   |         |
| <i>DOM_ACTIV6</i>  | Administrative, supervisory<br>activities               | 1186              | 2.64  | 4  | 0.620 | ns   |         |
| <i>DOM_ACTIV7</i>  | Professional services                                   | 1186              | 1.18  | 4  | 0.882 | ns   |         |
| <i>DOM_ACTIV8</i>  | Quality control, production<br>management               | 1186              | 2.75  | 4  | 0.600 | ns   |         |
| <i>DOM_ACTIV9</i>  | Accounting, contracts                                   | 1186              | 2.65  | 4  | 0.618 | ns   |         |
| <i>DOM_ACTIV10</i> | Marketing, consumer<br>services, public relations       | 1186              | 1.44  | 4  | 0.837 | ns   |         |
| <i>DOM_ACTIV11</i> | Other activities not defined<br>above                   | 1186              | 2.30  | 4  | 0.681 | ns   |         |
| <i>DOM_RandD2</i>  | Research and Development<br>(2+3+4)                     | 1186              | 2.88  | 4  | 0.578 | ns   |         |
| <i>ACTV1</i>       | Teaching                                                | 1186              | 37.07 | 16 | 0.002 | ***  | 0.2132  |
| <i>ACTV2</i>       | Applied research                                        | 1186              | 11.04 | 16 | 0.807 | ns   |         |
| <i>ACTV3</i>       | Basic research                                          | 1186              | 14.16 | 16 | 0.587 | ns   |         |
| <i>ACTV4</i>       | Development                                             | 1186              | 11.64 | 16 | 0.768 | ns   |         |
| <i>ACTV5</i>       | Computer use, programming,<br>system development        | 1186              | 14.12 | 16 | 0.590 | ns   |         |
| <i>ACTV6</i>       | Administrative, supervisory<br>activities               | 1186              | 10.72 | 16 | 0.826 | ns   |         |
| <i>ACTV7</i>       | Professional services                                   | 1186              | 15.29 | 16 | 0.504 | ns   |         |
| <i>ACTV8</i>       | Quality control, production<br>management               | 1186              | 13.12 | 16 | 0.664 | ns   |         |
| <i>ACTV9</i>       | Accounting, contracts                                   | 1186              | 16.40 | 16 | 0.425 | ns   |         |
| <i>ACTV10</i>      | Marketing, consumer<br>services, public relations       | 1186              | 10.67 | 16 | 0.829 | ns   |         |
| <i>ACTV11</i>      | Other activities not defined<br>above                   | 1186              | 11.14 | 16 | 0.801 | ns   |         |
| <i>RDintensity</i> | Research and Development<br>(2+3+4)                     | 1186              | 23.95 | 16 | 0.091 | +    | 0.0037  |
| <i>NWexpTUR</i>    | Respondent has no full time<br>work exp. in Turkey      | 1224              | 13.54 | 4  | 0.009 | ***  | 0.0682  |
| <i>contrA</i>      | Overseas scholarships for<br>Turkish students           | 1099              | 1.36  | 4  | 0.852 | ns   | 0.0209  |
| <i>contrB</i>      | Lobbying activities on behalf of<br>Turkey              | 1099              | 5.72  | 4  | 0.221 | ns   | -0.0986 |
| <i>contrC</i>      | Increased overseas business<br>contacts with Turkey     | 1099              | 5.04  | 4  | 0.283 | ns   | -0.0898 |
| <i>contrD</i>      | Increased knowledge about<br>Turkey in general          | 1099              | 8.64  | 4  | 0.071 | +    | -0.1393 |
| <i>contrE</i>      | Donations to Turkish<br>organizations                   | 1099              | 7.62  | 4  | 0.106 | ns   | 0.0113  |
| <i>contrF</i>      | Increased professional contacts<br>betw. Turkey and cc. | 1099              | 7.71  | 4  | 0.103 | ns   | -0.0574 |
| <i>contrG</i>      | Helped in the transfer of<br>knowledge                  | 1099              | 20.68 | 4  | 0.000 | ***  | -0.1585 |
| <i>contrH</i>      | Other positive contribution                             | 1099              | 4.25  | 4  | 0.373 | ns   | 0.0579  |

Table B.2 Summary Statistics and Descriptions of the Variables used in the Final Model,  
Professionals (*n* = 1031)

| Variable             | Variable Descriptions                                                                                                                                                          | Mean    | Std<br>Dev. | Min | Max  |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|-----|------|
| <i>y</i>             | Dependent variable: return intentions<br>(1=definite return plans; 2=definite return,<br>no immediate plans; 3=return probable;<br>4=return unlikely; 5=definitely not return) | 3.15    | 0.97        | 1   | 5    |
| <i>female</i>        | Gender of respondent (1=female)                                                                                                                                                | 0.28    | 0.45        | 0   | 1    |
| <i>init_UNSURE</i>   | Initial return intentions: Unsure (1=yes)                                                                                                                                      | 0.36    | 0.48        | 0   | 1    |
| <i>init_RETURN</i>   | Initial return intentions: Return (1=yes)                                                                                                                                      | 0.53    | 0.50        | 0   | 1    |
| <i>age</i>           | Age of respondent in 2001                                                                                                                                                      | 35.04   | 8.90        | 22  | 72   |
| <i>agesq</i>         | Square of Age                                                                                                                                                                  | 1307.99 | 722.14      | 484 | 5184 |
| <i>staydur</i>       | Stay duration in current country of residence<br>(years)                                                                                                                       | 12.78   | 6.89        | 1   | 32   |
| <i>yrs_wrkd_cc</i>   | Work experience in current country (years)                                                                                                                                     | 6.84    | 6.88        | 1   | 31   |
| <i>spousenat2</i>    | Married to a foreign spouse (1=yes)                                                                                                                                            | 0.15    | 0.36        | 0   | 1    |
| <i>NWexpTUR</i>      | Respondent has no work experience in<br>Turkey (1=yes)                                                                                                                         | 0.32    | 0.47        | 0   | 1    |
| <i>FFTJloc3</i>      | Country of work after completing studies<br>abroad is Turkey (1=yes)                                                                                                           | 0.09    | 0.29        | 0   | 1    |
| <i>HDTURXPHD</i>     | Respondent's highest degree is a PhD from a<br>Turkish university (1=yes)                                                                                                      | 0.04    | 0.20        | 0   | 1    |
| <i>social_assess</i> | Assessment of social conditions abroad                                                                                                                                         | 2.63    | 1.00        | 0   | 5    |
| <i>SOL_assess</i>    | Assessment of standard of living abroad                                                                                                                                        | 4.48    | 0.81        | 0   | 5    |
| <i>fam_sup1</i>      | Family support for initial decision to go<br>abroad                                                                                                                            | 3.48    | 0.75        | 1   | 4    |
| <i>fam_sup2</i>      | Family support for settling abroad                                                                                                                                             | 4.39    | 1.51        | 1   | 6    |
| <i>academic2</i>     | Type of organization: Academic / Research<br>Center / Medical School                                                                                                           | 0.27    | 0.44        | 0   | 1    |
| <i>whygo_C</i>       | Job requirement in Turkey                                                                                                                                                      | 0.22    | 0.42        | 0   | 1    |
| <i>whygo_F</i>       | Insufficient facilities, equipment for research                                                                                                                                | 0.27    | 0.44        | 0   | 1    |
| <i>whygo_G</i>       | Prestige and advantages of study abroad                                                                                                                                        | 0.46    | 0.50        | 0   | 1    |
| <i>whygo_H</i>       | Lifestyle preference                                                                                                                                                           | 0.33    | 0.47        | 0   | 1    |
| <i>whygo_I</i>       | To be with spouse, family                                                                                                                                                      | 0.12    | 0.33        | 0   | 1    |
| <i>whygo_K</i>       | Get away from political environment                                                                                                                                            | 0.32    | 0.47        | 0   | 1    |
| <i>pushC</i>         | Limited job opport. in specialty                                                                                                                                               | 0.54    | 0.50        | 0   | 1    |
| <i>pushD</i>         | No opportunity for advanced training                                                                                                                                           | 0.37    | 0.48        | 0   | 1    |
| <i>pushF</i>         | Lack of financial resources for business                                                                                                                                       | 0.30    | 0.46        | 0   | 1    |
| <i>pushK</i>         | Economic instability                                                                                                                                                           | 0.85    | 0.35        | 0   | 1    |
| <i>pullE</i>         | Greater oppr. to develop specialty                                                                                                                                             | 0.71    | 0.45        | 0   | 1    |
| <i>pullF</i>         | More organized, ordered envir.                                                                                                                                                 | 0.77    | 0.42        | 0   | 1    |
| <i>pullG</i>         | More satisfying social/cultural life                                                                                                                                           | 0.26    | 0.44        | 0   | 1    |
| <i>pullH</i>         | Proximity to research and innov. centers                                                                                                                                       | 0.42    | 0.49        | 0   | 1    |
| <i>pullI</i>         | Spouse's preference or job                                                                                                                                                     | 0.31    | 0.46        | 0   | 1    |
| <i>pullJ</i>         | Better educational opport. For children                                                                                                                                        | 0.37    | 0.48        | 0   | 1    |
| <i>pullK</i>         | Need to finish /continue with current project                                                                                                                                  | 0.16    | 0.36        | 0   | 1    |

Table B.2 continued.

| Variable          | Variable Description                                                   | Mean | Std<br>Dev. | Min | Max |
|-------------------|------------------------------------------------------------------------|------|-------------|-----|-----|
| <i>pullL</i>      | Other                                                                  | 0.05 | 0.21        | 0   | 1   |
| <i>Hdnew2</i>     | Field of Highest Degree:<br>Education/Languages/Social Sciences/Arts   | 0.04 | 0.20        | 0   | 1   |
| <i>Hdnew3</i>     | Field of Highest Degree:<br>Engineering/Math/Science/Medicine          | 0.66 | 0.47        | 0   | 1   |
| <i>adj_A</i>      | Adjustment factor: previous experience                                 | 0.43 | 0.50        | 0   | 1   |
| <i>adj_C</i>      | Adjustment factor: support from TSA<br>(Turkish Student Association)   | 0.05 | 0.21        | 0   | 1   |
| <i>difabrd4</i>   | Difficulties abroad: being away from family                            | 0.83 | 0.38        | 0   | 1   |
| <i>contrB2</i>    | Contribution to Turkey: Lobbying activities on<br>behalf of Turkey     | 0.60 | 0.49        | 0   | 1   |
| <i>FTr4</i>       | Formal training received abroad is specific to<br>organization (1=yes) | 0.04 | 0.19        | 0   | 1   |
| <i>lastvis1</i>   | Last visit to Turkey decreased return<br>intentions (1=yes)            | 0.28 | 0.45        | 0   | 1   |
| <i>lastvis3</i>   | Last visit to Turkey increased return<br>intentions (1=yes)            | 0.09 | 0.29        | 0   | 1   |
| <i>sept11_inc</i> | Effect of September 11, 2001 (1=increased<br>return intentions)        | 0.10 | 0.30        | 0   | 1   |

Table B.3a Estimation Results and Marginal Effects for Outcomes  $y = 1$  and  $y = 2$ ,  
Ordered Probit Model, Professionals

|                 | $\beta$ (a) | z-value   | y = DRP = 1 |            | y = DRNP = 2 |            |
|-----------------|-------------|-----------|-------------|------------|--------------|------------|
|                 |             |           | dy/dx       | z-value    | dy/dx        | z-value    |
| female (b)      | 0.355       | (2.40)**  | -0.0031     | (-2.24)**  | -0.0773      | (-2.57)*** |
| init_UNSURE (b) | -0.950      | (6.65)*** | 0.0172      | (3.06)***  | 0.2433       | (6.43)***  |
| init_RETURN (b) | -1.323      | (8.87)*** | 0.0186      | (3.56)***  | 0.2930       | (9.43)***  |
| age             | 0.085       | (1.11)    | -0.0009     | (-1.08)    | -0.0199      | (-1.11)    |
| agesq           | -0.001      | (0.54)    | 0.0000      | (0.54)     | 0.0001       | (0.54)     |
| staydur         | 0.327       | (3.40)*** | -0.0034     | (-2.58)*** | -0.0767      | (-3.36)*** |
| yrs_wrkd_cc     | 0.051       | (3.23)*** | -0.0005     | (-2.39)**  | -0.0120      | (-3.19)*** |
| AGExSTAYDUR     | -0.012      | (2.77)*** | 0.0001      | (2.28)**   | 0.0029       | (2.74)***  |
| AGESQxSTAYDUR   | 0.000       | (2.05)**  | 0.0000      | (-1.85)*   | 0.0000       | (-2.04)**  |
| spousnat2 (b)   | 0.403       | (3.43)*** | -0.0030     | (-2.94)*** | -0.0824      | (-3.95)*** |
| NWexpTUR (b)    | 0.213       | (2.45)**  | -0.0020     | (-2.12)**  | -0.0482      | (-2.52)**  |
| FFTJloc3 (b)    | 0.475       | (3.18)*** | -0.0031     | (-2.81)*** | -0.0918      | (-3.94)*** |
| HDTURXPHD (b)   | -0.477      | (2.31)**  | 0.0093      | (1.37)     | 0.1320       | (2.06)**   |
| social_assess   | 0.101       | (2.43)**  | -0.0011     | (-2.09)**  | -0.0237      | (-2.42)**  |
| SOL_assess      | 0.129       | (2.80)*** | -0.0014     | (-2.21)**  | -0.0304      | (-2.78)*** |
| fam_sup1        | -0.176      | (2.82)*** | 0.0019      | (2.21)**   | 0.0413       | (2.79)***  |
| fam_sup2        | 0.154       | (5.46)*** | -0.0016     | (-3.11)*** | -0.0362      | (-5.28)*** |
| academic2 (b)   | 0.078       | (0.39)    | -0.0008     | (-0.41)    | -0.0179      | (-0.4)     |
| whygo_C (b)     | -0.190      | (1.92)*   | 0.0023      | (1.55)     | 0.0466       | (1.83)*    |
| whygo_F (b)     | 1.536       | (4.22)*** | -0.0111     | (-2.74)*** | -0.2538      | (-5.8)***  |
| whygo_G (b)     | -0.666      | (1.69)*   | 0.0085      | (1.25)     | 0.1595       | (1.67)*    |
| whygo_H (b)     | 0.178       | (2.14)**  | -0.0017     | (-1.97)**  | -0.0407      | (-2.2)**   |
| whygo_I (b)     | -0.454      | (2.95)*** | 0.0078      | (1.74)*    | 0.1217       | (2.64)***  |
| whygo_K (b)     | 0.144       | (1.69)*   | -0.0014     | (-1.61)    | -0.0331      | (-1.74)*   |
| FxWHYGOC (b)    | 0.347       | (1.69)*   | -0.0025     | (-2.15)**  | -0.0700      | (-2.04)**  |
| FxWHYGOI (b)    | 0.396       | (1.73)*   | -0.0027     | (-2.16)**  | -0.0782      | (-2.11)**  |
| ACADxWHYGOG (b) | -0.465      | (2.49)**  | 0.0082      | (1.53)     | 0.1253       | (2.24)**   |
| AGExWHYGOF      | -0.042      | (4.14)*** | 0.0004      | (2.8)***   | 0.0098       | (4.06)***  |
| AGExWHYGOG      | 0.021       | (1.74)*   | -0.0002     | (-1.57)    | -0.0050      | (-1.74)*   |
| pushC (b)       | -0.070      | (0.69)    | 0.0007      | (0.69)     | 0.0164       | (0.69)     |
| pushD (b)       | -0.966      | (2.96)*** | 0.0174      | (1.63)     | 0.2466       | (2.83)***  |
| pushF (b)       | -0.132      | (1.65)*   | 0.0015      | (1.44)     | 0.0318       | (1.62)     |
| pushK (b)       | 0.368       | (3.38)*** | -0.0056     | (-2.12)**  | -0.0961      | (-3.08)*** |
| pullE (b)       | 0.263       | (2.59)*** | -0.0033     | (-1.91)*   | -0.0648      | (-2.46)**  |
| pullF (b)       | 0.164       | (1.76)*   | -0.0020     | (-1.47)    | -0.0399      | (-1.69)*   |
| pullG (b)       | 0.275       | (3.05)*** | -0.0025     | (-2.48)**  | -0.0605      | (-3.25)*** |
| pullH (b)       | -0.215      | (2.10)**  | 0.0024      | (1.75)*    | 0.0512       | (2.06)**   |
| pullI (b)       | 0.357       | (3.58)*** | -0.0033     | (-2.61)*** | -0.0787      | (-3.8)***  |
| pullJ (b)       | 0.317       | (3.67)*** | -0.0031     | (-2.66)*** | -0.0716      | (-3.74)*** |
| pullK (b)       | -0.618      | (4.99)*** | 0.0122      | (2.5)**    | 0.1694       | (4.44)***  |
| pullL (b)       | -0.460      | (2.12)**  | 0.0087      | (1.25)     | 0.1264       | (1.89)*    |
| femalepushC (b) | -0.257      | (1.61)    | 0.0035      | (1.19)     | 0.0650       | (1.5)      |
| femalepullI (b) | -0.469      | (2.73)*** | 0.0084      | (1.68)*    | 0.1267       | (2.45)**   |
| femalepullK (b) | 0.380       | (1.58)    | -0.0026     | (-2.21)**  | -0.0750      | (-1.95)*   |
| femalepullL (b) | 0.813       | (1.99)**  | -0.0034     | (-2.99)*** | -0.1244      | (-3.65)*** |



Table B.3a continued

|                | $\beta$ (a) | z-statistic | y = DRP = 1 |            | y = DRNP = 2 |            |
|----------------|-------------|-------------|-------------|------------|--------------|------------|
|                |             |             | dy/dx       | z-value    | dy/dx        | z-value    |
| ACADxpushC (b) | 0.387       | (2.24)**    | -0.0029     | (-2.41)**  | -0.0791      | (-2.6)***  |
| ACADxpulle (b) | -0.292      | (1.36)      | 0.0039      | (1.02)     | 0.0736       | (1.28)     |
| ACADxpulH (b)  | 0.493       | (2.40)**    | -0.0036     | (-2.36)**  | -0.0991      | (-2.83)*** |
| AGExpushD      | 0.030       | (3.14)***   | -0.0003     | (-2.35)**  | -0.0069      | (-3.11)*** |
| HDnew2 (b)     | 0.544       | (3.03)***   | -0.0031     | (-2.91)*** | -0.0988      | (-4.1)***  |
| HDnew3 (b)     | 0.270       | (3.29)***   | -0.0033     | (-2.3)**   | -0.0658      | (-3.17)*** |
| adj_A (b)      | -0.268      | (3.58)***   | 0.0030      | (2.45)**   | 0.0640       | (3.49)***  |
| adj_C (b)      | -0.248      | (1.51)      | 0.0036      | (1.12)     | 0.0639       | (1.39)     |
| difabrdA(b)    | -0.217      | (2.21)**    | 0.0019      | (2.08)**   | 0.0475       | (2.37)**   |
| contrB2 (b)    | -0.390      | (4.99)***   | 0.0039      | (2.97)***  | 0.0882       | (5.13)***  |
| FTr4 (b)       | 0.366       | (1.90)*     | -0.0025     | (-2.35)**  | -0.0726      | (-2.31)**  |
| lastvis1 (b)   | 0.154       | (1.87)*     | -0.0015     | (-1.74)*   | -0.0350      | (-1.92)*   |
| lastvis3 (b)   | -0.716      | (5.64)***   | 0.0175      | (2.71)***  | 0.2044       | (4.95)***  |
| sept11_inc (b) | -0.262      | (2.06)**    | 0.0037      | (1.39)     | 0.0671       | (1.91)*    |

Notes: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%;

(a) Robust z-statistics in parentheses; Observations = 1031; Log-likelihood = -1028.82; LR chi2(59) = 651.57; Maximum Likelihood R2 = 0.527; McFadden's Adjusted R2 = 0.228; McKelvey-Zavoina R2 = 0.583; AIC = 2.118; BIC = -4658.626.

