

T.C.
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SOSYAL BİLİMLER ENSTİTÜSÜ
İŞLETME ANABİLİM DALI
SAYISAL YÖNTEMLER (İNG.)

**COMPARATIVE STATISTICAL ANALYSIS OF TURKISH AND
EUROPEAN INSURANCE SECTORS (BASED ON THE IMPORTANCE
OF INSURANCE SECTORS IN TURKISH AND EUROPEAN
ECONOMIES)**

Yüksek Lisans Tezi

SENEM KARAOĞLU

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INTRODUCTION

Economists have demonstrated that if insurance did not exist, world would be much less developed and much less stable. Insurance sector has a big impact on economy and fosters economic growth and employment.

Insurance mechanism provides pooling and transferring risk, and create more stable operating environment for the insurers. On the one hand, Insurance encourages people fully aware of their social benefits and health care, for companies on the other hand help companies to protect themselves against risk.

Insurance sector in Turkey and Europe follows different pattern whereas Turkey is a developing country and Europe include many developed and industrialized countries. That is why we are interested in analyzing and comparing Turkish and European insurance industry.

Our main aim is in this study to evaluate Turkish and European Insurance sector based on importance of insurance sectors in Turkish and European Economies and also develop an objective of classification of countries (European countries and Turkey) as well as to compare and profile the structure of the Turkish and European Insurance sector.

Second aim is to find out, the relationship between Total Premium Income (dependent variable) and GDP, Number of Employee, Inflation, Population, Number of Companies and investment. Part 1 and Part 2 provide a literature review for the structure of European and Turkish insurance sector respectively. In part 3, we describe the variables which are used in the model and then use some statistical analyses to examine and classified the countries in the model.

1.CHARACTERISTICS OF THE PROFILES OF EUROPEAN INSURANCE SECTOR

1.1 PREMIUM

Premium is a payment, or one of the periodical payments, a policyholder makes for an insurance policy. Premium is divided into two parts and in the following is explained these two part also other instruments which are important indicators for premium income.

1.1.1 Growth in Life Insurance Premiums in 2005

Life insurance is a contract of insurance which undertakes to pay at maturity stated in the contract, or at death, the sum specified as the face value.¹ The policy may also cover certain payments in the event of disability; in addition, it can be used as a means of investment or saving.²

There is a strong growth in life insurance % 6.2 compare to previous year was 4.1% so it reflects consumer confidence in life products. The evolution of the life insurance market may also reflect awareness of Europe's growing demographic challenge: the ratio of the working population to retirees will reduce significantly, due

¹ Insurance Dictionary 'The Insurance Centre', <http://www.nauticom.net/www/insctr/glossary.htm#sectN> (December 1999)

² Swiss Re, Sigma No 5 / 2005 'Insurance in emerging markets' focus on liability developments p 23

to factors such as increased longevity and falling birth rates. Public pension schemes will be placed under mounting pressure, meaning that alternative pension schemes, such as those provided by private insurers, need to be encouraged.³

There is also growth in life premium volume in western countries such as Portugal (43%), Sweden (23.4 %) and Belgium (22.4%), in addition in Eastern European countries, life insurance grew at double digit rates. Growth was particularly strong in Poland and Slovenia as well as Baltic States and in Southeast Europe. In these regions strong growth was mainly driven by their well organized underlying economies generally low interest rates and tax related incentives.⁴

The penetration rate of life insurance in the economy, defined as the ratio of life premium to GDP, has shown a slight increase from 5% in 2004 to 5.1% in 2005 and as well as it supports economic development in Europe also create competitiveness of the industry.

1.1.2 Growth in Non-Life Insurance Premiums in 2005

In Europe Non-life insurance covers all these products excluding life insurance; Motor, Accident & Health, Property, General Liability and Marine Aviation and Transport.

Real total growth rate of 1.8% observed on the non life market is slightly

³ Association of Insurance and Reinsurance Companies of Turkey, Annual Report 2005,

<http://www.tsrbs.org.tr/FaaliyetRaporu.pdf>

⁴ Swiss Re, Sigma No 5 / 2005 'Insurance in emerging markets' focus on liability developments p 32

higher than that observed in 2004, but lags behind the levels of more than 6% registered in 2002 and 2003. Within Europe there is a clear contrast: in eastern countries there is impressive growth of more than 10% on average, whereas in western countries the growth rate averages less than 2%.⁵

Premiums in Eastern Europe registered double digit growth of 13.8%. Growth in Eastern Europe was driven by strong increases in Russia as a consequence of the surge in compulsory motor third party liability.⁶

This evolution reflects the development of eastern economies, for which the insurance industry acts as one of the drivers by providing the necessary risk coverage and reduction of capital requirements. The western markets are characterized by more heterogeneity. While some countries show growth rates superior to 6%, others register negative growth rates. The lower growth in western countries is also related to the maturity of these markets.⁷