(b) dy/dx is for discrete change of dummy variable from 0 to 1.

Table B.3b Estimation Results and Marginal Effects for Outcomes  $y = 3, 4$  and  $5$ ,  
Ordered Probit Model, Professionals

| Explanatory Variables | $y = RP = 3$ |            | $y = RU = 4$ |            | $y = DNR = 5$ |            |
|-----------------------|--------------|------------|--------------|------------|---------------|------------|
|                       | dy/dx        | z-value    | dy/dx        | z-value    | dy/dx         | z-value    |
| female (b)            | -0.0518      | (-2)**     | 0.1211       | (2.39)**   | 0.0111        | (1.87)*    |
| init_UNSURE (b)       | 0.0532       | (3.56)***  | -0.2928      | (-7.2)***  | -0.0210       | (-4.39)*** |
| init_RETURN (b)       | 0.1480       | (6.04)***  | -0.4107      | (-9.71)*** | -0.0488       | (-4.7)***  |
| age                   | -0.0099      | (-1.09)    | 0.0286       | (1.11)     | 0.0022        | (1.07)     |
| agesq                 | 0.0001       | (0.54)     | -0.0002      | (-0.54)    | 0.0000        | (-0.54)    |
| staydur               | -0.0382      | (-3.01)*** | 0.1100       | (3.37)***  | 0.0083        | (2.78)***  |
| yrs_wrkd_cc           | -0.0060      | (-2.92)*** | 0.0172       | (3.2)***   | 0.0013        | (2.82)***  |
| AGExSTAYDUR           | 0.0014       | (2.54)**   | -0.0042      | (-2.75)*** | -0.0003       | (-2.4)**   |
| AGESQxSTAYDUR         | 0.0000       | (-1.95)*   | 0.0000       | (2.04)**   | 0.0000        | (1.88)*    |
| spousnat2 (b)         | -0.0674      | (-2.62)*** | 0.1383       | (3.4)***   | 0.0145        | (2.45)**   |
| NWexpTUR (b)          | -0.0279      | (-2.14)**  | 0.0722       | (2.42)**   | 0.0060        | (2.12)**   |
| FTJloc3 (b)           | -0.0874      | (-2.38)**  | 0.1630       | (3.24)***  | 0.0194        | (1.97)**   |
| HDTURXPHD (b)         | 0.0113       | (0.68)     | -0.1451      | (-2.66)*** | -0.0075       | (-3.22)*** |
| social_assess         | -0.0118      | (-2.29)**  | 0.0340       | (2.42)**   | 0.0026        | (2.25)**   |
| SOL_assess            | -0.0152      | (-2.57)*** | 0.0436       | (2.79)***  | 0.0033        | (2.36)**   |
| fam_sup1              | 0.0206       | (2.61)***  | -0.0593      | (-2.82)*** | -0.0045       | (-2.31)**  |
| fam_sup2              | -0.0181      | (-4.25)*** | 0.0520       | (5.43)***  | 0.0039        | (3.49)***  |
| academic2 (b)         | -0.0096      | (-0.37)    | 0.0263       | (0.39)     | 0.0021        | (0.37)     |
| whygo_C (b)           | 0.0181       | (2.27)**   | -0.0627      | (-1.96)**  | -0.0043       | (-1.91)*   |
| whygo_F (b)           | -0.2912      | (-4.18)*** | 0.4475       | (6.98)***  | 0.1085        | (2.08)**   |
| whygo_G (b)           | 0.0670       | (1.97)**   | -0.2177      | (-1.77)*   | -0.0172       | (-1.47)    |
| whygo_H (b)           | -0.0229      | (-1.88)*   | 0.0604       | (2.12)**   | 0.0049        | (1.85)*    |
| whygo_I (b)           | 0.0200       | (2.24)**   | -0.1416      | (-3.25)*** | -0.0080       | (-3.05)*** |
| whygo_K (b)           | -0.0183      | (-1.52)    | 0.0489       | (1.68)*    | 0.0039        | (1.53)     |
| FxWHYGOC (b)          | -0.0598      | (-1.3)     | 0.1195       | (1.69)*    | 0.0128        | (1.2)      |
| FxWHYGOI (b)          | -0.0707      | (-1.33)    | 0.1363       | (1.75)*    | 0.0153        | (1.17)     |
| ACADxWHYGOG (b)       | 0.0189       | (1.83)*    | -0.1443      | (-2.76)*** | -0.0080       | (-3)***    |
| AGExWHYGOF            | 0.0049       | (3.53)***  | -0.0140      | (-4.08)*** | -0.0011       | (-3.33)*** |
| AGExWHYGOG            | -0.0025      | (-1.66)*   | 0.0071       | (1.73)*    | 0.0005        | (1.63)     |
| pushC (b)             | 0.0083       | (0.68)     | -0.0237      | (-0.69)    | -0.0018       | (-0.67)    |
| pushD (b)             | 0.0556       | (3.63)***  | -0.2979      | (-3.37)*** | -0.0217       | (-2.54)**  |
| pushF (b)             | 0.0140       | (1.75)*    | -0.0442      | (-1.67)*   | -0.0032       | (-1.66)*   |
| pushK (b)             | -0.0228      | (-3.59)*** | 0.1174       | (3.62)***  | 0.0071        | (3.25)***  |
| pullE (b)             | -0.0246      | (-2.97)*** | 0.0867       | (2.66)***  | 0.0060        | (2.42)**   |
| pullF (b)             | -0.0162      | (-2.04)**  | 0.0543       | (1.79)*    | 0.0038        | (1.79)*    |
| pullG (b)             | -0.0390      | (-2.47)**  | 0.0937       | (3)***     | 0.0083        | (2.39)**   |
| pullH (b)             | 0.0234       | (2.13)**   | -0.0718      | (-2.12)**  | -0.0053       | (-1.91)*   |
| pullI (b)             | -0.0504      | (-2.87)*** | 0.1215       | (3.54)***  | 0.0109        | (2.61)***  |
| pullJ (b)             | -0.0417      | (-3.09)*** | 0.1073       | (3.65)***  | 0.0090        | (2.74)***  |
| pullK (b)             | 0.0159       | (1.21)     | -0.1873      | (-5.7)***  | -0.0102       | (-3.95)*** |
| pullL (b)             | 0.0130       | (0.83)     | -0.1407      | (-2.42)**  | -0.0074       | (-2.85)*** |
| femalepushC (b)       | 0.0204       | (2.63)***  | -0.0835      | (-1.68)*   | -0.0054       | (-1.81)*   |
| femalepullI (b)       | 0.0184       | (1.76)*    | -0.1454      | (-3.05)*** | -0.0080       | (-3.04)*** |
| femalepullK (b)       | -0.0679      | (-1.21)    | 0.1309       | (1.59)     | 0.0146        | (1.11)     |
| femalepullL (b)       | -0.1877      | (-1.57)    | 0.2632       | (2.51)**   | 0.0523        | (1.07)     |

Table B.3b continued

|                | y = RP = 3 |            | y = RU = 4 |            | y = DNR = 5 |            |
|----------------|------------|------------|------------|------------|-------------|------------|
|                | dy/dx      | z-value    | dy/dx      | z-value    | dy/dx       | z-value    |
| ACADxpushC (b) | -0.0650    | (-1.75)*   | 0.1330     | (2.23)**   | 0.0140      | (1.64)     |
| ACADxpulIE (b) | 0.0236     | (2.26)**   | -0.0950    | (-1.42)    | -0.0062     | (-1.53)    |
| ACADxpulIH (b) | -0.0848    | (-1.87)*   | 0.1688     | (2.43)**   | 0.0187      | (1.61)     |
| AGExpushD      | -0.0035    | (-2.83)*** | 0.0100     | (3.11)***  | 0.0008      | (2.7)***   |
| Hdnew2 (b)     | -0.1089    | (-2.27)**  | 0.1857     | (3.17)***  | 0.0252      | (1.85)*    |
| Hdnew3 (b)     | -0.0266    | (-3.27)*** | 0.0893     | (3.34)***  | 0.0063      | (2.89)***  |
| adj_A (b)      | 0.0293     | (3.32)***  | -0.0896    | (-3.62)*** | -0.0067     | (-2.83)*** |
| adj_C (b)      | 0.0174     | (3.07)***  | -0.0800    | (-1.59)    | -0.0049     | (-1.9)*    |
| difabrda(b)    | 0.0312     | (1.83)*    | -0.0741    | (-2.18)**  | -0.0066     | (-1.77)*   |
| contrB2 (b)    | 0.0507     | (3.86)***  | -0.1316    | (-4.93)*** | -0.0112     | (-3.44)*** |
| FTr4 (b)       | -0.0651    | (-1.45)    | 0.1262     | (1.91)*    | 0.0140      | (1.32)     |
| lastvis1 (b)   | -0.0200    | (-1.66)*   | 0.0522     | (1.85)*    | 0.0043      | (1.65)*    |
| lastvis3 (b)   | -0.0054    | (-0.27)    | -0.2065    | (-6.96)*** | -0.0100     | (-4.09)*** |
| sept11_inc (b) | 0.0191     | (3.38)***  | -0.0847    | (-2.18)**  | -0.0053     | (-2.21)**  |

Notes: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%;

(b) dy/dx is for discrete change of dummy variable from 0 to 1.

Table B.4 Marginal Effects for the Multinomial Logit Model, Professionals

|               | y = DRP = 1 |         | y = DRNP = 2 |            | y = RP = 3 |           | y = RU = 4 |            | y = DNR = 5 |           |
|---------------|-------------|---------|--------------|------------|------------|-----------|------------|------------|-------------|-----------|
|               | dy/dx       | z-value | dy/dx        | z-value    | dy/dx      | z-value   | dy/dx      | z-value    | dy/dx       | z-value   |
| female*       | -0.0002     | (-0.63) | -0.0957      | (-2.05)**  | -0.1179    | (-1.49)   | 0.2141     | (2.57)***  | -0.0003     | (-0.84)   |
| init_UNSURE*  | 0.0002      | (0.4)   | 0.1810       | (1.68)*    | 0.1816     | (1.86)*   | -0.3610    | (-5.07)*** | -0.0017     | (-2.04)** |
| init_RETURN*  | 0.0005      | (0.89)  | 0.3067       | (3.76)***  | 0.1907     | (2.23)**  | -0.4950    | (-6.61)*** | -0.0030     | (-2)**    |
| age           | 0.0003      | (0.87)  | 0.0030       | (0.1)      | -0.0398    | (-0.77)   | 0.0357     | (0.65)     | 0.0008      | (1.92)*   |
| ageseq        | 0.0000      | (-0.93) | -0.0002      | (-0.44)    | 0.0005     | (0.66)    | -0.0003    | (-0.37)    | 0.0000      | (-1.87)*  |
| staydur       | -0.0003     | (-0.85) | -0.0489      | (-1.21)    | -0.0405    | (-0.67)   | 0.0884     | (1.43)     | 0.0012      | (1.94)*   |
| yrs_wkld cc   | -0.0001     | (-0.95) | -0.0126      | (-1.92)*   | -0.0092    | (-1)      | 0.0218     | (2.4)**    | 0.0001      | (1.37)    |
| AGESSTAYDUR   | 0.0000      | (0.6)   | 0.0016       | (0.79)     | 0.0012     | (0.42)    | -0.0027    | (-0.92)    | -0.0001     | (-1.99)** |
| AGESQxSTAYDUR | 0.0000      | (-0.12) | 0.0000       | (-0.37)    | 0.0000     | (-0.21)   | 0.0000     | (0.42)     | 0.0000      | (1.5)     |
| spousnat2*    | 0.0002      | (0.65)  | -0.1162      | (-3.37)*** | -0.1021    | (-1.63)   | 0.2174     | (3.4)***   | 0.0006      | (1.04)    |
| NWexpTUR*     | -0.0004     | (-1)    | -0.0496      | (-1.65)*   | -0.0217    | (-0.44)   | 0.0715     | (1.42)     | 0.0001      | (0.46)    |
| FFTLloc3*     | -0.0003     | (-0.99) | -0.0783      | (-2.22)**  | -0.0335    | (-0.4)    | 0.1091     | (1.23)     | 0.0030      | (1.29)    |
| HDTURXPHD*    | 0.0003      | (0.41)  | 0.1407       | (1.32)     | 0.0412     | (0.4)     | -0.1817    | (-2.69)*** | -0.0006     | (-1.86)*  |
| social_assess | -0.0001     | (-0.99) | -0.0346      | (-2.31)**  | -0.0062    | (-0.28)   | 0.0410     | (1.7)*     | 0.0001      | (0.44)    |
| SOL_assess    | -0.0001     | (-0.48) | -0.0388      | (-2.41)**  | -0.0149    | (-0.54)   | 0.0531     | (1.71)*    | 0.0006      | (1.56)    |
| fam_sup1      | 0.0000      | (0.33)  | 0.0549       | (2.43)**   | -0.0217    | (-0.66)   | -0.0329    | (-0.94)    | -0.0004     | (-1.23)   |
| fam_sup2      | -0.0001     | (-1.02) | -0.0499      | (-4.75)*** | -0.0078    | (-0.47)   | 0.0576     | (3.12)***  | 0.0002      | (1.09)    |
| academic2*    | -0.0001     | (-0.23) | -0.0420      | (-0.61)    | 0.1387     | (1.32)    | -0.0979    | (-0.95)    | 0.0013      | (0.82)    |
| whygo_C*      | 0.0003      | (0.86)  | 0.0587       | (1.47)     | 0.0349     | (0.61)    | -0.0940    | (-1.64)*   | 0.0001      | (0.18)    |
| whygo_F*      | -0.0021     | (-0.77) | -0.3013      | (-4.02)*** | -0.2033    | (-1.13)   | 0.4975     | (2.74)***  | 0.0091      | (0.63)    |
| whygo_G*      | 0.0158      | (0.49)  | 0.1840       | (1.16)     | 0.1185     | (0.54)    | -0.3143    | (-1.54)    | -0.0040     | (-1.13)   |
| whygo_H*      | 0.0001      | (0.32)  | -0.0443      | (-1.46)    | -0.0202    | (-0.45)   | 0.0636     | (1.4)      | 0.0008      | (1.48)    |
| whygo_I*      | 0.0004      | (0.56)  | 0.2214       | (2.05)**   | -0.1797    | (-1.95)*  | -0.0412    | (-0.51)    | -0.0009     | (-1.83)*  |
| whygo_K*      | -0.0004     | (-1.09) | 0.0048       | (0.15)     | -0.1011    | (-2.15)** | 0.0965     | (1.97)**   | 0.0002      | (0.63)    |
| FxWHYGOC*     | -0.0003     | (-0.94) | -0.0758      | (-1.65)*   | -0.0502    | (-0.45)   | 0.1257     | (1.03)     | 0.0006      | (0.39)    |
| FxWHYGOL*     | -0.0003     | (-0.94) | -0.0933      | (-1.84)*   | 0.1407     | (1.17)    | -0.0804    | (-0.82)    | 0.0333      | (0.69)    |
| ACADxWHYGOG*  | 0.0000      | (0.14)  | 0.1609       | (1.55)     | 0.0740     | (0.71)    | -0.2345    | (-3.58)*** | -0.0005     | (-1.32)   |
| AGExWHYGOF    | 0.0001      | (0.9)   | 0.0133       | (3.25)***  | 0.0019     | (0.36)    | -0.0153    | (-2.69)*** | -0.0001     | (-1.29)   |
| AGExWHYGOG    | -0.0001     | (-0.92) | -0.0070      | (-1.48)    | -0.0044    | (-0.62)   | 0.0113     | (1.56)     | 0.0001      | (1.53)    |

Table B.4 continued

|                | y = DRP = 1 |         | y = DRNP = 2 |            | y = RP = 3 |           | y = RU = 4 |            | y = DNR = 5 |          |
|----------------|-------------|---------|--------------|------------|------------|-----------|------------|------------|-------------|----------|
|                | dy/dx       | z-value | dy/dx        | z-value    | dy/dx      | z-value   | dy/dx      | z-value    | dy/dx       | z-value  |
| pushC*         | -0.0007     | (-0.97) | 0.0348       | (1)        | 0.0543     | (0.95)    | -0.0879    | (-1.48)    | -0.0005     | (-1.19)  |
| pushD*         | 0.0099      | (0.41)  | 0.2097       | (1.21)     | 0.1738     | (0.91)    | -0.3922    | (-2.72)*** | -0.0012     | (-1.03)  |
| pushF*         | 0.0002      | (0.83)  | 0.0227       | (0.73)     | 0.0483     | (1.09)    | -0.0712    | (-1.64)*   | 0.0000      | (-0.17)  |
| pushK*         | -0.0012     | (-0.95) | -0.1190      | (-2.47)**  | 0.1137     | (1.94)*   | 0.0059     | (0.1)      | 0.0006      | (1.83)*  |
| pullE*         | -0.0001     | (-0.28) | -0.0772      | (-1.89)*   | 0.0162     | (0.29)    | 0.0602     | (1.12)     | 0.0009      | (1.73)*  |
| pullF*         | 0.0001      | (0.72)  | -0.0478      | (-1.38)    | -0.0139    | (-0.27)   | 0.0612     | (1.15)     | 0.0005      | (1.21)   |
| pullG*         | -0.0003     | (-1)    | -0.0362      | (-1.15)    | -0.0595    | (-1.17)   | 0.0947     | (1.79)*    | 0.0013      | (1.71)*  |
| pullH*         | 0.0001      | (0.46)  | 0.0388       | (1.01)     | -0.0206    | (-0.39)   | -0.0173    | (-0.33)    | -0.0011     | (-1.71)* |
| pullI*         | -0.0003     | (-0.93) | -0.0809      | (-2.39)**  | -0.0680    | (-1.18)   | 0.1487     | (2.42)**   | 0.0006      | (1.38)   |
| pullJ*         | -0.0001     | (-0.62) | -0.1027      | (-3.21)*** | -0.0108    | (-0.23)   | 0.1132     | (2.34)**   | 0.0004      | (1.06)   |
| pullK*         | 0.0012      | (0.89)  | 0.1699       | (2.68)***  | 0.0271     | (0.41)    | -0.1973    | (-3.5)***  | -0.0009     | (-1.92)* |
| pullL*         | 0.0061      | (0.89)  | 0.1286       | (0.97)     | -0.0301    | (-0.24)   | -0.1046    | (-1.21)    | -0.0001     | (-0.12)  |
| femalexppushC* | 0.0022      | (0.66)  | 0.0553       | (0.78)     | 0.0158     | (0.19)    | -0.0733    | (-0.97)    | 0.0000      | (0.03)   |
| femalexpullI*  | 0.0010      | (0.52)  | 0.1678       | (1.63)     | -0.0187    | (-0.19)   | -0.1497    | (-2.1)**   | -0.0005     | (-1.49)  |
| femalexpullK*  | 0.0000      | (-0.13) | -0.1046      | (-2.31)**  | -0.0105    | (-0.08)   | 0.1103     | (0.79)     | 0.0049      | (0.57)   |
| femalexpullL*  | -0.0004     | (-0.91) | -0.1350      | (-3.03)*** | -0.2132    | (-1.01)   | 0.3465     | (1.57)     | 0.0022      | (0.6)    |
| ACADxppushC*   | -0.0002     | (-0.83) | -0.1130      | (-2.81)*** | -0.1372    | (-1.44)   | 0.2497     | (2.45)**   | 0.0007      | (0.74)   |
| ACADxpullE*    | 0.0047      | (0.6)   | 0.1342       | (1.23)     | -0.2047    | (-1.91)*  | 0.0663     | (0.52)     | -0.0006     | (-1.25)  |
| ACADxpullH*    | -0.0005     | (-0.85) | -0.1386      | (-3.25)*** | 0.0249     | (0.22)    | 0.1133     | (0.98)     | 0.0008      | (0.7)    |
| AGExpushD      | 0.0000      | (-0.86) | -0.0056      | (-1.27)    | -0.0071    | (-1.23)   | 0.0127     | (2.22)**   | 0.0000      | (1.25)   |
| HDnew2*        | -0.0001     | (-0.57) | -0.0596      | (-0.99)    | -0.1352    | (-1.29)   | 0.1933     | (1.83)*    | 0.0017      | (0.83)   |
| HDnew3*        | -0.0004     | (-0.95) | -0.0701      | (-2.06)**  | 0.0185     | (0.4)     | 0.0518     | (1.14)     | 0.0002      | (0.61)   |
| adj_A*         | 0.0002      | (0.74)  | 0.0473       | (1.66)*    | -0.0138    | (-0.34)   | -0.0330    | (-0.81)    | -0.0008     | (-1.73)* |
| adj_C*         | 0.0006      | (0.69)  | 0.0569       | (0.83)     | 0.0963     | (1.27)    | -0.1535    | (-2.41)**  | -0.0003     | (-0.58)  |
| difabrdA*      | 0.0000      | (-0.06) | 0.0356       | (1.02)     | 0.0635     | (1.11)    | -0.0982    | (-1.66)*   | -0.0009     | (-1.41)  |
| contrB2*       | 0.0002      | (0.76)  | 0.1072       | (3.96)***  | 0.0695     | (1.62)    | -0.1763    | (-3.81)*** | -0.0006     | (-1.32)  |
| FLt4*          | 0.0004      | (0.44)  | -0.0571      | (-1.14)    | -0.0190    | (-0.17)   | 0.0718     | (0.59)     | 0.0040      | (1.08)   |
| lastvis1*      | -0.0005     | (-1.01) | -0.0607      | (-2.13)**  | 0.0592     | (1.28)    | 0.0021     | (0.04)     | 0.0000      | (-0.15)  |
| lastvis3*      | 0.0016      | (0.9)   | 0.1165       | (1.83)*    | 0.1870     | (2.81)*** | -0.3011    | (-7.08)*** | -0.0039     | (-1.8)*  |
| sept11_inc*    | 0.0007      | (1.15)  | 0.0304       | (0.75)     | 0.0902     | (1.27)    | -0.1206    | (-1.65)*   | -0.0007     | (-1.87)* |

Table B.5 Summary Statistics and Descriptions of the Variables used in the Final Model, Students ( $n = 960$ )

| Variable           | Variable Descriptions                                                                                                                                                            | Mean   | Std Dev. | Min | Max  |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------|-----|------|
| <i>y</i>           | Dependent variable: return intentions (1=return without completing studies; 2=return immed. after compl. studies; 3=return probable; 4=return unlikely; 5=definitely not return) | 3.57   | 1.06     | 1   | 6    |
| <i>female</i>      | Gender of respondent (1=female)                                                                                                                                                  | 0.39   | 0.49     | 0   | 1    |
| <i>age</i>         | Age of respondent in 2001                                                                                                                                                        | 26.96  | 3.67     | 18  | 44   |
| <i>agesq</i>       | Square of Age                                                                                                                                                                    | 740.40 | 207.08   | 324 | 1936 |
| <i>init_UNSURE</i> | Initial return intentions: Unsure (1=yes)                                                                                                                                        | 0.37   | 0.48     | 0   | 1    |
| <i>init_STAY</i>   | Initial return intentions: Return (1=yes)                                                                                                                                        | 0.09   | 0.29     | 0   | 1    |
| <i>staydur1</i>    | Stay duration in current country of residence (years)                                                                                                                            | 2.79   | 2.31     | 0   | 13   |
| <i>FAMSUP1_S</i>   | Family support for initial decision to go abroad (1= supportive)                                                                                                                 | 0.95   | 0.21     | 0   | 1    |
| <i>FAMSUP2_SS</i>  | Family support for settling abroad (1=somewhat supportive)                                                                                                                       | 0.48   | 0.50     | 0   | 1    |
| <i>FAMSUP2_DS</i>  | Family support for settling abroad (1=definitely supportive)                                                                                                                     | 0.27   | 0.44     | 0   | 1    |
| <i>soc_W</i>       | Assessment of social conditions abroad (1=much worse or worse)                                                                                                                   | 0.44   | 0.50     | 0   | 1    |
| <i>SOL_B</i>       | Assessment of standard of living abroad (1=better or much better)                                                                                                                | 0.69   | 0.46     | 0   | 1    |
| <i>TSA_member</i>  | Turkish Student Association membership (1=yes)                                                                                                                                   | 0.57   | 0.49     | 0   | 1    |
| <i>res_USA</i>     | Current residence is USA (1=yes)                                                                                                                                                 | 0.86   | 0.35     | 0   | 1    |
| <i>fieldnew1</i>   | Current field of study: arch / econ / admin                                                                                                                                      | 0.29   | 0.45     | 0   | 1    |
| <i>fieldnew3</i>   | Current field of study: engin / math / science / medic                                                                                                                           | 0.58   | 0.49     | 0   | 1    |
| <i>div_sep</i>     | Respondent is divorced or separated                                                                                                                                              | 0.02   | 0.15     | 0   | 1    |
| <i>not_married</i> | Respondent has never married                                                                                                                                                     | 0.71   | 0.45     | 0   | 1    |
| <i>spousenat2</i>  | Respondent is married to a foreign spouse                                                                                                                                        | 0.02   | 0.14     | 0   | 1    |
| <i>whygo_A</i>     | Learn language, improve language skills                                                                                                                                          | 0.25   | 0.44     | 0   | 1    |
| <i>whygo_C</i>     | Job requirement in Turkey                                                                                                                                                        | 0.41   | 0.49     | 0   | 1    |
| <i>whygo_F</i>     | Insufficient facilities, equipment for research                                                                                                                                  | 0.45   | 0.50     | 0   | 1    |
| <i>whygo_G</i>     | Prestige and advantages of study abroad                                                                                                                                          | 0.72   | 0.45     | 0   | 1    |
| <i>whygo_H</i>     | Lifestyle preference                                                                                                                                                             | 0.24   | 0.43     | 0   | 1    |
| <i>whygo_I</i>     | To be with spouse, family                                                                                                                                                        | 0.08   | 0.27     | 0   | 1    |
| <i>whygo_K</i>     | Get away from political environment                                                                                                                                              | 0.25   | 0.44     | 0   | 1    |
| <i>DC_E</i>        | Chose current institution because of job opportunities                                                                                                                           | 0.26   | 0.44     | 0   | 1    |
| <i>DC_F</i>        | Chose current institution to be near spouse                                                                                                                                      | 0.11   | 0.31     | 0   | 1    |
| <i>adj_A</i>       | Adjustment Factor: previous experience                                                                                                                                           | 0.34   | 0.47     | 0   | 1    |
| <i>adj_F</i>       | Adjustment Factor: Turkish friends at institution of study                                                                                                                       | 0.57   | 0.50     | 0   | 1    |



Table B.5 continued.

| Variable          | Variable Description                                                  | Mean | Std Dev. | Min | Max |
|-------------------|-----------------------------------------------------------------------|------|----------|-----|-----|
| <i>difabrdF</i>   | Difficulties faced while abroad: unemployment                         | 0.05 | 0.21     | 0   | 1   |
| <i>academic_b</i> | Respondent plans to work in academia 5 years after completing studies | 0.47 | 0.50     | 0   | 1   |
| <i>compulsory</i> | Respondent is bound by compulsory academic service requirement        | 0.18 | 0.38     | 0   | 1   |
| <i>pushE</i>      | Push Factor: being away from research centers and recent advance      | 0.59 | 0.49     | 0   | 1   |
| <i>pushG</i>      | Push Factor: less than satisfying cultural and social life            | 0.23 | 0.42     | 0   | 1   |
| <i>pullA</i>      | Pull Factor: a higher level of income in host country                 | 0.76 | 0.43     | 0   | 1   |
| <i>pullC</i>      | Pull Factor: better work environment                                  | 0.68 | 0.47     | 0   | 1   |
| <i>pullD</i>      | Pull Factor: greater job availability in specialization               | 0.75 | 0.43     | 0   | 1   |
| <i>pullF</i>      | Pull Factor: more organized, ordered environment                      | 0.76 | 0.42     | 0   | 1   |
| <i>pullH</i>      | Pull Factor: proximity to research and innovation centers             | 0.60 | 0.49     | 0   | 1   |
| <i>pullI</i>      | Pull Factor: spouse's preference or job                               | 0.21 | 0.41     | 0   | 1   |
| <i>pullJ</i>      | Pull Factor: better educational opportunities for children            | 0.19 | 0.39     | 0   | 1   |
| <i>pullK</i>      | Pull Factor: need to finish current project                           | 0.30 | 0.46     | 0   | 1   |
| <i>pullL</i>      | Pull Factor: other factors                                            | 0.04 | 0.19     | 0   | 1   |
| <i>lastvis1</i>   | Last visit to Turkey decreased return intentions (1=yes)              | 0.32 | 0.47     | 0   | 1   |
| <i>lastvis3</i>   | Last visit to Turkey increased return intentions (1=yes)              | 0.09 | 0.29     | 0   | 1   |
| <i>sept11_inc</i> | Effect of September 11, 2001 (1=increased return intentions)          | 0.14 | 0.34     | 0   | 1   |

Table B.6 Estimation Results and Marginal Effects for each Outcome, Ordered Probit Model, Students

| Explanatory Variables | $\beta$ (a) | z-statistic | dy/dx  |        |        |        |        |        |
|-----------------------|-------------|-------------|--------|--------|--------|--------|--------|--------|
|                       |             |             | y = 1  | y = 2  | y = 3  | y = 4  | y = 5  | y = 6  |
| female(b)             | 0.124       | (1.61)      | 0.000  | -0.015 | -0.034 | 0.023  | 0.025  | 0.001  |
| age                   | 0.036       | (0.34)      | 0.000  | -0.004 | -0.010 | 0.007  | 0.007  | 0.000  |
| agesq                 | -0.001      | (0.60)      | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| init_UNSURE(b)        | 0.495       | (5.66)***   | -0.001 | -0.055 | -0.139 | 0.085  | 0.106  | 0.004  |
| init_STAY(b)          | 1.434       | (8.55)***   | -0.001 | -0.077 | -0.379 | -0.005 | 0.404  | 0.057  |
| staydur1              | 0.087       | (4.26)***   | 0.000  | -0.010 | -0.024 | 0.017  | 0.017  | 0.001  |
| FAMSUP2_SS(b)         | 0.216       | (2.55)**    | 0.000  | -0.026 | -0.060 | 0.041  | 0.043  | 0.001  |
| FAMSUP2_DS(b)         | 0.415       | (3.80)***   | -0.001 | -0.044 | -0.119 | 0.068  | 0.092  | 0.004  |
| soc_W(b)              | -0.339      | (4.49)***   | 0.001  | 0.042  | 0.091  | -0.066 | -0.066 | -0.002 |
| SOL_B(b)              | 0.172       | (1.99)**    | 0.000  | -0.022 | -0.046 | 0.034  | 0.033  | 0.001  |
| TSA_member(b)         | -0.167      | (2.15)**    | 0.000  | 0.020  | 0.046  | -0.031 | -0.034 | -0.001 |
| div_sep(b)            | 0.542       | (2.44)**    | -0.001 | -0.044 | -0.163 | 0.062  | 0.138  | 0.008  |
| not_married(b)        | 0.181       | (1.60)      | 0.000  | -0.023 | -0.048 | 0.036  | 0.035  | 0.001  |
| spousenat2(b)         | 0.545       | (1.64)      | -0.001 | -0.044 | -0.163 | 0.062  | 0.139  | 0.008  |
| whygo_A(b)            | -0.127      | (1.47)      | 0.000  | 0.016  | 0.034  | -0.025 | -0.025 | -0.001 |
| whygo_C(b)            | -0.248      | (3.05)***   | 0.001  | 0.031  | 0.067  | -0.049 | -0.048 | -0.002 |
| whygo_F(b)            | 0.220       | (2.14)**    | 0.000  | -0.026 | -0.061 | 0.042  | 0.045  | 0.001  |
| whygo_G(b)            | -0.241      | (2.12)**    | 0.000  | 0.027  | 0.068  | -0.043 | -0.051 | -0.002 |
| whygo_H(b)            | 0.213       | (2.06)**    | 0.000  | -0.024 | -0.061 | 0.038  | 0.045  | 0.002  |
| whygo_I(b)            | -0.331      | (1.65)*     | 0.001  | 0.049  | 0.080  | -0.072 | -0.056 | -0.001 |
| whygo_K(b)            | 0.280       | (2.42)**    | 0.000  | -0.031 | -0.080 | 0.049  | 0.060  | 0.002  |
| ACADxwhygoF(b)        | -0.252      | (1.67)*     | 0.001  | 0.033  | 0.066  | -0.052 | -0.047 | -0.001 |
| ACADxwhygoG(b)        | 0.349       | (2.13)**    | -0.001 | -0.039 | -0.099 | 0.061  | 0.075  | 0.003  |
| ACADxwhygoI(b)        | -0.604      | (2.67)***   | 0.003  | 0.107  | 0.118  | -0.140 | -0.086 | -0.002 |
| ACADxwhygoK(b)        | 0.370       | (2.03)**    | -0.001 | -0.036 | -0.109 | 0.056  | 0.085  | 0.004  |
| DC_E(b)               | 0.290       | (3.58)***   | -0.001 | -0.032 | -0.083 | 0.050  | 0.062  | 0.002  |
| DC_F(b)               | 0.436       | (2.82)***   | -0.001 | -0.041 | -0.129 | 0.062  | 0.103  | 0.005  |
| adj_A(b)              | -0.178      | (2.19)**    | 0.000  | 0.022  | 0.048  | -0.035 | -0.034 | -0.001 |
| adj_F(b)              | -0.128      | (1.64)      | 0.000  | 0.015  | 0.035  | -0.024 | -0.026 | -0.001 |
| difabrdF(b)           | -0.227      | (1.33)      | 0.001  | 0.032  | 0.057  | -0.048 | -0.040 | -0.001 |
| academic_b(b)         | -0.430      | (2.51)**    | 0.001  | 0.053  | 0.116  | -0.082 | -0.085 | -0.003 |
| compulsory(b)         | -0.705      | (5.75)***   | 0.004  | 0.118  | 0.147  | -0.157 | -0.108 | -0.003 |
| pushE(b)              | 0.191       | (2.25)**    | 0.000  | -0.024 | -0.052 | 0.037  | 0.038  | 0.001  |
| pushG(b)              | -0.061      | (0.56)      | 0.000  | 0.008  | 0.017  | -0.012 | -0.012 | 0.000  |
| pullA(b)              | 0.279       | (3.27)***   | -0.001 | -0.038 | -0.072 | 0.058  | 0.051  | 0.001  |
| pullC(b)              | -0.104      | (1.26)      | 0.000  | 0.012  | 0.029  | -0.019 | -0.021 | -0.001 |
| pullD(b)              | 0.092       | (1.02)      | 0.000  | -0.011 | -0.025 | 0.018  | 0.018  | 0.001  |
| pullF(b)              | 0.225       | (2.50)**    | -0.001 | -0.030 | -0.059 | 0.046  | 0.042  | 0.001  |
| pullI(b)              | 0.365       | (3.53)***   | -0.001 | -0.038 | -0.106 | 0.060  | 0.081  | 0.003  |
| pullJ(b)              | -0.116      | (1.12)      | 0.000  | 0.015  | 0.031  | -0.023 | -0.022 | -0.001 |
| pullK(b)              | -0.087      | (0.77)      | 0.000  | 0.011  | 0.024  | -0.017 | -0.017 | -0.001 |
| pullL(b)              | -0.469      | (1.53)      | 0.002  | 0.077  | 0.102  | -0.107 | -0.073 | -0.002 |

Table B.6 continued

| Explanatory Variables | $\beta$ (a) | z-statistic | dy/dx  |        |        |        |        |        |
|-----------------------|-------------|-------------|--------|--------|--------|--------|--------|--------|
|                       |             |             | y = 1  | y = 2  | y = 3  | y = 4  | y = 5  | y = 6  |
| ACADxpushG(b)         | 0.403       | (2.12)**    | -0.001 | -0.038 | -0.119 | 0.058  | 0.095  | 0.004  |
| ACADxpullK(b)         | -0.188      | (1.18)      | 0.000  | 0.025  | 0.049  | -0.039 | -0.035 | -0.001 |
| ACADxpullL(b)         | 0.864       | (1.84)*     | -0.001 | -0.055 | -0.253 | 0.048  | 0.240  | 0.020  |
| lastvis1(b)           | 0.352       | (3.99)***   | -0.001 | -0.039 | -0.100 | 0.061  | 0.075  | 0.003  |
| lastvis3(b)           | -0.350      | (2.91)***   | 0.001  | 0.052  | 0.084  | -0.077 | -0.059 | -0.002 |
| sept11_inc(b)         | -0.284      | (2.79)***   | 0.001  | 0.040  | 0.072  | -0.060 | -0.051 | -0.001 |

Notes: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%;

(a) Robust z-statistics in parentheses; Observations = 960; Log-likelihood = -1073.44; LR  $\chi^2(48) = 583.83$ ; Maximum Likelihood  $R^2 = 0.491$ ; McFadden's Adjusted  $R^2 = 0.194$ ; McKelvey-Zavoina  $R^2 = 0.535$ ; AIC = 2.347; BIC = -4081.431.

(b) dy/dx is for discrete change of dummy variable from 0 to 1.

## **APPENDIX C**

### **SURVEY LETTERS AND SURVEY QUESTIONNAIRES**

#### **C.1 E-Mail Cover Letter (English and Turkish Versions)**

Dear ...,

We are conducting a survey on the Turkish brain drain and we need your help.

The purpose of our study is to identify the reasons why skilled individuals of Turkish origin, students studying abroad or professionals, do not return or postpone returning to Turkey. With this study we also hope to shed light on mobility patterns, and interactions or feedback patterns between those that have gone abroad and their friend, family and colleagues staying in Turkey.