⁵ CEA (European Insurance and Reinsurance Federation) Annual Report 2005

<http://www.cea.assur.org/cea/download/publ/article242.pdf> p 14

⁶ Swiss Re, Sigma No 5 / 2005 'Insurance in emerging markets' focus on liability developments p 23

⁷ CEA (European Insurance and Reinsurance Federation) Annual Report 2005 - 2006

<http://www.cea.assur.org/cea/download/publ/article242.pdf> p 15

1.1.3 Penetration rate

The Insurance penetration rate (direct premiums as a percentage of GDP) showed a slight increase from 5% in 2004 to 5.1% in 2005 in the economy.⁸

The penetration rate of life insurance in the economy reflects not only differences in living standards but also differences in legislation, in social protection, in savings habits, in product developments, in pension organization.⁹

Differences appear much wider for non-life insurance. The GDP penetration rate in non-life is decreased by 0.1 points to 3.2% in 2005 in Europe and displays very different patterns across the countries. In some countries insurance penetration rate is very low. The highest penetration rates are observed in Luxembourg (5.8%), the Netherlands (4.9%), Switzerland (4.5%), Belgium and UK which all have ratios above 10% while most of the EU countries such as Romania (0.8%) and Greece (1.1%) have lower rates.¹⁰

⁸ CEA (European Insurance and Reinsurance Federation) Annual Report 2005

<http://www.cea.assur.org/cea/download/publ/article242.pdf> p 13

⁹ CEA Statistics No 24, 'European Insurance in Figures' <http://www.cea.assur.org/cea/download/publ/article243.pdf> (June 2006)

¹⁰ CEA Statistics No 24, 'European Insurance in Figures' <http://www.cea.assur.org/cea/download/publ/article243.pdf> (June 2006) p 15

1.1.4 Density

Density is an average premium per inhabitant and measured by total annual premium payments divided by population. It reflects the development of the insurance sector in an economy and enables comparisons to be made between countries.

Switzerland shows an average premium per inhabitant of above €4200 and is closely followed by the United Kingdom (€3679/hab). The density is much lower in all eastern countries where it ranges from €41 in Romania to €821 in Slovenia. Nevertheless, these countries recorded the highest growth, since most of them were above 10% and even above 40% for Romania.

The major share of the average premium relates to life insurance, which amounted to €1040/hab in 2005 and which grew by 8.1%. The non-life density level is €667 and grew by 5.0% in 2005. The density, as well as the penetration rate, shows a wider spread in life than in non-life and reflects differences in economic development but also differences in savings habits, in social protection, in pension organization.¹¹

1.2 INVESTMENT

The investment income calculated as a premium supplement is the income earned on technical reserves and amounts €6,371bn of the insurance industry in Europe. This figure, estimated at market value, has progressed by 8.3% (inflation-adjusted) and

¹¹ CEA Statistics No 24, 'European Insurance in Figures' <http://www.cea.assur.org/cea/download/publ/article243.pdf> (June 2006)

reflects the dynamism of insurers' investment activity and the good performance of the stock market.¹²

Life investments amounted to €5.161bn, or 81% of the total investment. The biggest share of this sum is provided by the United Kingdom, France and Germany, which together represent 63% of total life investments.

According to 2004 figures, 43.2% of the insurers' investments are invested in fixed-income products, 28.2% in shares and other variable-yield products and 11.9% in loans. The remaining 16.8% is typically invested in land and buildings, affiliated under-takings and participating interests, deposits with credit institutions and others.

On average, investment represents 53% of the GDP in 2004. This ratio shows the growing role of insurers in the financing of the economy and also represents the success of life products. Different countries in EU have different investment share, such as Luxembourg and Liechtenstein are above 100% due to the large share of international business. Behind these two countries Switzerland, Sweden, The United Kingdom, Denmark and France show ratios of between 70% and 95% which countries insurance has been developed for a long time.

When we look at the eastern countries where insurance is newly developed, share investment is also increasing regularly for several years. Countries such as Spain,

¹² CEA (European Insurance and Reinsurance Federation) Annual Report 2005 - 2006

<http://www.cea.assur.org/cea/download/publ/article242.pdf>

Portugal and Austria show potential development of insurance with 25 %.¹³

1.3 MARKET OPERATORS

1.3.1 Number of Companies

The number of companies operating in European markets is reduced by 0.8% in 2005 to approximately 5300 companies. The breakdown of these companies for 2004 shows that around 75% are national, 22% are EU branches and only 3% are non-EU branches. On most markets, domestic companies account for more than 90% of total premium income.¹⁴

1.3.2 Concentration Ratio

The concentration ratio indicates whether an industry is comprised of a few large firms or many small firms. The market share of the 5, 10, and 15 largest groups of insurers in each country and in Europe is also an indicator of the concentration of activities on the insurance market.