The survey will take 15, at most 20, minutes of your time. The questions are easy to answer but need to be responded to carefully. The information you provide will be kept strictly confidential and will in no way be presented in a way that will identify you.

The survey is not anonymous, but confidential. We ask for your name and email for the purpose of identifying who we have successfully reached. We will also be sending a summary of our findings to respondents via email.

We would appreciate it if you would forward this message to any friends or colleagues of Turkish origin who meet the following criteria:

- 1) those studying abroad at the university level (associate, bachelors, masters, doctorate, postdoc)
- 2) those who are working abroad holding at least a bachelor's degree.

We are trying to reach as many people as we can who hold the above qualifications.

Our survey web address is <http://www.metu.edu.tr/home/survey> . To fill out the survey please go to this address and follow the appropriate links.

We would greatly appreciate your prompt response.

We thank you again for your help.

Yours sincerely,

Aysit Tansel, Nil Demet G ng r

Prof. Dr. Aysit Tansel / Research Assistant Nil Demet G ng r  
Department of Economics  
Faculty of Economic and Administrative Sciences  
Middle East Technical University  
Ankara, Turkey 06531  
email: [survey@metu.edu.tr](mailto:survey@metu.edu.tr)

[Turkish Version]

Değerli ...,

Türkiye’den beyin göçü üzerine bir anket çalışması yapıyoruz ve sizin yardımınıza ihtiyacımız var.

Çalışmamızın amacı yurtdışında okuyan Türk öğrencilerin ve yurtdışında çalışan nitelikli Türk işgücünün yurda dönmemelerinin veya dönmeyi ertelemelerinin nedenlerini tespit etmektir. Çalışmamızla ayrıca vasıflı işgücü hareketlerine ve yurtdışında bulunanların Türkiye’deki arkadaş, aile ve meslektaşlarıyla etkileşimlerine ışık tutmayı ümit ediyoruz.

Anketimizi doldurmanız en fazla 15-20 dakikanızı alacaktır. Sorular kolay cevaplandırabileceğiniz sorulardır ama dikkatli okunmaları gerekiyor. Vereceğiniz tüm bilgiler bizde gizli kalacaktır ve çalışmamızın sonuçları hiçbir şekilde bireylerin tespit edilmesini mümkün kılacak şekilde sunulmayacaktır.

Anketimizde isim ve eposta alanları da yer almaktadır. Bu bilgileri istememimizin nedeni kimlere ulaşabildiğimizi anlayabilmemizdir. Ayrıca çalışmamızın bitiminde, ankete katılanlara bulgularımızın bir özetini eposta ile göndereceğiz.

Bu mesajı aşağıdaki kriterlere uyan tanıdıklarınıza gönderebilerseniz çok seviniriz.

- 1) yurtdışında okuyan Türk öğrenciler (lise üstü teknik kolej, lisans, master, doctora, doktora sonrası eğitim düzeyinde)
- 2) yurtdışında çalışan ve en az lisans derecesine sahip olan Türkler

Bu niteliklere sahip olan mümkün olduğu kadar fazla kişiye ulaşmaya çalışıyoruz.

Web adresimiz <http://www.metu.edu.tr/home/survey> ’dir. Anket formunu doldurmak için lütfen bu adrese girip, sayfadaki linkleri takip ediniz.

Yanıtınızı en kısa zamanda yollarsanız çok memnun oluruz.

Yardımanız için tekrar teşekkür ederiz.  
Saygılarımızla,

Aysit Tansel, Nil Demet Güngör

Prof. Dr. Aysit Tansel / Araştırma Görevlisi Nil Demet Güngör  
İktisat Bölümü  
İktisadi ve İdari Bilimler Fakültesi  
Orta Doğu Teknik Üniversitesi  
Ankara, Türkiye 06531  
eposta: [survey@metu.edu.tr](mailto:survey@metu.edu.tr)

## C.2 Courtesy Reply Message (English and Turkish Versions)

Dear friend,

Thank you for participating in our survey on the determinants of student non-return and migration of skilled individuals from Turkey to other countries. We appreciate your help.

If you know any colleagues or friends of Turkish origin who qualify to take part in our survey (students at the undergraduate or graduate level studying abroad, and skilled individuals holding at least a bachelor's degree who are working abroad), we would appreciate it if you would forward them our survey address.

If you would like to receive a copy of the survey results by email when they become available, please reply to this message indicating that you request a copy.

Regards,

Prof. Dr. Aysit Tansel, Research Assistant Nil Demet Gungor

METU Department of Economics

[survey@metu.edu.tr](mailto:survey@metu.edu.tr)

<http://www.metu.edu.tr/home/survey>

---

Degerli arkadas / meslektas,

Turkiye’den diger ulkelere goc eden egitimli bireylerin, yurda donmeme kararlariyla ilgili olarak yaptigimiz arastirmaya katildiginiz icin tesekkur ederiz.

Eger arastirmamiza katilabilecek niteliklerdeki Turk arkadas ve meslektaslariniz varsa (yabanci ulkelerdeki universite mezunu veya universiteyi bitirmekte olan ogrenciler ve disarda calismakta olan en azindan universite mezunu bireyler) anketimizin web adresini bu kimselere iletirseniz memnun oluruz.

Calismamizin sonuclarinin bir kopyasini isterseniz, bu mesaja isteginizi belirten bir yanit gondererek bize bildirebilirsiniz. Degerli katkilarinizdan dolayi tekrar tesekkur ederiz.

Saygilar,

Prof. Dr. Aysit Tansel, Arastirma Gorevlisi Nil Demet Gungor

ODTU Iktisat Bolumu

[survey@metu.edu.tr](mailto:survey@metu.edu.tr)

<http://www.metu.edu.tr/home/survey>



### C.3 English Mail-outVersion of Tertiary-Educated Workforce Abroad Survey

---

#### Brain Drain Survey of Academicians, Professionals and other Workers

1) Please write your name and e-mail address in the boxes provided below. This information is for our record-keeping only; it will not be used in our study, and it will not be disclosed in any way to other parties. The information you provide will be used for research or statistical purposes only.

2) Please read and answer carefully. The survey will take approximately 15-20 minutes. Since not all of the questions will apply, you will be able skip those that are not relevant to you.

3) Please place an X within the square bracket of the appropriate selection for multiple choice questions.

Thank you again for taking the time to participate in our study.

YOUR NAME: \_\_\_\_\_

YOUR E-MAIL ADDRESS: \_\_\_\_\_

#### GENERAL INFORMATION

##### 1. Personal Information: Please indicate your

###### a) Gender:

Please mark the appropriate box with an X.

☐ Male

☐ Female

###### b) Birthyear: \_\_\_\_\_

###### c) Birthplace:

city: \_\_\_\_\_

country: \_\_\_\_\_

##### 2. a) What is your current *country* of residence?

Please mark the appropriate box with an X.

☐ Australia

☐ Canada

- ☐ England  
☐ New Zealand  
☐ USA  
☐ other, please indicate: \_\_\_\_\_

**b) Please indicate your current *city* and (if applicable) *state* or *province* of residence:**

city: \_\_\_\_\_

state / province: \_\_\_\_\_

**3. How long have you been staying in your current COUNTRY of residence?**

\_\_\_\_\_ number of years

**4. a) Did you have any study, work, travel or other experience outside Turkey prior to coming to your current country of residence?**

Please mark the appropriate box with an X.

- ☐ yes  
☐ no

*If you have no prior experience abroad please proceed to question 5.*

**b) What kind of previous experience did you have abroad?**

Please mark all that apply.

- ☐ study  
☐ work  
☐ travel  
☐ other, please specify: \_\_\_\_\_

**c) What is the longest period you have spent outside Turkey not counting your current stay?**

\_\_\_\_\_ number of months/years

## EDUCATIONAL INFORMATION

**5. a) Which high school (lycée) did you graduate from?**

*Please indicate the name of the high school and its location.*

NAME: \_\_\_\_\_

LOCATION: \_\_\_\_\_  
(e.g. Ankara)

b) What was the *language of instruction* of the

i. science courses at your high school (lycée)?

*Please mark the appropriate box with an X.*

- ☐ Turkish
- ☐ English
- ☐ German
- ☐ French
- ☐ other, please specify: \_\_\_\_\_

ii. social courses (e.g., history, geography, philosophy) at your high school (lycée)? *Please mark the appropriate box with an X.*

- ☐ Turkish
- ☐ English
- ☐ German
- ☐ French
- ☐ other, please specify: \_\_\_\_\_

6. a) From which university did you receive your undergraduate (bachelor's or associate's) degree?

\_\_\_\_\_

b) What was your major? \_\_\_\_\_

c) What year did you graduate? \_\_\_\_\_

7. a) What is the highest academic degree you hold?

*Please mark the appropriate box with an X.*

- ☐ associate's
- ☐ bachelor's
- ☐ post baccalaureate certificate
- ☐ master's
- ☐ post master's certificate
- ☐ doctorate

b) From which university did you receive your highest academic degree?

\_\_\_\_\_

c) In which country did you receive your highest academic degree?

*Please mark the appropriate box with an X.*

- ☐ Australia
- ☐ Canada
- ☐ England
- ☐ New Zealand
- ☐ USA
- ☐ Other, please indicate: \_\_\_\_\_

d) Please indicate also the *city* and (if applicable) *state* or *province* where you received your highest degree.

CITY : \_\_\_\_\_

STATE/PROVINCE : \_\_\_\_\_

e) What was your field of study?

*Please be specific and indicate any areas of specialization as well.*

General field of study: \_\_\_\_\_

Specialization 1: \_\_\_\_\_

Specialization 2: \_\_\_\_\_

Specialization 3: \_\_\_\_\_

f) If you received your last academic degree outside Turkey, where did you start your first first full time job after completing your studies?

*Please mark the appropriate box with an X.*

- ☐ same city and country where I received my last degree
- ☐ same country but different city
- ☐ Turkey
- ☐ another country, please specify: \_\_\_\_\_
- ☐ not applicable

8. What is the highest academic title you hold or have held in the past?

*Please mark the appropriate boxes with an X.*

a) in Turkey:

- ☐ none
- ☐ professor
- ☐ associate professor
- ☐ assistant professor
- ☐ instructor / lecturer
- ☐ research assistant
- ☐ teaching assistant

b) in your current country of residence:

- ☐ none
- ☐ professor
- ☐ associate professor
- ☐ assistant professor
- ☐ instructor / lecturer
- ☐ research assistant
- ☐ teaching assistant

9. a) Do you hold any professional degrees?

*(e.g. in law, medicine, dentistry, nursing, pharmacy, etc. such as M.D., V.M.D., J.D., L.L.M.)*

- ☐ yes
- ☐ no

b) If so, which professional degrees do you hold?

\_\_\_\_\_

## WORK-RELATED INFORMATION

**10. What is your occupation?**

*Please be specific. For example, high school science teacher, university professor in sociology, computer programmer, mid-level manager etc.*

\_\_\_\_\_

**11. What is your current employment status?**

- ☐ self-employed
- ☐ employee
- ☐ unemployed, looking for a job

*If you are unemployed or between jobs, please refer to your last job when answering questions concerning your 'current workplace or institution'.*

**12. a) How long have you been working outside Turkey?**

\_\_\_\_\_ number of years

**b) How long have you been working in your current country of residence?**

\_\_\_\_\_ number of years

**c) How long have you been working at your current workplace/institution?**

\_\_\_\_\_ number of years

**13. How many different organizations have you worked full time for so far?**

in Turkey: \_\_\_\_\_

abroad: \_\_\_\_\_

**14. What sector is the firm / organization you are currently working for in?**

*Please mark the appropriate box with an X.*

- ☐ private
- ☐ public
- ☐ other (e.g., non-profit organization or trust)

**15. What type of organization do you work for?**

*Please mark the appropriate box with an X.*

- ☐ Multinational firm (headquarters in Turkey)
- ☐ Multinational firm (headquarters in current country)
- ☐ Multinational firm (headquarters in third country)
- ☐ Other incorporated firm

- ☐ Non-incorporated firm or business
- ☐ Pre-school, primary or middle school (junior high school)
- ☐ High school (secondary school)
- ☐ 2-3 year arts college or technical institute
- ☐ University
- ☐ Research center at a university
- ☐ Hospital / medical center
- ☐ International Organization (IMF, ILO, World Bank, etc.)
- ☐ Armed forces
- ☐ Government department, organization
- ☐ Local government
- ☐ Non-governmental organization
- ☐ other, please specify: \_\_\_\_\_

**16.a) When was the firm or organization you are working for established?**  
*Please mark the appropriate box with an X.*

- ☐ within the past year (Jan. 1 2001 – Dec. 31, 2001)
- ☐ within the last 2 years
- ☐ within the last 5 years
- ☐ within the last 10 years
- ☐ 10-15 years ago
- ☐ 15-30 years ago
- ☐ 30-50 years ago
- ☐ more than 50 years ago
- ☐ don't know

**b) Approximately how many people currently work full time in your organization (at all levels)?** *Please mark the appropriate box with an X.*

- ☐ less than 5
- ☐ 5-11
- ☐ 11-25
- ☐ 26-50
- ☐ 51-100
- ☐ 101-200
- ☐ 201-500
- ☐ 501-1000
- ☐ more than 1000
- ☐ don't know

**17. In which country were you residing when you found (or established) your current job abroad?** *Please mark the appropriate box with an X.*

- ☐ in my current country of residence
- ☐ in Turkey
- ☐ in a third country, please specify: \_\_\_\_\_

**18. a) Through which channel(s) did you find your current job?**  
*Please mark all that apply.*

- ☐ Direct contacts initiated with firm / organization  
(e.g., sending unsolicited CV)
- ☐ Professional recruiters (e.g., "headhunters")
- ☐ 'Career Days' held at Turkish universities
- ☐ Informal channels (e.g., friends, colleagues)
- ☐ Ads in professional journals



- ☐ Turkish internet network (e.g., alumni networks)
- ☐ Newspaper ads
- ☐ Placement office at university
- ☐ Faculty or advisors
- ☐ other, please specify: \_\_\_\_\_

**b) How did you find your first full time job abroad?**

*Please mark **all** that apply.*

- ☐ Direct contacts initiated with firm / organization (e.g., sending unsolicited CV)
- ☐ Professional recruiters (e.g., "headhunters")
- ☐ 'Career Days' held at Turkish universities
- ☐ Informal channels (e.g., friends, colleagues)
- ☐ Ads in professional journals
- ☐ Turkish internet network (e.g., alumni networks)
- ☐ Newspaper ads
- ☐ Placement office at university
- ☐ Faculty or advisors
- ☐ other, please specify: \_\_\_\_\_

**19. During the past year what percentage of your time on your current job went to each of the following activities listed below? Please indicate the percentage in the squared brackets. e.g., teaching [50] %, basic research [40] %, administrative [10] %, others [0] %.**

- |                                                                                                           |       |
|-----------------------------------------------------------------------------------------------------------|-------|
| a) Teaching                                                                                               | [ ] % |
| b) Applied research activities<br>(research for the purpose of gaining knowledge to meet a specific need) | [ ] % |
| c) Basic research activities<br>(research for the purpose of gaining knowledge for its own sake)          | [ ] % |
| d) Development<br>(transforming knowledge from research into production)                                  | [ ] % |
| e) Computer use, programming, system development                                                          | [ ] % |
| f) Administrative activities, supervision                                                                 | [ ] % |
| g) Professional services<br>(medical practice, legal practice, financial consultancy)                     | [ ] % |
| h) Quality control, production management                                                                 | [ ] % |
| i) Accounting, contracts                                                                                  | [ ] % |
| j) Marketing, consumer services, public relations                                                         | [ ] % |
| k) Other, please specify below:                                                                           | [ ] % |
- 

**20. a) Have you received any formal job skills training in your current organization?**

*(e.g., classroom, seminar, lecture or workshop training in management, professional and technical skills, computer, clerical, sales, customer relations, service-related or production-related) Please mark the appropriate box with an X.*

- ☐ yes
- ☐ no

*If you have not received any formal training, please go to question 21.*

**b) In general, would you say that the skills you acquired from formal training in your current job are:**

- ☐ Specific to your current organization (cannot be easily transferred to other organizations)
- ☐ Specific to the industry of your organization (can be easily transferred between organizations in the same industry but not between industries)
- ☐ Generally transferable to other organizations in other industries

**c) For what reasons did you receive formal training at your current organization?**

*Please mark all that apply.*

- ☐ To gain new knowledge or skills related to my profession that would improve my job performance
- ☐ Training was compulsory, mandatory
- ☐ Training was required for future advancement
- ☐ To stay up-to-date with new regulations, laws, technologies, etc.
- ☐ To receive promotion at the end of training
- ☐ To receive certification / licence upon completion
- ☐ To receive higher pay or bonus upon completion
- ☐ other, please specify: \_\_\_\_\_

**21. a) Have you received any informal on-the-job training in your current organization? (e.g., learning from senior colleagues during medical internship, any other learning on the job.)**

- ☐ yes
- ☐ no

*If you have not received any formal training, please go to **question 22**.*

**b) In general, would you say that the informal training you received in your current organization is:**

- ☐ Specific to your current organization (cannot be easily transferred to other organizations)
- ☐ Specific to the industry of your organization (can be easily transferred between organizations in the same industry but not between industries)
- ☐ Generally transferable to other organizations in other industries

**22. a) How many hours did you typically spend on your current job each week during the past year (2001)?**

\_\_\_\_\_ HOURS PER WEEK

**b) How many weeks did you spend on your current job during the past year (2001)?**

\_\_\_\_\_ WEEKS PER YEAR

23. What was your 2001 gross annual wage or salary income in U.S.\$ from your current job?

- ☐ under \$ 20,000
- ☐ \$ 20,000 - \$ 49,999
- ☐ \$ 50,000 - \$ 74,999
- ☐ \$ 75,000 - \$ 99,999
- ☐ \$ 100,000 - \$ 149,999
- ☐ over \$ 150,000
- ☐ rather not answer

If you received your salary or earnings in a different currency, indicate the currency type and your gross annual income in local units below.

CURRENCY TYPE (CAN\$, DM, £, ¥, etc.) : \_\_\_\_\_

ANNUAL GROSS INCOME : \_\_\_\_\_

### QUESTIONS RELATING TO THE DECISIONS TO LEAVE, STAY AND RETURN

24. a) What were your main reasons for going to the country you are currently staying? Please mark all that apply.

- ☐ A. To learn a new language / improve language skills
- ☐ B. In need of change / want to experience a new culture
- ☐ C. Education or experience in another country is required by employers in Turkey
- ☐ D. Could not find a job in Turkey
- ☐ E. No program in my specialization in Turkey
- ☐ F. Insufficient facilities, lack of necessary equipment to carry out research in Turkey
- ☐ G. In order to take advantage of the prestige and advantages associated with study abroad
- ☐ H. Preference for the lifestyle in my current country of residence.
- ☐ I. To be with spouse or loved one
- ☐ J. To provide a better environment for children
- ☐ K. To get away from the political environment in Turkey
- ☐ L. other, please specify: \_\_\_\_\_

b) Which of the above was the most important reason?

\_\_\_\_\_

25. a) In general, how supportive was your family (e.g. father, mother, spouse) in your decision to go abroad to work or study?

Please mark the appropriate box with an X.

- ☐ very supportive
- ☐ somewhat supportive
- ☐ not very supportive
- ☐ not at all supportive
- ☐ not applicable

**b) Do you think your family in Turkey would support (or supports) your decision to settle permanently outside Turkey?**

*Please mark the appropriate box with an X.*

- ☐ They would definitely support me.
- ☐ They would most likely support me.
- ☐ Some family members would support me, others would not.
- ☐ They are not likely to be very supportive.
- ☐ They would actively discourage me.
- ☐ I am not sure.
- ☐ not applicable

**26. Before you left Turkey, what were your thoughts about returning?**

*Please mark the appropriate box with an X.*

- ☐ I thought that I would definitely return.
- ☐ I was undecided about returning; I would wait and see.
- ☐ I did not think that I would return.

**27. a) What are your thoughts about returning to Turkey now?**

*Please mark the appropriate box with an X.*

- ☐ I will definitely return and have made plans to do so.
- ☐ I will definitely return but have not made concrete plans to do so.
- ☐ I will probably return.
- ☐ I don't think that I will be returning.
- ☐ I will definitely not return.

*If you marked one of the last two options ('not return') please question 30.*

**28. When do you think you will be returning to Turkey?**

*Please mark the appropriate box with an X.*

- ☐ within 6 months
- ☐ 6 to 12 months
- ☐ 1 to 2 years
- ☐ 2 to 5 years
- ☐ 5 to 10 years
- ☐ more than 10 years
- ☐ not applicable

**29. a) What are your main reasons for returning to Turkey?**

*Please mark all that apply.*

- ☐ to complete compulsory military service
- ☐ to complete university service (e.g., YÖK, TÜBA scholarship recipients)
- ☐ I will return when my permitted time for working abroad ends (e.g. I am a visiting scholar)
- ☐ I miss my family in Turkey
- ☐ I want my children to continue their education in Turkey
- ☐ after achieving specific goals (gaining work experience, completing research project) I want to apply what I have learned in Turkey
- ☐ I will return after reaching my savings goal
- ☐ I will return after reaching my career goal
- ☐ I received a job offer from a firm or institution in Turkey

- ☐ I want to spend my retirement in Turkey.
- ☐ I don't feel safe in my current environment
- ☐ other, please specify: \_\_\_\_\_

**b) After you return, do you plan to go abroad again?**

*Please mark the appropriate box with an X.*

- ☐ No
- ☐ Yes, for a few days to several weeks at most
- ☐ Yes, for 1-3 months at most
- ☐ Yes, for 4-6 months at most
- ☐ Yes, for 7-12 months at most
- ☐ Yes, for 1-2 years at most
- ☐ Yes, could be longer than 2 years but I believe I will definitely return to Turkey.
- ☐ Yes, to settle down permanently
- ☐ not applicable

**30. In general, how does your life in your current country of residence compare with your life in Turkey?**

**a) work environment (e.g. your job satisfaction):**

- ☐ much better
- ☐ better
- ☐ neither better or worse
- ☐ worse
- ☐ much worse
- ☐ don't know

**b) social aspects (e.g. friendships, social relations):**

- ☐ much better
- ☐ better
- ☐ neither better or worse
- ☐ worse
- ☐ much worse
- ☐ don't know

**c) standard of living:**

- ☐ much better
- ☐ better
- ☐ neither better or worse
- ☐ worse
- ☐ much worse
- ☐ don't know

**31. a) What are the main difficulties that you have faced / are facing living in your current country of residence? Please mark all that apply.**

- ☐ A. Being away from family
- ☐ B. Children growing up in a different culture
- ☐ C. Loneliness, not being able to adjust
- ☐ D. Fast-paced life
- ☐ E. Little or no leisure time

- ☐ F. Unemployment
- ☐ G. No jobs in my area of specialty
- ☐ H. Discrimination against foreigners
- ☐ I. Lower income compared to the income I had in Turkey
- ☐ J. Higher taxes
- ☐ K. Crime, lack of personal security
- ☐ L. High cost of living
- ☐ M. Other, please specify: \_\_\_\_\_

b) Which of the above factors do you consider to be the most difficult for you? \_\_\_\_\_

32. a) Which of the following factors were important in helping you adjust to life abroad? Please mark all that apply.

- ☐ A. having previous experience abroad
- ☐ B. the passage of time
- ☐ C. support from the Turkish Student Association (TSA) at my institution
- ☐ D. having spouse or other loved one with me
- ☐ E. having cultural attaché / embassy support
- ☐ F. having Turkish friends/colleagues at my university/college/research center
- ☐ G. existence of a large Turkish community in my city
- ☐ H. being able to share experiences, ask for advise via Turkish internet network
- ☐ I. other, please specify: \_\_\_\_\_

b) Which has been the most important factor in helping you adjust?

\_\_\_\_\_



**33. What are the greatest difficulties RELATING TO TURKEY that may cause you NOT to return? Please indicate how important for you the following factors are in this decision.**

*Please answer even if you have indicated that you will definitely return.*

| REASON                                                                               | Very<br>Important<br>5 | Important<br>4 | Somewhat<br>Important<br>3 | Not<br>Important<br>2 | Not at all<br>Important<br>1 |
|--------------------------------------------------------------------------------------|------------------------|----------------|----------------------------|-----------------------|------------------------------|
| A. Low income in my occupation                                                       | —                      | —              | —                          | —                     | —                            |
| B. Little opportunity for advancement<br>in my occupation                            | —                      | —              | —                          | —                     | —                            |
| C. Limited job opportunities in my field of<br>expertise                             | —                      | —              | —                          | —                     | —                            |
| D. No opportunity for <u>advanced</u><br>training in my field                        | —                      | —              | —                          | —                     | —                            |
| E. Being far from important research<br>centers and as a result from new<br>advances | —                      | —              | —                          | —                     | —                            |
| F. Lack of financial resources and<br>opportunities to start up my business          | —                      | —              | —                          | —                     | —                            |
| G. Less than satisfying social and<br>cultural life                                  | —                      | —              | —                          | —                     | —                            |
| H. Bureaucracy, inefficiencies in<br>organizations                                   | —                      | —              | —                          | —                     | —                            |
| I. Political pressures, discord                                                      | —                      | —              | —                          | —                     | —                            |
| J. Lack of social security                                                           | —                      | —              | —                          | —                     | —                            |
| K. Economic instability, uncertainty                                                 | —                      | —              | —                          | —                     | —                            |
| L. Other reason, please indicate below:<br>_____                                     | —                      | —              | —                          | —                     | —                            |

**34. Please indicate the relative importance FOR YOU of each of the following factors relating to your CURRENT COUNTRY OF RESIDENCE in deciding not to return or postpone returning to Turkey.**

*Please answer even if you have indicated that you will definitely return.*

| REASON                                                                                          | Very<br>Important<br>5 | Important<br>4 | Somewhat<br>Important<br>3 | Not<br>Important<br>2 | Not at all<br>Important<br>1 |
|-------------------------------------------------------------------------------------------------|------------------------|----------------|----------------------------|-----------------------|------------------------------|
| A. Higher salary or wage                                                                        | —                      | —              | —                          | —                     | —                            |
| B. Greater opportunity to advance<br>in profession                                              | —                      | —              | —                          | —                     | —                            |
| C. Better work environment<br>(flexible work hours, relaxed setting, etc.)                      | —                      | —              | —                          | —                     | —                            |
| D. Greater job availability in my area<br>of specialization                                     | —                      | —              | —                          | —                     | —                            |
| E. Greater opportunity for further<br>development in area of specialty                          | —                      | —              | —                          | —                     | —                            |
| F. A more organized and ordered life<br>in general                                              | —                      | —              | —                          | —                     | —                            |
| G. More satisfying social and cultural life                                                     | —                      | —              | —                          | —                     | —                            |
| H. Proximity to important research<br>and innovation centers                                    | —                      | —              | —                          | —                     | —                            |
| I. Spouse's preference to stay or<br>spouse's job being in current country                      | —                      | —              | —                          | —                     | —                            |
| J. Better educational opportunities for children /<br>want children to continue their education | —                      | —              | —                          | —                     | —                            |
| K. Need to finish or continue with current project                                              | —                      | —              | —                          | —                     | —                            |
| L. Other reason, please specify below:                                                          | —                      | —              | —                          | —                     | —                            |

---

**INTERACTIONS WITH TURKISH AND NON-TURKISH COLLEAGUES  
AND MEMBERSHIPS IN ORGANIZATIONS RELATING TO PROFESSION**

**35. a) Are you a member of any professional, cultural or alumni associations / societies?**

- ☐ Yes  
☐ No

*If you are not a member of any associations or societies, please go to question 36.*

**b) If so, how many associations are you a member of?**

- i. Turkish associations located in Turkey \_\_\_\_\_  
(e.g., Genç Yönetici ve İşadamları Derneği in İstanbul)
- ii. Turkish associations located in your current country of residence \_\_\_\_\_  
(e.g., Turkish Canadian Business Council or ITU Alumni Assoc.- Canada if you are living in Canada):
- iii. National or local associations in your current country of residence \_\_\_\_\_  
(e.g., Manitoba Association of Architects, American Dental Association):
- iv. International or regional associations \_\_\_\_\_  
(e.g., International Association of Agricultural Economists, European Association of Archeologists)

**c) In the past year (January 1, 2001 - Dec. 31, 2001) did you attend or participate in any of the activities (meeting, conference, fundraiser, dinner, etc.) organized by these associations?**

- i. Turkish associations in Turkey: \_\_\_\_\_
- ii. Turkish associations in current country: \_\_\_\_\_
- iii. National / local associations in current country: \_\_\_\_\_
- iv. International or regional associations: \_\_\_\_\_

**36. a) Do you have any patented inventions?**

- ☐ Yes  
☐ No

*If you do not have any patented inventions, please go to question 37.*

**b) If so, how many patented inventions do you have? \_\_\_\_\_**

**For how many of these inventions are the patents owned:**

- i. by you? \_\_\_\_\_
- ii. by firms or universities in your current country of residence? \_\_\_\_\_
- iii. by firms or universities in Turkey? \_\_\_\_\_
- iv. by firms or universities in another country? \_\_\_\_\_

c) How many patented inventions do you have where you are the sole inventor? \_\_\_\_\_

Of these, how many are the product of research or experiments you have undertaken mostly:

- i. in Turkey? \_\_\_\_\_
- ii. in your current country of residence? \_\_\_\_\_
- iii. in another country? \_\_\_\_\_

d) For how many of your patented inventions were you part of a team of inventors that included colleagues of Turkish origin? \_\_\_\_\_

Of these, how many are the product of research or experiments you have undertaken mostly:

- i. in Turkey? \_\_\_\_\_
- ii. in your current country of residence? \_\_\_\_\_
- iii. in another country? \_\_\_\_\_

37. a) How many of your studies have been published (in journals, books, reports, etc.) within the past two years (Jan. 1, 2000 - Dec. 31, 2001)?

- i. total: \_\_\_\_\_
- ii. with you as the sole author: \_\_\_\_\_
- iii. written with Turkish colleagues: \_\_\_\_\_
- iv. written with non-Turkish origin colleagues: \_\_\_\_\_

How many of these were published in Turkish journals or by Turkish publishers? \_\_\_\_\_

b) How many ongoing projects or studies are you currently involved in?

- i. total: \_\_\_\_\_
- ii. by yourself: \_\_\_\_\_
- iii. with Turkish colleagues residing in Turkey: \_\_\_\_\_
- iv. with Turkish colleagues residing in current country: \_\_\_\_\_
- v. with Turkish colleagues residing in other countries: \_\_\_\_\_
- vi. with non-Turkish origin colleagues: \_\_\_\_\_

c) What percent (%) of your studies do you believe contributes to:  
*Please indicate the percentage in the squared brackets.*

- i. the knowledge stock of Turkey: [ ] %
- ii. the knowledge stock of your current country of residence: [ ] %
- iii. the universal stock of knowledge: [ ] %

You can write down your thoughts about this question below:

\_\_\_\_\_

**38. What type of positive contribution(s) do you think your stay abroad is making or has made to Turkey? Please mark all that apply.**

- ☐ Helped Turkish students find scholarships abroad
- ☐ Participated in lobbying activities on behalf of Turkey
- ☐ Helped increase business contacts with Turkey
- ☐ Helped increase knowledge about Turkey in general
- ☐ Made donations to Turkish organizations
- ☐ Helped increase professional contacts between colleagues in my current country and colleagues in Turkey
- ☐ Helped transfer knowledge gained in my current country of residence to colleagues in Turkey (e.g., by presenting papers in conferences or teaching in Turkey)
- ☐ other, please specify: \_\_\_\_\_

### OTHER INFORMATION

**39. Please indicate your marital status:**

- ☐ married, spouse with me
- ☐ married, spouse away
- ☐ never married
- ☐ divorced / widowed / separated

*If you marked either 'never married' or 'divorced / widowed / separated', please go to question 41.*

**40. Please indicate your spouse's:**

**a) Age:** \_\_\_\_\_

**b) Nationality:**

- ☐ Turkish
- ☐ other
- ☐ dual citizen (Turkish and other)

**c) Education level:**

- ☐ less than primary
- ☐ primary school
- ☐ middle school
- ☐ high school
- ☐ bachelor's or equivalent
- ☐ master's or equivalent
- ☐ doctorate

**d) Occupation:** \_\_\_\_\_

**e) Employment status:**

- ☐ not employed
- ☐ employed full time
- ☐ employed part time

**41. Indicate the number of children living with you as part of your family in the following age categories.**

under 2 years \_\_\_\_\_  
between 2-5 years \_\_\_\_\_  
between 6-11 years \_\_\_\_\_  
between 12-17 years \_\_\_\_\_  
18 and over \_\_\_\_\_

**42. Please indicate your**

**a) mother's education level:**

- ☐ less than primary
- ☐ primary school
- ☐ middle school
- ☐ high school
- ☐ bachelor's or equivalent
- ☐ master's or equivalent
- ☐ doctorate
- ☐ don't know

**b) mother's occupation: \_\_\_\_\_**

**c) father's education level:**

- ☐ less than primary
- ☐ primary school
- ☐ middle school
- ☐ high school
- ☐ bachelor's or equivalent
- ☐ master's or equivalent
- ☐ doctorate
- ☐ don't know

**d) father's occupation: \_\_\_\_\_**

**43. a) How many of your *family*\*\* are living in Turkey? \_\_\_\_\_**

*\*\*e.g., mother, father, sibling, spouse, children, or any other family member who is close to you.*

**b) How many of your *relatives* are living abroad? \_\_\_\_\_**

**c) How many of your *relatives* are living in your current country of residence? \_\_\_\_\_**

**44. a) How do you maintain contact with family members in Turkey?**

*Please mark all that apply.*

- ☐ telephone calls
- ☐ regular mail
- ☐ email
- ☐ visits to Turkey
- ☐ visits by family
- ☐ other, please specify: \_\_\_\_\_



b) Which has been your most frequent means of contact? \_\_\_\_\_

c) Has your contact with family members in Turkey increased, decreased or remained the same over time?

- ☐ increased
- ☐ decreased
- ☐ stayed the same
- ☐ not applicable

Reason: \_\_\_\_\_

45. a) Do you currently subscribe to any Turkish publications?

- ☐ yes
- ☐ no

*If you do not currently subscribe to any publications in Turkey, go to question 45c.*

b) How many Turkish publications do you currently subscribe to?

- i) newspapers \_\_\_\_\_
- ii) journals related to your studies \_\_\_\_\_
- ii) other \_\_\_\_\_, please specify: \_\_\_\_\_

c) How frequently do you keep in touch with news from Turkey?

- ☐ daily
- ☐ weekly
- ☐ monthly
- ☐ once or twice per year
- ☐ infrequently
- ☐ not at all

d) How do you keep current with the news from Turkey?

*Please mark all that apply.*

- ☐ looking at Turkish internet sites
- ☐ through visits from family / friends in Turkey
- ☐ phone conversations with relatives in Turkey
- ☐ email messages from family/friends in Turkey
- ☐ through Turkish embassy or cultural attaché
- ☐ other, please specify: \_\_\_\_\_

46. a) Indicate the number of visits you have made to Turkey where the main reason for your visit was the following:

*If you have not made any trips to Turkey during your current stay abroad please go on to question 47.*

- A. vacation / family visits: \_\_\_\_\_
- B. participate in conferences or seminars: \_\_\_\_\_
- C. take part in research activities: \_\_\_\_\_
- D. take part in business activities: \_\_\_\_\_
- E. other: \_\_\_\_\_

Describe other here: \_\_\_\_\_

**b) When was your last visit to Turkey?** month: \_\_\_\_\_ year: \_\_\_\_\_

**c) How did your last trip to Turkey affect your views about returning to Turkey?**

- ☐ increased my likelihood of returning
- ☐ decreased my likelihood of returning
- ☐ did not change my views
- ☐ not applicable

**Reason:** \_\_\_\_\_

**47. Have the events of September 11, 2001 - the terrorist attacks in the US – and the aftermath affected your views about returning to Turkey?**

- ☐ increased my likelihood of returning
- ☐ decreased my likelihood of returning
- ☐ did not change my views

**48. How did you find the length of this survey?**

- ☐ too long
- ☐ too short
- ☐ just right

**49. Please write down any comments or questions about any part of this survey in the text box below. We would greatly appreciate receiving your input.**

---

---

---

---

---

**Thank you for taking part in our survey!**

Prof. Dr. Aysit Tansel  
Research Assistant Nil Demet Güngör

Middle East Technical University  
FEAS Department of Economics

survey@metu.edu.tr

## C.4 English Mail-out Version of Turkish Students Abroad Survey

---

### Turkish Brain Drain Student Survey

1) Please write your name and e-mail address in the boxes provided below. This information is for our record-keeping only; it will not be used in our study, and it will not be disclosed in any way to other parties. The information you provide will be used for research or statistical purposes only.

2) Please read and answer carefully. The survey will take approximately 15-20 minutes. Since not all of the questions will apply, you will be able skip those that are not relevant to you.

3) Please place an X within the square bracket of the appropriate selection for multiple choice questions.

Thank you again for taking the time to participate in our study.

YOUR NAME: \_\_\_\_\_

YOUR E-MAIL ADDRESS: \_\_\_\_\_

### GENERAL INFORMATION

#### 1. Personal Information: Please indicate your

a) Gender:

Please mark the appropriate box with an X.

- ☐ Male  
☐ Female

b) Birthyear: \_\_\_\_\_

c) Birthplace:

city: \_\_\_\_\_  
country: \_\_\_\_\_

#### 2. a) What is your current *country* of residence?

Please mark the appropriate box with an X.

- ☐ Australia  
☐ Canada  
☐ England

- ☐ New Zealand  
☐ USA  
☐ other, please indicate: \_\_\_\_\_

**b) Please indicate your current *city* and (if applicable) *state* or *province* of residence:**

city: \_\_\_\_\_

state / province: \_\_\_\_\_

**3. How long have you been staying in your current COUNTRY of residence?**

\_\_\_\_\_ number of years

### EDUCATIONAL INFORMATION

**4. a) What is the highest degree you hold?**

- ☐ high school certificate  
☐ associates degree (e.g. 2 year program)  
☐ bachelor's (BA / BS)  
☐ post baccalaureate certificate  
☐ master's degree (MA / MS / MBA)  
☐ post master's certificate  
☐ doctorate (e.g., Ph.D., Ed.D., D.Sc.)