In life, on every market except the United Kingdom, Spain and Germany, which are three major markets, the share of the 5 top groups, calculated on the basis of their turnover, is above 50%. The development of this share between 1993 and 2004 shows an increase in most western countries and a decrease in Eastern Europe and

¹³ CEA Statistics No 24, 'European Insurance in Figures' <http://www.cea.assur.org/cea/download/publ/article243.pdf> p 19

¹⁴ CEA Statistics No 24, 'European Insurance in Figures' <http://www.cea.assur.org/cea/download/publ/article243.pdf> (June 2006)
p 21

Scandinavia. The share of the top 15 groups in life insurance is over 90% on almost every market apart from the three large markets quoted above.

The non-life market shows a similar pattern to the life market. The market share of the 5 top groups is above 50% on every market except for Spain and Cyprus. On average the market share of the 5 largest groups on each market was 58% in 2004 against 35.6% in 1993. The market share of the 15 largest groups is 84%, i.e. 22.8% higher than in 1993.

Both for life and for non-life, the concentration ratio of the 5 largest groups is negatively correlated with the size of the market: on the largest markets (e.g. UK, FR, ES) where there is space for a large number of companies, the market share of the largest group is lower while it is the reverse on the small markets (IS, SI..) ¹⁵

1.3.3 Number of Employees

The total number of people directly employed in the insurance industry was above 1 million employees in 2005. Due to the high competition between insurers and concentration of the market this number has reduced by 0.7% compared to 2004. The share of full time workers in 2004 was approximately 85% this development is closely related to the greater flexibility of the labor market.

¹⁵ CEA Statistics No 24, 'European Insurance in Figures' <http://www.cea.assur.org/cea/download/publ/article243.pdf> (June 2006)^p

There are different distribution methods among countries in Europe such as agents, brokers' financial intermediaries and commercial networks deal with several thousand experts, computer firms, prevention officers, etc.

1.3.4 Distribution Channels

As we mentioned above distribution channels for insurance products illustrate very different patterns among European countries. In Netherlands, Poland and Slovakia agents represent more than 50% of the total insurance business; whereas in Portugal, France and Italy banks appear to be preferred by consumers for the purchase of insurance products.

While in Switzerland 84% of the premium income is directly collecting by company employees, in Austria, Spain and Belgium the share of the premium income is collecting with different distribution channels.¹⁶

1.3.4.1 Life Insurance Distribution Channels

For life products in the United Kingdom, Ireland and Slovakia, brokers are the most important distribution channels. Independent distributors in the UK have grown over the last few years, and are concomitant with the fall in 'tied agents and

¹⁶ CEA (European Insurance and Reinsurance Federation) Annual Report 2005 - 2006

<http://www.cea.assur.org/cea/download/publ/article242.pdf> p 19

employees' market share.

The bankinsurance network in western continental Europe (IE, AT, BE, ES FR, IT, PT, SE), is the leading distribution channel for life products. The share of this channel varies from 45% in Sweden and Belgium to 83% in Portugal.

Contrast it is in other developed countries in Europe bankinsurance in Germany is not yet well developed while brokers and tied agents is still leading the life insurance market in Germany.

In the markets of the Netherlands, Poland and Slovenia agents has a big impact where their share is above 50%.

1.3.4.2 Non-life Insurance Distribution Channels

When we look at many European countries banks are leaders in the distribution of life insurance; however in the non-life products agents is the leader. Their market share is above 50% in Italy (83%), Slovenia (71.5%), Turkey (70.6%), Portugal (60.6%), Poland (56.2%) and the Netherlands (54%). The lowest market shares are encountered in Austria (10.5%) and Belgium (8.4%).¹⁷

The main distribution channels for non-life products in Belgium, Slovakia and the United Kingdom is brokers with 67.1%, 57% and 36% market shares respectively.

¹⁷ CEA (European Insurance and Reinsurance Federation) Annual Report 2005 – 2006 p 13

Insurance companies' employees whose market share is declining on every market (except the UK and Netherlands) are far from negligible players in Austria (43.7%), France (35%) and the Netherlands (35%).

Bankassurance providers have not met with the same success in non-life as in life activity. Except in the United Kingdom, the Netherlands and Portugal where they have more than 10% of market share is bankassurance. This difference may find its origins in the savings aspect of many life products, which is close to bank products, and to the willingness of customers to keep privileged relationships with their agents or brokers who are often able to offer a greater proximity.

1.3 THE ECONOMIC SIGNIFICANCE OF INSURANCE MARKETS IN EUROPE

Insurance industry plays a key role in the Europe market and has potential growth economy and employment. Nevertheless, in order to allow the insurance sector to play the full its economic and social role, an optimal regulatory environment is required.