**b) In which country did you receive your highest degree?**

- ☐ Australia  
☐ Canada  
☐ England  
☐ New Zealand  
☐ United States  
☐ Turkey  
☐ other, please specify: \_\_\_\_\_

**c) What is the highest degree that you plan to receive?**

- ☐ high school certificate  
☐ associates degree (e.g. 2 year program)  
☐ bachelor's (BA / BS)  
☐ post baccalaureate certificate  
☐ master's degree (MA / MS / MBA)  
☐ post master's certificate  
☐ doctorate (e.g., Ph.D., Ed.D., D.Sc.)

**5. a) Which high school (lycée) did you graduate from?**

*Please indicate the name of the high school and its location.*

NAME: \_\_\_\_\_

LOCATION: \_\_\_\_\_

(e.g. Ankara)

**b) What was the *language of instruction* of the**

**i. science courses at your high school (lycée)?**

*Please mark the appropriate box with an X.*

- ☐ Turkish
- ☐ English
- ☐ German
- ☐ French
- ☐ other, please specify: \_\_\_\_\_

**ii. social courses (e.g., history, geography, philosophy) at your high school (lycée)? *Please mark the appropriate box with an X.***

- ☐ Turkish
- ☐ English
- ☐ German
- ☐ French
- ☐ other, please specify: \_\_\_\_\_

**6. If the highest degree you hold is a 'high school certificate', please go on to question 7.**

**a) From which university did you receive your undergraduate (bachelor's or associate's) degree?**

\_\_\_\_\_

**b) What was your major?**

\_\_\_\_\_

**c) What year did you graduate?**

\_\_\_\_\_

**d) In how many years did you complete your undergraduate studies?**

\_\_\_\_\_

**e) What was your CGPA (cumulative grade point average) at the end of your undergraduate studies?**

*Please indicate the scale as well: e.g., 3.2/4.0 or 6.1/10*

\_\_\_\_\_

**7. What type of program are you currently enrolled in abroad?**

- ☐ student exchange program
- ☐ visiting student / scholar program (e.g., you are a TÜBA or TÜBİTAK scholarship recipient enrolled in a Turkish university and completing part of your program requirements abroad)
- ☐ intensive language program (as prerequisite for continuing with undergraduate or graduate studies abroad)
- ☐ associate's degree program
- ☐ bachelor's degree program
- ☐ post baccalaureate certificate program
- ☐ master's degree program
- ☐ post master's certificate program
- ☐ doctoral degree program, course work not yet completed
- ☐ doctoral degree program, course work completed
- ☐ postdoctoral fellow
- ☐ other, please specify: \_\_\_\_\_

**8. If you are an exchange student or a visiting student / scholar, please answer the following questions. Others please go on to question 9.**

**a) From which university will you be receiving your degree?**

\_\_\_\_\_

**b) What degree will you be receiving from this university?**

- ☐ bachelor's degree
- ☐ master's degree
- ☐ doctorate degree
- ☐ other, please specify: \_\_\_\_\_

**c) What type of activities are you involved in at the university or research center you are currently visiting? Please check all that apply.**

- ☐ lab work / experiments
- ☐ participating in seminars
- ☐ attending courses
- ☐ giving lectures
- ☐ independent research activities
- ☐ other, please specify: \_\_\_\_\_

**d) Do you plan to get a separate degree or certificate from the university / research center you are visiting?**

- ☐ yes
- ☐ no

**e) If so, which degree or certificate do you plan to receive?**

- ☐ bachelor's degree
- ☐ master's degree
- ☐ doctorate degree
- ☐ other, please specify: \_\_\_\_\_
- ☐ not applicable

**9. a) What is the name of the institution (university / research center ) you are currently attending abroad? (or will be attending after you complete your language program)**

\_\_\_\_\_

**b) What was your field of study?**

*Please be specific and indicate any areas of specialization as well.*

General field of study: \_\_\_\_\_

Specialization 1: \_\_\_\_\_

Specialization 2: \_\_\_\_\_

Specialization 3: \_\_\_\_\_



c) If you will be receiving a degree or certificate from this institution, please answer the following questions. If you will not be receiving any degree from this institution, please go on to question 10.

i) When did you start the program? Please include any compulsory language training that formed part of the degree requirement.

MONTH \_\_\_\_\_ YEAR \_\_\_\_\_

ii) When do you expect to receive your degree?

MONTH \_\_\_\_\_ YEAR \_\_\_\_\_

iii) Were you required to take part in an intensive language training program prior to being accepted into the degree program?

- ☐ Yes
- ☐ No
- ☐ I am currently enrolled in a language program.
- ☐ not applicable

10.a) Which of the following factors played a significant part in your decision to choose your current university or research center for studying abroad. Please check all that apply.

- ☐ A. provided the most relevant program for my field of specialization
- ☐ B. provided the best scholarship or financial support
- ☐ C. having Turkish contacts at the institution
- ☐ D. recommended by advisor or other professors
- ☐ E. greater job opportunities
- ☐ F. being with or near spouse
- ☐ G. able to get acceptance
- ☐ H. other, please specify: \_\_\_\_\_

b) Which was the most important factor? \_\_\_\_\_

11. Which source(s) of financial support do you or (did you) have available to you for your current studies abroad?

Please check all that apply. (To uncheck click on the box again.)

- ☐ savings or support from family
- ☐ part-time job (university)
- ☐ part-time job (private sector)
- ☐ part-time job (public sector)
- ☐ teaching or research assistant salary
- ☐ YÖK (Yüksek Öğretim Kurumu) scholarship
- ☐ MEB (Milli Eğitim Bakanlığı) scholarship
- ☐ TÜBA or TÜBİTAK scholarship

- ☐ other national scholarship or support (including private sector)
- ☐ financial support from current university
- ☐ Fulbright scholarship
- ☐ international scholarship or support
- ☐ other, please specify: \_\_\_\_\_

**12. a) Do you intend to go on to the next level of studies immediately after receiving your degree or certificate? i.e., continue with the master's program after receiving your bachelor's degree, or go on to do a postdoc after receiving your Ph.D., etc.**

- ☐ Yes
- ☐ No
- ☐ I am not sure
- ☐ not applicable

**b) If yes, in which city / country are you most likely to continue your studies?**

CITY: \_\_\_\_\_ COUNTRY: \_\_\_\_\_

**13. The following questions are about your living arrangements abroad.**

**a) Which of the following best describes your living accommodations abroad?**

- ☐ dormitory
- ☐ house
- ☐ room in a house
- ☐ apartment
- ☐ room in an apartment
- ☐ other, please specify: \_\_\_\_\_

**b) Are you living on or off campus?**

- ☐ on campus
- ☐ off campus

**14. a) Which of the following factors were important in helping you adjust to life abroad? Please check all that apply.**

- ☐ A. having previous experience abroad
- ☐ B. the passage of time
- ☐ C. support from the Turkish Student Association (TSA) at my institution
- ☐ D. having spouse or other loved one with me
- ☐ E. having cultural attaché/embassy support
- ☐ F. having Turkish friends/colleagues at my university/college/research center
- ☐ G. existence of a large Turkish community in my city
- ☐ H. being able to share experiences, ask for advice via Turkish internet network
- ☐ I. other, please specify: \_\_\_\_\_

b) Which has been the most important factor in helping you adjust?

\_\_\_\_\_

c) Are you a member of the Turkish Students Association (TSA) at your institution?

- ☐ yes  
☐ no  
☐ There is no TSA at my institution

Why or why not? \_\_\_\_\_

15. a) Did you have any study, work, travel or other experience outside Turkey prior to coming to your current country of residence?

- ☐ yes  
☐ no

*If you have no prior experience abroad then go on to question 16.*

b) What kind of previous experience did you have abroad?  
Please select all that apply.

- ☐ study  
☐ work  
☐ travel  
☐ other, please specify: \_\_\_\_\_

c) What is the longest period you have spent outside Turkey not counting your current stay? \_\_\_\_\_

## JOB SEARCH / WORK RELATED INFORMATION

16. In which country do you think you will be working immediately after completing your studies?

- ☐ Turkey  
☐ USA  
☐ another country, please specify: \_\_\_\_\_  
☐ I do not plan to work

*If you do not plan to work, please go to question 20.*

**17. What type of organization will you most likely be working for?**

**a) SOON after completing your studies:**

- ☐ University (private)
- ☐ University (public)
- ☐ College / technical institute (private)
- ☐ College / technical institute (public)
- ☐ Pre, primary, secondary school (private)
- ☐ Pre, primary, secondary school (public)
- ☐ Government department
- ☐ Government owned corporation
- ☐ Multinational corporation
- ☐ Other private sector organization
- ☐ Self-employed in incorp. business, practice, farm
- ☐ Self-employed in nonincorp. business, practice, farm
- ☐ International organization
- ☐ Non-profit organization
- ☐ Armed forces
- ☐ not sure

**b) 5 YEARS AFTER completing your studies:**

[Same choices as above]

**18. What type of activities will you most likely be doing at work?**

**a) SOON after completing your studies:**

- ☐ Teaching
- ☐ Applied research (gaining knowledge to meet a specific need)
- ☐ Basic research (gaining knowledge for its own sake)
- ☐ Development (transforming knowledge from research into production)
- ☐ Computer use, programming, system development
- ☐ Administrative activities, supervision
- ☐ Professional services (medical, legal, financial, etc.)
- ☐ Performing arts, visual and related arts
- ☐ Quality control, production management
- ☐ Accounting, contracts
- ☐ Marketing, consumer services, public relations
- ☐ not sure

**b) 5 YEARS AFTER completing your graduate studies:**

[Same choices as above]

**19. a) During your current stay abroad did you apply to any firms / organizations for jobs in Turkey or other countries?**

- ☐ Yes
- ☐ No

*If you did not apply for any jobs, please go to question 19d.*

**b) In which countries are the firms and organizations that you applied to for jobs located? Please select all that apply.**

- ☐ Turkey
- ☐ Australia
- ☐ Canada
- ☐ England
- ☐ New Zealand
- ☐ United States
- ☐ other, please specify: \_\_\_\_\_

**c) What were your reasons for applying?**

- ☐ To find a full time job that is directly related to my career or education
- ☐ To find a full time job (which may not be related directly to my education) after I graduate
- ☐ To find a part time job to cover my education or other expenses (e.g., university bookstore, library, shop)
- ☐ To make extra money during the summer months
- ☐ To gain work experience in my field during the summer months
- ☐ other, please specify: \_\_\_\_\_

**d) During your current stay abroad did you receive any job offers from firms / organizations in Turkey or other countries?**

- ☐ Yes
- ☐ No

*If not, please go on to question 20.*

**e) Were these job offers directly related to your education /training abroad?**

**i) job offers from Turkey:**

- ☐ most are directly related
- ☐ most are somewhat related
- ☐ most are unrelated
- ☐ not applicable

**ii) job offers from other countries:**

- ☐ most are directly related
- ☐ most are somewhat related
- ☐ most are unrelated
- ☐ not applicable

**f) From which channels did you seek jobs or receive job offers?**

*Please select all that apply.*

- ☐ Direct contacts initiated with firm / organization (e.g., sending unsolicited CV)
- ☐ Professional recruiters (e.g., "headhunters")
- ☐ 'Career Days' held at Turkish universities

- ☐ Informal channels (e.g., friends, colleagues)
- ☐ Ads in professional journals
- ☐ Turkish internet network (e.g., alumni networks)
- ☐ Newspaper ads
- ☐ Placement office at university
- ☐ Faculty or advisors
- ☐ other, please specify: \_\_\_\_\_

## QUESTIONS RELATING TO THE DECISIONS TO LEAVE, STAY AND RETURN

**20. a) What were your main reasons for going to the country you are currently staying? Please mark all that apply.**

- ☐ A. To learn a new language / improve language skills
- ☐ B. In need of change / want to experience a new culture
- ☐ C. Education or experience in another country is required by employers in Turkey
- ☐ D. Could not find a job in Turkey
- ☐ E. No program in my specialization in Turkey
- ☐ F. Insufficient facilities, lack of necessary equipment to carry out research in Turkey
- ☐ G. In order to take advantage of the prestige and advantages associated with study abroad
- ☐ H. Preference for the lifestyle in my current country of residence.
- ☐ I. To be with spouse or loved one
- ☐ J. To provide a better environment for children
- ☐ K. To get away from the political environment in Turkey
- ☐ L. other, please specify: \_\_\_\_\_

**b) Which of the above was the most important reason?**

\_\_\_\_\_

**21. a) In general, how supportive was your family (e.g. father, mother, spouse) in your decision to go abroad to work or study?**  
*Please mark the appropriate box with an X.*

- ☐ very supportive
- ☐ somewhat supportive
- ☐ not very supportive
- ☐ not at all supportive
- ☐ not applicable

**b) Do you think your family in Turkey would support (or supports) your decision to settle permanently outside Turkey?**

*Please mark the appropriate box with an X.*

- ☐ They would definitely support me.
- ☐ They would most likely support me.
- ☐ Some family members would support me, others would not.
- ☐ They are not likely to be very supportive.
- ☐ They would actively discourage me.
- ☐ I am not sure.
- ☐ not applicable



**22. Before you left Turkey, what were your thoughts about returning?**

*Please mark the appropriate box with an X.*

- ☐ I thought that I would definitely return.
- ☐ I was undecided about returning; I would wait and see.
- ☐ I did not think that I would return.

**23. What are your thoughts about returning to Turkey now?**

*Please mark the appropriate box with an X.*

- ☐ I will return as soon as possible without completing my studies.
- ☐ I will return immediately after completing my studies.
- ☐ I will definitely return but not soon after completing my studies.
- ☐ I will probably return.
- ☐ I don't think that I will be returning.
- ☐ I will definitely not return.

*If you marked one of the last two options ('not return') please go to question 26.*

**24. When do you think you will be returning to Turkey?**

*Please mark the appropriate box with an X.*

- ☐ within 6 months
- ☐ 6 to 12 months
- ☐ 1 to 2 years
- ☐ 2 to 5 years
- ☐ 5 to 10 years
- ☐ more than 10 years
- ☐ not applicable

**25. a) What are your main reasons for returning to Turkey?**

*Please mark all that apply.*

- ☐ to complete compulsory military service
- ☐ to complete university service (e.g., YÖK, TÜBA scholarship recipients)
- ☐ I will return when my permitted time for working abroad ends (e.g. I am a visiting scholar)
- ☐ I miss my family in Turkey
- ☐ I want my children to continue their education in Turkey
- ☐ after achieving specific goals (gaining work experience, completing research project) I want to apply what I have learned in Turkey
- ☐ I will return after reaching my savings goal
- ☐ I will return after reaching my career goal
- ☐ I received a job offer from a firm or institution in Turkey
- ☐ I want to spend my retirement in Turkey.
- ☐ I don't feel safe in my current environment
- ☐ other, please specify: \_\_\_\_\_

**b) After you return, do you plan to go abroad again?**

*Please mark the appropriate box with an X.*

- ☐ No
- ☐ Yes, for a few days to several weeks at most
- ☐ Yes, for 1-3 months at most

- ☐ Yes, for 4-6 months at most
- ☐ Yes, for 7-12 months at most
- ☐ Yes, for 1-2 years at most
- ☐ Yes, could be longer than 2 years but I believe I will definitely return to Turkey.
- ☐ Yes, to settle down permanently
- ☐ not applicable

**26. In general, how does your life in your current country of residence compare with your life in Turkey?**

**a) work environment (e.g. your job satisfaction):**

- ☐ much better
- ☐ better
- ☐ neither better or worse
- ☐ worse
- ☐ much worse
- ☐ don't know

**b) social aspects (e.g. friendships, social relations):**

- ☐ much better
- ☐ better
- ☐ neither better or worse
- ☐ worse
- ☐ much worse
- ☐ don't know

**c) standard of living:**

- ☐ much better
- ☐ better
- ☐ neither better or worse
- ☐ worse
- ☐ much worse
- ☐ don't know

**27. a) What are the main difficulties that you have faced / are facing living in your current country of residence? Please mark all that apply.**

- ☐ A. Being away from family
- ☐ B. Children growing up in a different culture
- ☐ C. Loneliness, not being able to adjust
- ☐ D. Fast-paced life
- ☐ E. Little or no leisure time
- ☐ F. Unemployment
- ☐ G. No jobs in my area of specialty
- ☐ H. Discrimination against foreigners
- ☐ I. Lower income compared to the income I had in Turkey
- ☐ J. Higher taxes
- ☐ K. Crime, lack of personal security
- ☐ L. High cost of living
- ☐ M. Other, please specify: \_\_\_\_\_

**b) Which of the above factors do you consider to be the most difficult for you? \_\_\_\_\_**

**28. What are the greatest difficulties RELATING TO TURKEY that may cause you NOT to return? Please indicate how important for you the following factors are in this decision.**

*Please answer even if you have indicated that you will definitely return.*

| REASON                                                                         | Very<br>Important<br>5 | Important<br>4 | Somewhat<br>Important<br>3 | Not<br>Important<br>2 | Not at all<br>Important<br>1 |
|--------------------------------------------------------------------------------|------------------------|----------------|----------------------------|-----------------------|------------------------------|
| A. Low income in my occupation                                                 | —                      | —              | —                          | —                     | —                            |
| B. Little opportunity for advancement in my occupation                         | —                      | —              | —                          | —                     | —                            |
| C. Limited job opportunities in my field of expertise                          | —                      | —              | —                          | —                     | —                            |
| D. No opportunity for <u>advanced</u> training in my field                     | —                      | —              | —                          | —                     | —                            |
| E. Being far from important research centers and as a result from new advances | —                      | —              | —                          | —                     | —                            |
| F. Lack of financial resources and opportunities to start up my business       | —                      | —              | —                          | —                     | —                            |
| G. Less than satisfying social and cultural life                               | —                      | —              | —                          | —                     | —                            |
| H. Bureaucracy, inefficiencies in organizations                                | —                      | —              | —                          | —                     | —                            |
| I. Political pressures, discord                                                | —                      | —              | —                          | —                     | —                            |
| J. Lack of social security                                                     | —                      | —              | —                          | —                     | —                            |
| K. Economic instability, uncertainty                                           | —                      | —              | —                          | —                     | —                            |
| L. Other reason, please indicate below:<br>_____                               | —                      | —              | —                          | —                     | —                            |

**29. Please indicate the relative importance FOR YOU of each of the following factors relating to your CURRENT COUNTRY OF RESIDENCE in deciding not to return or postpone returning to Turkey.**

*Please answer even if you have indicated that you will definitely return.*

| REASON                                                                                          | Very<br>Important<br>5 | Important<br>4 | Somewhat<br>Important<br>3 | Not<br>Important<br>2 | Not at all<br>Important<br>1 |
|-------------------------------------------------------------------------------------------------|------------------------|----------------|----------------------------|-----------------------|------------------------------|
| A. Higher salary or wage                                                                        | —                      | —              | —                          | —                     | —                            |
| B. Greater opportunity to advance<br>in profession                                              | —                      | —              | —                          | —                     | —                            |
| C. Better work environment<br>(flexible work hours, relaxed setting, etc.)                      | —                      | —              | —                          | —                     | —                            |
| D. Greater job availability in my area<br>of specialization                                     | —                      | —              | —                          | —                     | —                            |
| E. Greater opportunity for further<br>development in area of specialty                          | —                      | —              | —                          | —                     | —                            |
| F. A more organized and ordered life<br>in general                                              | —                      | —              | —                          | —                     | —                            |
| G. More satisfying social and cultural life                                                     | —                      | —              | —                          | —                     | —                            |
| H. Proximity to important research<br>and innovation centers                                    | —                      | —              | —                          | —                     | —                            |
| I. Spouse's preference to stay or<br>spouse's job being in current country                      | —                      | —              | —                          | —                     | —                            |
| J. Better educational opportunities for children /<br>want children to continue their education | —                      | —              | —                          | —                     | —                            |
| K. Need to finish or continue with current project                                              | —                      | —              | —                          | —                     | —                            |
| L. Other reason, please specify below:                                                          | —                      | —              | —                          | —                     | —                            |
| _____                                                                                           |                        |                |                            |                       |                              |

## OTHER INFORMATION

### 30. Please indicate your marital status:

- ☐ married, spouse with me
- ☐ married, spouse away
- ☐ never married
- ☐ divorced / widowed / separated

*If you marked either 'never married' or 'divorced / widowed / separated', please go to question 32.*

### 31. Please indicate your spouse's:

a) Age: \_\_\_\_\_

b) Nationality:

- ☐ Turkish
- ☐ other
- ☐ dual citizen (Turkish and other)

c) Education level:

- ☐ less than primary
- ☐ primary school
- ☐ middle school
- ☐ high school
- ☐ bachelor's or equivalent
- ☐ master's or equivalent
- ☐ doctorate

d) Occupation: \_\_\_\_\_

e) Employment status:

- ☐ not employed
- ☐ employed full time
- ☐ employed part time

### 32. Indicate the number of children living with you as part of your family in the following age categories.

under 2 years \_\_\_\_\_  
between 2-5 years \_\_\_\_\_  
between 6-11 years \_\_\_\_\_  
between 12-17 years \_\_\_\_\_  
18 and over \_\_\_\_\_

### 33. Please indicate your

a) mother's education level:

- ☐ less than primary
- ☐ primary school
- ☐ middle school
- ☐ high school
- ☐ bachelor's or equivalent
- ☐ master's or equivalent

- ☐ ] doctorate
- ☐ ] don't know

b) **mother's** occupation: \_\_\_\_\_

c) **father's** education level:

- ☐ ] less than primary
- ☐ ] primary school
- ☐ ] middle school
- ☐ ] high school
- ☐ ] bachelor's or equivalent
- ☐ ] master's or equivalent
- ☐ ] doctorate
- ☐ ] don't know

d) **father's** occupation: \_\_\_\_\_

34. a) How many of your **family\*\*** are living in **Turkey**? \_\_\_\_\_

*\*\*e.g., mother, father, sibling, spouse, children, or any other family member who is close to you.*

b) How many of your **relatives** are living **abroad**? \_\_\_\_\_

c) How many of your **relatives** are living in your **current country of residence**? \_\_\_\_\_

35. a) How do you maintain contact with family members in Turkey?

*Please mark all that apply.*

- ☐ ] telephone calls
- ☐ ] regular mail
- ☐ ] email
- ☐ ] visits to Turkey
- ☐ ] visits by family
- ☐ ] other, please specify: \_\_\_\_\_

b) Which has been your most frequent means of contact? \_\_\_\_\_

c) Has your contact with family members in Turkey increased, decreased or remained the same over time?

- ☐ ] increased
- ☐ ] decreased
- ☐ ] stayed the same
- ☐ ] not applicable

Reason: \_\_\_\_\_

36. a) Do you currently subscribe to any Turkish publications?

- ☐ ] yes
- ☐ ] no

*If you do not currently subscribe to any publications in Turkey, go to question 45c.*



**b) How many Turkish publications do you currently subscribe to?**

- i) newspapers \_\_\_\_\_
- ii) journals related to your studies \_\_\_\_\_
- iii) other \_\_\_\_\_, please specify: \_\_\_\_\_

**c) How frequently do you keep in touch with news from Turkey?**

- ☐ daily
- ☐ weekly
- ☐ monthly
- ☐ once or twice per year
- ☐ infrequently
- ☐ not at all

**d) How do you keep current with the news from Turkey?**

*Please mark all that apply.*

- ☐ looking at Turkish internet sites
- ☐ through visits from family / friends in Turkey
- ☐ phone conversations with relatives in Turkey
- ☐ email messages from family/friends in Turkey
- ☐ through Turkish embassy or cultural attaché
- ☐ other, please specify below: \_\_\_\_\_

**37. a) Indicate the number of visits you have made to Turkey where the main reason for your visit was the following:**

*If you have not made any trips to Turkey during your current stay abroad please go on to **question 38**.*

- A. vacation / family visits: \_\_\_\_\_
- B. participate in conferences or seminars: \_\_\_\_\_
- C. take part in research activities: \_\_\_\_\_
- D. take part in business activities: \_\_\_\_\_
- E. other: \_\_\_\_\_

Describe other here: \_\_\_\_\_

**b) When was your last visit to Turkey?**

month: \_\_\_\_\_ year: \_\_\_\_\_

**c) How did your last trip to Turkey affect your views about returning to Turkey?**

- ☐ increased my likelihood of returning
- ☐ decreased my likelihood of returning
- ☐ did not change my views
- ☐ not applicable

**Reason:** \_\_\_\_\_

**38. Have the events of September 11, 2001 - the terrorist attacks in the US – and the aftermath affected your views about returning to Turkey?**

- ☐ increased my likelihood of returning
- ☐ decreased my likelihood of returning
- ☐ did not change my views

**39. How did you find the length of this survey?**

- ☐ too long
- ☐ too short
- ☐ just right

**40. Please write down any comments or questions about any part of this survey in the text box below. We would greatly appreciate receiving your input.**

---

---

---

---

---

**Thank you for taking part in our survey!**

**Prof. Dr. Aysit Tansel  
Research Assistant Nil Demet Güngör**

**Middle East Technical University  
FEAS Department of Economics**

**survey@metu.edu.tr**

## APPENDIX D

### TURKISH SUMMARY

Çalışmada, yüksek eğitilmiş işgücü göçü kalkınmakta olan ülkeler açısından irdelenmektedir. Gelişmekte olan ülkelere gelişmiş ülkelere gerçekleşen nitelikli işgücü göçü, gelişen ülkeler açısından yüksek maliyetli bir hibe olarak nitelendirilebilir. Çalışmanın ilk bölümünde bu göçün göç veren ülkeler üzerindeki etkisini tartışan yazın ele alınarak tartışmada ulaşılan son noktanın ortaya konulması amaçlanmaktadır. Çalışmanın diğer amacı, Türkiye’den yurt dışına gerçekleşen nitelikli insan göçünü belirleyen etmenleri inceleyerek, bu göçte en etkili olanları belirlemektir. Türkiye’den yurt dışına nitelikli işgücü göçü özellikle son dönemlerde peşpeşe yaşanan ekonomik krizlerden sonra daha da önem kazanmıştır, çünkü ekonomik krizlerin ardından eğitilmiş gençlerde işsizlik önemli bir ölçüde artmıştır.

Nitelikli işgücü göçüne iktisadî açıdan bakan modellerde nitelikli işgücü hareketleri fizikî sermaye hareketleriyle benzer bir şekilde ele alınır. Buna göre, yüksek eğitilmiş kişilerin daima kendilerine daha yüksek getiri sağlayacağı bölgelere ve ülkelere doğru hareket ettiği görüşü benimsenir. Neoklasik kurama göre, gelişmiş ülkeler ve gelişen ülkeler arasında oluşan gelir farkları bu ülkelerdeki yapısal işgücü talep-arz açıklarından kaynaklanır. Nitelikli işgücüne daha fazla gereksinim duyan gelişmiş ülkeler, talep fazlalarını gelişen ülkelere göç alarak karşılarlar. Gelişmiş ülkelerdeki nitelikli işgücü sayılarının artmasıyla nitelikli işgücünün marjinal verimliliğinin ve getirisinin düşmesi beklenir. Öte yandan, göç veren gelişmekte olan ülkelere ise yüksek eğitilmiş insanların sayıları azaldıkça kalan nitelikli işgücünün marjinal getirisinde ve verimliliğinde artış beklenir. Neoklasik yaklaşım, gerçekleşen bölgesel göç hareketlerinin sonucunda ülkeler arası gelir farklarının kapanmasını öngörür ve buna göre de göç hareketlerinin kısıtlanmayarak tamamen serbest bırakılmasını önerir. Ancak, gelişmiş ülkelere nitelikli işgücü göçünün artan sayılarla gerçekleşmesi neoklasik yaklaşımın öngördüğü gibi ülkeler arasındaki gelir farklarının kapanmasına neden olamamıştır. Bunun aksine, bazı çalışmaların bulgularına göre gelişmiş ve gelişen bölgeler arasındaki gelir uçurumu daha da derinleşmiştir.

Beyin göçünü açıklamayı amaçlayan kuramsal çalışmaların pek çoğu iktisadî nedenleri ön plâna çıkartarak ülkeler arası gelir farklarını en önemli göç nedeni olarak göstermektedir. Bu çalışmalar beyin göçüne neden olan gelir farklarının nasıl ortaya çıktığını incelerken genelde gelirlerin verimliliğe göre belirlendiği varsayımını benimserler. Daha çok yurt dışına öğrenim görmek için gidenlerin geri dönmelerini açıklamak için geçerli olan bazı yaklaşımlarda, göç alan ve göç veren ülkelere bulunan işverenler arasındaki bilgi asimetrisinin gelir farklarına yol açabileceği vurgulanmaktadır. Kwok ve Leland'ın (1982) çalışmasında, gelişmiş ülkelerdeki işverenler ülkelere öğrenim görmek için gelen öğrencilerin verimlilikleri ve kabiliyetleri hakkında öğrencilerin ana yurtlarında bulunan işverenlere göre daha çok bilgiye sahiptirler. Bu yüzden onlara gerçek verimliliklerini ya da üretime sağladıkları katkılarını yansıtan gelirleri verebilecek durumdadırlar. Göç veren ülkelerdeki işverenler ise yurda dönen öğrencilerin verimlilikleri hakkında aynı bilgiye sahip olmadıkları için onlara ancak daha önceden dönen öğrencilerin ortalama verimliliğini yansıtan gelirleri verebilirler. Bu durumda gerçek verimlilikleri ortalama gelirin altında olan öğrenciler dönmeyi tercih ederken, en verimli ve en kabiliyetli öğrenciler de yurt dışında kalmayı tercih eder. Bu yaklaşıma getirilen eleştirilerde asimetric bilginin ancak kısa vadede geçerli olabileceği, orta ve uzun vadede ise geri dönen öğrencilerle ilgili bilgi eksiklerinin tamamen yok olacağı savunulmaktadır.

Diğer yaklaşımlarda gelişmiş ve gelişmekte olan ülkeler arasındaki sosyal (beşeri ve fiziksel) sermaye farkları önemlidir. Miyagiwa'nın modeline göre yüksek eğitilmiş kişilerin birarada toplanması verimliliklerini ve gelirlerini olumlu şekilde etkiler. Beyin göçünün nedeni nitelikli çalışanların daha verimli ve daha fazla kazanç sağlayabilecekleri nitelikli işgücü sayısının yüksek olduğu ülkelere yönelmeleridir. Wong'un modelinde ise yurt dışında çalışmak eğitilmiş kişilere yurt dışındaki toplu iş tecrübesinden faydalanma olanağı tanır ve verimliliklerini artırır. Chen ve Su bu konuya farklı bir yaklaşım daha getirirler. Yurt dışında öğrenim görenlerin gördükleri eğitim bulundukları ülkenin sermaye stoğuyla daha çok uyumludur. Bu yüzden yurt dışında eğitim görenler yurt dışında daha fazla kazanç elde edebilirler. Bu modeller ikinci bölümdeki ampirik çalışmanın teorik çerçevesini oluşturmaktadır.

Ampirik analizde kullanılan veriler 2002 senesinin ilk yarısında gerçekleştirilen anket uygulamasının sonuçlarına dayanmaktadır. Anketin hedef kitlesi yurt dışında öğrenimlerini sürdüren lisans, yüksek lisans ve doktora öğrencileri ile üniversite eğitilmiş

işgücü olarak belirlenmiştir. Buna göre, bu iki gruba ayrı anket soruları dağıtılmış ve 2000'in üzerinde yanıt toplanmıştır. Anketlerden elde edilen verilerle çeşitli gitme/kalma nedenlerinin önemlerini belirlemek amacıyla sıralı probit analizi yapılmıştır. Bu analizin sonuçları aşağıda yurt dışında çalışan üniversite eğitilmiş Türkler ve yurt dışında okuyan Türk öğrenciler için ayrı ayrı verilmiştir.

#### **Yurt Dışında Çalışanlar: Sıralı Probit Kestirim Sonuçları**

##### ***Cinsiyet ve Yaş Etkileri:***

Yurt dışında çalışan yüksek nitelikli işgücü için Türkiye'ye geri dönme niyeti cinsiyete göre farklılık göstermektedir. 'Kadın' değişkeninin katsayısı pozitif ve %1 oranında anlamlıdır. Buna göre, kadınlar erkeklere göre daha kuvvetli yurt dışında kalma niyeti belirtmektedirler.

Modelde 'yaş' ve 'yaş kare' değişkenleri katılımcı yaşının geri dönme niyeti üzerindeki etkisini gösterir. Genç katılımcıların daha yaşlı katılımcılara göre dönme niyetlerinin daha az olması beklenebilir. Bunun nedenlerinden biri gençlerin önündeki işgücüne katılım süresinin daha uzun olması, ve buna göre de yurt dışındaki yüksek gelirden daha uzun süre faydalanma olanağına sahip olmalarıdır (Chen ve Su, 1995). Geri dönmeme niyetini, 'yaş' değişkeni artı yönde, 'yaş kare' değişkeni ise eksi yönde etkilediği anlaşılmaktadır. Katılımcı yaşı arttıkça, geri dönme niyeti azalan hızla azalmaktadır. Diğer bir deyişle, daha yaşlı katılımcılar daha kuvvetli geri dönmeme (yurt dışında kalma) niyeti belirtmektedir. Bu olgunun nedeni bulunan yerde uzun süre geçirilince, alışkanlıkların gelişmesi ve yerleşmesi dolayısı ile dönüşün güçleşmesi olabilir. Bazı katılımcılar yaşlarının ilerlediği için geri dönmenin zor olacağını ifade etmişlerdir. Yaş değişkenleri yurt dışında kalma ve çalışma süresiyle ilişkili olduğundan, modele bu değişkenler dahil edildiğinde yaş değişkenleri istatistiksel olarak anlamlı bulunmamaktadır.

##### ***Yurt Dışına Çıkmadan Önceki Niyetlerin Etkileri:***

Türkiye'ye geri dönme niyetinde en belirleyici etkenlerden biri yurt dışına çıkmadan önce katılımcıların geri dönme konusundaki tutumlarıdır. Yurt dışına çıkmadan önceki dönme/dönmeme eğilimlerini ölçmek amacıyla katılımcılara üç kategori içeren bir soru yöneltilmiştir: "Türkiye'den ayrılmadan önce, Türkiye'ye geri dönme konusundaki düşünceniz neydi?". Kategoriler, "mutlaka geri dönmeyi düşünüyordum", "kararsızdım" ve "kesinlikle geri dönmeyi düşünmüyordum" seçeneklerinden oluşmaktadır. Modelde bu

eğilimler, “mutlaka geri dönme” kategorisi baz alınarak, kukla değişkenlerle gösterilmiştir. Her iki kukla değişkenin katsayısı pozitif ve istatistiksel olarak %1 düzeyinde anlamlı bulunmuştur. Yurt dışına çıkmadan önce kesin dönmeme niyeti veya dönme konusunda belirsizlik gösteren katılımcılar kesin geri döneceklerini belirtenlere göre daha kuvvetli geri dönmeme eğilimi göstermektedirler. Bu sonucu, geri dönmeme konusunda daha kararlı olanların yurt dışına intibak etmek ve yurt dışında başarılı olmak için daha fazla azim ve çaba göstermelerine de bağlayabiliriz, ve de “kendi kendini doğrulayan kehanet” olarak nitelendirebiliriz. Bazı katılımcıların açıklamaları da bu tür bir yorumu destekler niteliktedir.

#### *Aile desteğinin etkisi:*

Aile desteğinin Türkiye’ye geri dönme niyetindeki rolünü ölçmek için ankette iki soru sorulmuştur. Birinci soru, katılımcıların yurt dışına ilk çıkma kararlarında gördükleri aile desteğini belirlemek amacıyla sorulmuştur. Modelde bu desteğin derecesini ifade eden bir ve beş arasında değer alan bir değişken kullanılmıştır. Bu değişken aile desteği gördüklerini belirten katılımcılar için daha yüksek değer, aile desteği görmediklerini belirtenler için daha düşük değer almaktadır. Birinci aile desteği değişkeninin katsayısı negatif ve %1 oranında anlamlıdır. Daha fazla aile desteği gördüklerini belirten katılımcıların Türkiye’ye geri dönme niyetleri daha kuvvetlidir. Bu değişken, aile bağlarını ve dolayısıyla yurta olan bağları temsil ediyor olabilir.

İkinci soruda, ailelerin katılımcıların yurt dışına yerleşmeleri konusundaki tutumları sorulmuştur. Modelde, bu tutumun etkisini göstermek için bir (hiç desteklemez) ile altı (çok destekler) arasında değer alan bir değişken kullanılmıştır. Bu değişken pozitif ve %1 düzeyinde anlamlı bulunmuştur. Bu sonuç, yurt dışına yerleşme konusunda aile desteğinin önemini göstermektedir.

#### *Anne-Babaların Eğitim Düzeyleri:*

Anne ve babaların eğitim düzeyleri modele sosyoekonomik gösterge olarak dahil edilmiştir. Daha yüksek eğitim düzeyleri iş gücü piyasalarında daha çok gelir getirdiğinden, eğitim düzeyi daha yüksek olan ailelerin çocukları daha fazla eğitim olanaklarına sahiptirler. Anne ve babaların eğitim düzeyleri, Türkiye’de kız ve erkek çocukların okulda erişimini belirleyen en önemli etkenler arasında gösterilmiştir (Tansel, 1999 ve 2002). Bu göstergenin Türkiye’ye geri dönme niyetinde ne yönde bir etki göstereceği önceden belli değildir. Probit analiz sonuçlarına göre, anne-baba eğitim değişkenleri istatistiksel olarak



anlamalı değildir. Bu göstergelerin daha çok yurt dışına çıkmakta etkili olduğunu düşünebiliriz. Bu yüzden çoğu katılımcının Türkiye ortalamasına göre daha yüksek eğitilmiş aileden geldiğini görmek şaşırtıcı değildir.

#### *Yurt Dışında Çalışma Şartlarının Etkisi:*

Anketi yanıtlayanlardan, çalıştıkları ülkede, içinde bulundukları çalışma şartlarını (örneğin, çalıştıkları işin verdiği tatmini), Türkiye'deki tecrübelerine kıyasla 'çok daha kötü'den 'çok daha iyi' arasında değişen altı kategoride değerlendirmeleri istenildi. Kategoriler kukla değişken olarak modele eklendi. 'Ne daha iyi, ne daha kötü' kategorisi baz kategori olarak seçildi. Probit kestirim sonuçları, tüm kategoriler için alınan sonuçların istatistiksel olarak anlamsız olduğunu gösteriyor. Öte yandan, ankete katılanların büyük çoğunluğu çalıştıkları ülkedeki çalışma şartlarının Türkiye'dekine kıyasla 'daha iyi' veya 'çok daha iyi' olduğuna inanıyor.

#### *Yurt Dışında Sosyal Yaşamın Etkisi:*

Aynı şekilde, anketi yanıtlayanlardan, çalıştıkları ülkedeki sosyal yaşamı (örneğin, arkadaşlıklar, sosyal etkinlikler) Türkiye'deki sosyal yaşama göre değerlendirmeleri istenildi. Bu değişkende görülen istatistiksel dağılım, 'daha kötü' kategorisine doğru eğilimlidir. 'Ne çok daha iyi, ne çok daha kötü' kategorisi baz alınarak, diğer kategoriler kukla değişken olarak modele konulmuştur. Şaşırtmayan bir sonuç ise, yurtdışındaki sosyal yaşamlarını 'çok daha iyi' olarak nitelendirenlerin Türkiye'ye geri dönmeme niyetlerinin baz kategoriye göre daha yüksek olmasıdır. Bu kategori, pozitif ve 5% oranında istatistiksel olarak anlamlı çıkmıştır.

#### *Çalışanların Yurt Dışındaki 'Yaşam Standartları'na dair Değerlendirmeleri:*

Çalışma şartları ve sosyal yaşam için yapılan değerlendirme yurt dışındaki yaşam standardı için de yapılmıştır. Gene şaşırtıcı olmayan bir sonuç 'çok daha iyi' kategorisinin pozitif ve %1 düzeyinde anlamlı çıkmasıdır. Baz olarak alınan 'ne çok daha iyi, ne çok daha kötü' kategorisini seçenlere göre yaşam standartlarının çok daha iyi olduğunu düşünenlerin geri dönmeme niyetleri daha yüksektir.

#### *Yurt Dışında İşyeri Tecrübelerinin Etkisi:*

Yurt dışında alınan işyeri eğitimi (on-the-job training), bu tecrübeye sahip olan çalışanların maaşlarının yükselmesi anlamına geleceğinden, yabancı işçilerin kendi ülkelerine dönmeme olasılığını kuvvetlendirebilir (Chen ve Su, 1995). Yurt dışındaki işyeri



tecrübesinin etkisini doğrudan ölçmek için katılımcılara çalıştıkları son kurumda işyeri eğitimi alıp almadıklarını sorduk. İşyerinde eğitim görenlere aldıkları eğitimin çalıştıkları işyerine mi özgü, çalıştıkları sektöre mi özgü yoksa genel bir eğitim mi olduğunu sorduk. Anketi yanıtlayanların çoğu böyle bir tecrübeye sahip olduklarını belirtmiştir. Öte yandan, probit analizi, 'işyeri tecrübesi'ni temsil eden değişkenlerin istatistiksel olarak anlamsız olduğunu gösteriyor.

Yurt dışı iş tecrübesi yurt dışında çalışılan yıl sayısı olarak da gösterilebilir. Katılımcıların bulundukları ülkede çalıştıkları yıl sayısı, pozitif ve %5 oranında istatistiksel olarak anlamlı çıkmıştır. Bu da, katılımcının yurt dışı iş tecrübesinin artmasıyla geri dönmeme niyetinin kuvvetlendiği anlamına gelmektedir. Modele dahil edilen başka bir değişken ise katılımcının Türkiye'de tam zamanlı bir işte çalışmadığı belirten kukla değişkendir. Bu değişkenin katsayısı pozitif ve %1 oranında anlamlıdır. Bu sonuç, Türkiye'de hiç çalışmayan katılımcıların geri dönmeme niyetlerinin, çalışanlara göre daha kuvvetli olduğu anlamına gelir.

#### *Akademik ve Diğer Meslekler:*

Anketi yanıtlayanların yaklaşık dörtte birini akademisyenler teşkil ediyor. Akademik alanda çalışanların diğer meslek gruplarına göre geri dönme niyetlerindeki fark bir kukla değişkenle ölçülmüştür. Sonuçlar, bu mesleği seçmenin Türkiye'ye dönüp dönmeme kararında etkili olmadığına işaret ediyor; kullanılan değişken istatistiksel olarak anlamsız çıkmıştır.

#### *AR-GE Çalışmaları:*

Ankette, çalışma saatlerinin en az yarısını araştırma-geliştirme faaliyetlerine ayırdıklarını belirten elemanlar 'AR-GE çalışanı' olarak nitelendirilmiştir. Anket sonuçlarına göre, AR-GE çalışanlarının üçte biri akademisyenlerden oluşuyor. Öte yandan, AR-GE faaliyetlerine yurtdışında daha fazla prim verildiği düşünülürse, probit analizinde AR-GE değişkeninin istatistiksel olarak anlamsız çıkması beklenmedik bir sonuç olarak nitelendirilebilir.

#### *Çekici ve İtici Etkenler:*

Yurt dışında kazanılan yüksek maaşlar, beyin göçünün en önemli nedenlerinden biri olarak görülmektedir. Yurtdışında kazanılan yüksek maaşın, Türkiye'ye dönüp dönmeme kararında ne denli etkili olduğunu araştırmak için, ankete bu soru dahil edilmiştir

ve anketi yanıtlayanlardan, yurtdışında kazandıkları nispeten yüksek olan maaşları, Türkiye'ye dönmeme kararında veya dönmeyi ertelemede bir etken olarak, 'çok önemli'den 'önemsiz'e kadar beş kategoride değerlendirmeleri istenmiştir. 'Önemli' ya da 'çok önemlidir' yanıtını verenlerin 'bir', diğerlerinin 'sıfır' değerini alan bir kukla değişken yaratılmıştır. Tablo 2'de görüldüğü gibi, bu değişken istatistiksel olarak anlamsız çıkmıştır.

Katılımcılar, ankette verilen diğer itici ve çekici faktörleri de aynı şekilde değerlendirmişlerdir ve bu faktörler modelde kukla değişkenlerle temsil edilmektedir. Verilen çekici faktörler arasında istatistiksel olarak anlamlı bulunanlar şunlardır: daha düzenli ve sistemli bir yaşam olanağı, daha doyurucu kültürel yaşam, çocuklarını için daha iyi eğitim olanaklarının bulunması, eşin işinin yurt dışında olması ya da eşin yurt dışında yaşamayı tercih etmesi, ve yurt dışındaki çalışılan projenin devam etmesi / tamamlanmaması. Belirtilen son iki etken %1 oranında anlamlı çıkmıştır; diğerleri %5 oranında anlamlıdır. Bu sonuçlar, Türkiye'ye geri dönmeme kararında ailenin önemi kanıtlamıştır. 'Yurt dışında girilen projenin devam etmesi' etkeninin katsayısı negatif çıkmıştır. Bu da bu nedeni çok önemli olarak belirten katılımcıların projelerini bitirdiklerinde geri dönme niyetinde olduklarını gösterebilir. Diğer çekici etkenlerin katsayıları beklenildiği gibi pozitifdir.

İstatistiksel olarak anlamlı çıkan itici değişkenler şunlardır: ihtisas alanında daha ileri seviyede deneyim kazanma olanaklarının azlığı (%5), iş kurmak için gerekli maddi destek ve finansmanın bulunmaması (%1), ekonomik istikrarsızlık, belirsizlik (%1), ve 'diğer' kategorisi (%5). Parantez içindeki yüzdeler istatistiksel anlamlılık düzeyini vermektedir. 'İş kurmak için olanakların azlığı' dışındaki etkenlerin katsayıları pozitifdir. Geri dönmeme niyetindeki en önemli itici nedenin ekonomik istikrarsızlık ve belirsizlik olduğu görülmektedir. 'Diğer' kategorisinin itici neden olarak önemli olduğunu belirtenler, işyerinde torpil, toplumsal yozlaşma, askerlik mecburiyeti gibi nedenler göstermişlerdir.

### **Bağımsız Değişkenler ve Kestirim Sonuçları: Öğrenciler**

Bu bölümde yurt dışında bulunan Türk öğrencilerin geri dönme niyetlerini belirleyen etkenler incelenmektedir. Pek çok bağımsız değişken yurt dışında çalışan Türk işgücü analizinde kullanılan değişkenle aynıdır. Bu yüzden, üçüncü bölümdeki değişkenlerle ilgili açıklamalar bu bölümde de geçerlidir.

#### *Cinsiyet ve Yaş Etkileri:*

Öğrenci grubunda geri dönme niyeti cinsiyet ve yaşa göre anlamlı bir farklılık göstermemektedir. Öğrenci katılımcıların yaşları çalışanlara göre daha düşük varyanslı olduğundan böyle bir sonuç beklenebilir.

#### *Yurt Dışına Çıkmadan Önceki Niyetlerin Etkileri:*

Yurt dışında yüksek öğrenim görenler için gitmeden önceki dönme niyetlerini belirleyen değişkenlerin katsayıları pozitif ve istatistiksel olarak %1 düzeyinde anlamlı bulunmuştur. Yurt dışında çalışanlar analizindeki gibi, yurt dışına çıkmadan önce kesin dönmeme niyeti veya dönme konusunda belirsizlik gösteren katılımcılar kesin geri döneceklerini belirtenlere göre daha kuvvetli geri dönmeme eğilimi göstermektedirler.

#### *Aile desteğinin etkisi:*

Birinci aile desteği (yurt dışına ilk çıkıştaki aile desteği) değişkenin katsayısı negatif ve istatistiksel olarak %5 düzeyinde anlamlı çıkmıştır. Ailelerin katılımcıların yurt dışına yerleşmeleri konusundaki tutumun etkisi beklendiği gibidir. Ailenin desteğini gösteren iki kukla değişken, 'çok destek' ve 'biraz destek', pozitif ve %1 ve %5 düzeylerinde anlamlıdır. Ailenin yurt dışına yerleşme konusundaki desteği arttıkça, katılımcının geri dönmeme niyeti de artmaktadır.

#### *Yurt Dışında Sosyal Yaşamın Etkisi:*

Çalışanlar anketinde olduğu gibi, öğrencilerin öğrenim gördükleri ülkedeki sosyal yaşamı Türkiye'deki sosyal yaşama göre değerlendirmeleri istenildi. 'Çok daha kötü' kategorisi baz alınarak, diğer kategoriler kukla değişken olarak modele konulmuştur. 'Daha kötü' kategorisi dışındaki değişkenlerin katsayıları pozitif ve istatistiksel olarak %1 oranında anlamlı bulunmuştur. Yurt dışındaki sosyal yaşamlarını 'ne daha iyi, ne daha kötü', 'daha iyi' veya 'çok daha iyi' olarak nitelendirenlerin Türkiye'ye geri dönmeme niyetleri baz kategoriye göre daha yüksektir.

#### *Öğrencilerin Yurt Dışındaki 'Yaşam Standartları'na dair Değerlendirmeleri:*

Ankette, yurtdışında okuyan öğrencilerden, dışardaki yaşam standartlarını değerlendirmeleri istenmiştir. Bu soruya verilen yanıtların istatistiksel dağılımı 'çok daha iyi' kategorisine doğru eğilimlidir. Dışardaki yaşam standartlarını Türkiye'dekine göre 'daha iyi' ya da 'çok daha iyi' olarak değerlendiren öğrencilerin baz alınan diğer

kategorilere göre yurtdışında kalma niyetlerinin daha fazla olduğu anlaşılmaktadır. Bu değişkenin katsayısı pozitif ve %1 de anlamlıdır.

#### *Yurt Dışında Türk Öğrenci Birliklerine Üye Olmanın Etkisi:*

Anketi yanıtlayan öğrencilerden yarıdan fazlası yurt dışında okudukları üniversitelerdeki Türk öğrenci birliklerine üye. Probit analizi sonuçlarına göre, yurt dışında Türk öğrenci birliklerine üye olmanın beyin göçüne etkisi, negatif ve istatistiksel olarak yüzde bir oranında anlamlı. Bu sonuç, Türk öğrenci birliği üyeleri arasında Türkiye'ye dönme niyetine sahip olanların daha fazla olduğuna işaret ediyor. Türk öğrenci birliklerine üye olmanın, Türkiye'ye hissedilen 'kültürel bağların' belki daha güçlü olduğunun bir göstergesi olarak düşünülebilir.

#### *Yurt Dışında kalma süresinin etkisi:*

Regresyon sonuçlarına göre, yurtdışında kalma süresinin Türk beyin göçüne olan etkisi pozitif ve istatistiksel anlamda yüzde bir oranında anlamlı. Sonuçlara göre, yurtdışında kalma süresi uzadıkça, Türkiye'ye dönmeme eğilimi de kuvvetleniyor. Bu beklenen bir sonuç, zira yurtdışında kalma süresinin uzaması, yurtdışındaki hayata intibakı güçlendirdiği gibi (örneğin, yurtdışında bir yabancıyla evlenmek), anavatana olan bağların zayıflamasına da yol açabiliyor.

#### *Meslek Alanının Etkisi:*

Chen ve Sue (1995), daha önce de değindiğimiz çalışmalarında, tıp, mühendislik ve işletme gibi 'capital dependent' mesleklerde görülen beyin göçünün diğer mesleklere göre daha yoğun olduğunu bulmuştur. Chen ve Sue'nun bu çalışmalarında kullandıkları ekonometrik analiz, Türk beyin göçüne yönelik olarak yürüttüğümüz anketten elde ettiğimiz verilere uygulanmıştır, fakat sonuçlarımızda, çalışılan meslek alanının Türk beyin göçüne olan etkisi istatistiksel olarak anlamsız çıkmıştır.

#### *Çekici ve İtici Etkenler:*

Öğrencilere yönelik olan ankette, yurtdışına beyin göçünde önemli rol oynadığı düşünülen 12 'çekici' ve 12 'itici' etken sıralanmış, ve anketi yanıtlayanlardan bu etkenleri, kendi aldıkları yurtdışına çıkma kararında taşıdıkları öneme göre değerlendirmeleri istenmiştir. Regresyon sonuçlarına göre, Türkiye ile ilgili sıralan itici faktörlerin çoğu istatistiksel olarak anlamsız çıkmıştır. Modelin tanımına göre anlamlı etkenler şunlardır: 'Uzmanlık alanında iş olanaklarının azlığı' ve 'diğer' itici nedenler. 'Diğer' kategorisini

işaretleyenler ‘mecburî askerliği ertelemek’, ‘Türkiye’deki yolsuzluklar’ gibi nedenler ileri sürmüşlerdir (%5’de anlamlı). Türk öğrenci beyin göçünü kuvvetlendiren yabancı ülkeye bağlı çekici etkenler şunlardır: Yurt dışında sistemli ve düzenli bir ortamın olması ve eşin yurtdışında bulunması istatistiksel olarak %1 oranında anlamlı bulunmuştur; Daha yüksek maaşlar ve yurt dışında henüz bitirilmemiş olan bir proje üzerinde çalışmak istatistiksel olarak %5 oranında anlamlı bulunmuştur.

### **Sonuç**

Probit analiz sonuçları, son dönemde yaşanan ekonomik krizin ve siyasi belirsizliğin yurt dışında çalışanların Türkiye’ye geri dönme niyetlerinde etkileyici rol oynadığını kanıtlamıştır. Yurt dışında öğrenim gören öğrenciler için geri dönmeme niyetlerinde çekici faktörlerin daha ağırlıklı olduğu gözükmemektedir. Literatürde, yüksek nitelikli işgücünün yurt dışına göç etmesinde ekonomik nedenlerin önemi vurgulanmaktadır. Yurt dışında kazanılan yüksek maaşlar, beyin göçünün en önemli nedenlerinden biri olarak görülmektedir. Çalışmada beklenenin aksine yurt dışında çalışanların Türkiye’ye geri dönmeme kararında yurt dışındaki yüksek gelirler istatistiksel olarak anlamlı bulunmamıştır. Öğrenci grubunda iste gelir farkları beklenildiği gibi önemli bulunmuştur. Öğrencilerin yurt dışında kalma kararındaki en önemli çekici faktörlerden biri yurt dışındaki sistemli ve düzenli yaşam tarzı olmuştur. Yurt dışında çalışanların Türkiye’ye geri dönmeme kararındaki en önemli itici nedenlerden biri ise Türkiye’deki ekonomik ve siyasî istikrarsızlık olmuştur. Analizde, her iki grup için Türkiye’ye geri dönme veya yurt dışında kalma kararında gitmeden önceki dönme niyetleri ve ailenin rolü önemli çıkmıştır. Geri dönmeme niyetinde yaş ve cinsiyet farkları, yurt dışında çalışan Türkler için önemli bulunmuştur. Öğrenci grubunda geri dönme niyeti cinsiyet ve yaşa göre anlamlı bir farklılık göstermemektedir.

Katılımcıların anne ve babalarının eğitim düzeylerine bakıldığında, ebeveynlerin genelde yüksek tahsilli oldukları görülmektedir; bu da yurt dışında eğitim görme ve çalışma fırsatlarının yüksek gelirli ailelerde toplandığına işaret etmektedir. Çalışmada ortaya çıkan “fırsat eşitsizliği” sonucu diğer benzer çalışmaların bulgularını desteklemektedir. Katılımcı ebeveynlerinin eğitim düzeylerinin Türkiye ortalamasının üzerinde olması Türkiye’den gerçekleşen nitelikli insan göçünün önemini göstermektedir. Ailelerin genelde çocuklarının yurt dışına gitmelerini teşvik edip yurt dışında kalmalarını (daha düşük oranda olsa da) desteklemeleri katılımcıların geri dönmeme kararında etkileyici olduğu anlaşılmaktadır.

## VITA

Nil Demet Güngör was born in İstanbul on September 26, 1971. She resided in Ottawa, Ontario, Canada with her family for 14 years. In 1993, she received her bachelor's degree (*magna cum laude*) in economics from the University of Ottawa, where she also minored in Public Policy and Public Management. In 1994, upon her return to Turkey, she was accepted into the master's program in economics at the Middle East Technical University (METU). After receiving her degree in 1996, she was accepted into the PhD program in economics at METU. She worked as research assistant in the economics department and also as editorial assistant for the journal *METU Studies in Development* for the duration of her doctoral studies. Her main areas of interest are labor economics, economics of education, applied econometrics and economic growth and development.

### Publications:

Tansel, A. and N. D. Güngör (2003) "'Brain Drain' from Turkey: Survey Evidence of Student Non-Return," *Career Development International*, special issue on Career Development in the Middle East, 8(2), 52-69.

Tansel, A. and N. D. Güngör (1997) "The Educational Attainment of Turkey's Labor Force: A Comparison Across Provinces and Over Time," *METU Studies in Development*, 24(4), 531-47.

Güngör, N. D. (1997) "Education and Economic Growth in Turkey 1980-1990: A Panel Study," *METU Studies in Development*, special issue on Education, 24(2), 185-214.

### Awards and Scholarships:

2000-2002 Turkish Academy of Sciences Scholarship for Integrated Doctoral Studies in Turkey and/or Abroad in the Social Sciences and Humanities;

1996 Young Researcher Award (awarded jointly by the Turkish Statistical Association and the Association of Statistics Graduates).