Moreover, in a global economy insurance mechanism promotes economic development in the market through different channels. For example, insurance sector is providing broader insurance coverage directly to firms, encouraging investment and create market dynamism and competition, in addition offering social protection and promoting sensible risk management by households and firms.

When considering the social protection, Europe population structure is changing and the ratio of the working population to retirees is reducing significantly due to factors, such as longer life expectancy, an increase in elderly people and falling birth rate. Public pension schemes are placing public sector financing under pressure, to overcome from this pressure insurance market needs alternative pension schemes provided by private insurers.

Within the EU there are also large gaps between different insurance markets. Some countries insurance penetration rate very high and comparable, whereas others show very low rate so there is different insurance patterns within EU but always positive correlation between macroeconomic performance and the size of the insurance sector.

In conclusion, insurance industry has potential for economic growth in Europe.

2. STRUCTURE OF TURKISH INSURANCE SECTOR

2.1 PREMIUM INCOME

In the 2005 Turkey generated a total premium volume of 7.816.434.741 YTL and increased 15.19 percent compared to the previous year. Moreover, in the year 2005 premium production in current prices in all branches are also increased due to the

development in awareness of the insured as the result of supportive economic environment, low interest rates and moderate inflation.

When we look at the dispersion between the premium production of life insurance area and the non – life insurance areas we will see that the premium production of non life insurance areas is 85.67% and that the premium production of the life insurance area is 14.33% and industry grew rapidly, particularly in the Fire, Marine, Accident, Agricultural and Life branches.

2.1.1 Life Insurance Premium Income

In the life branch the premium income in 2005 was generated 1.242.011 YTL, showing an increase rate of 1.48% compare to previous year, whereas the ratio of life branch in total premium income has decreased from 18.04% to 15.69 % in the year 2005 the reason for this is because many life insurance policies that were converted into Private Pension contracts with launching of Turkey’s Private Pension System.¹⁸

This improvement of life insurance indicates that when increase the income per person due to economic and financial development of Turkey will probably cause increase of the production variety in life insurance and sector will have a more competitive structure.

¹⁸ Association of Insurance and Reinsurance Companies of Turkey, Annual Report2005 p. 37

<http://www.tsrb.org.tr/FaaliyetRaporu.pdf>

2.1.2 Non - Life Insurance Premium Income

The premium volume achieved in non life was 5.365.788 and this figure has been improved to 5.640.965 at the end of 2005 by 5 % according to previous year.

Non life insurance is divided into these branches in Turkey, Fire, Transport, Accident, Liability, Engineering, Agriculture, Health, Forensic, Personal accident and Credit respectively. The rate of accident area in the total production is with 32,05 % at the first place, the fire area is with 16.38% at the second place and the financial responsibility area is with 14.99 at the third place.

2.1.3 Penetration rate

As economic potential, Turkey is a big country and has a huge potential for economic growth, however if we look at the insurance penetration rate, in the form of premium as a percentage of GDP is 1.8 % compare to other European market is still considerably low but is set to increase.¹⁹

When the reel premium increase is considered due to improving economic conditions and real income levels, the insurance awareness in Turkey is rising and it is estimated that the production variety would be increased and the insurance sector will grow its penetration in Turkish GDP;²⁰ moreover ‘having a young and increasing

¹⁹ **Olphen, G.,V.,** BEST, Turkinsurance, Turkish Insurance-Reinsurance- Pensions, ‘Turkey is an attractive market and a lot foreign investors have a huge trust in Turkey’ Volume Two April 2007, p.27-28.

²⁰ BEST, Turkinsurance, Turkish Insurance-Reinsurance- Pensions, ‘The Potential of Insurance Sector in Turkey’ Volume

population structure and also low level of insurance penetration in the GNP are accepted as the indication of the existence of a serious potential for insurance in the country. In general there is a positive correlation between insurance penetration and per capita GDP.²¹

2.2 INVESTMENT

Except for these two crises 1999-2001, which was characterized by the decline of huge capital investment losses, also number of companies and a loss of policyholder's confidence, Turkish insurance sector has experienced a real growth. The inflation, which has returned to one- digit numbers 7.7 % at the end of year 2005 in Turkey.

Investment in insurance sector in Turkey is reached 10.349.975.000 YTL. by the channel of various investment tools in 2005 with an increase of 41.14 % over the previous year. The highest proportion within the investment portfolios of the companies was of Treasury bonds and Government Bills with 49.59 %, followed by Participants with 20.96% and Deposit Accounts with 14.21%, therefore sector needs a strong insurance structure to protect and support these investments and assets.²²

Three May 2007, p.6.

²¹ **Basar C., BEST**, Turkinsurance, Turkish Insurance-Reinsurance- Pensions, 'Last two months of the market' Volume Four August 2007, p.17.

²² Association of Insurance and Reinsurance Companies of Turkey, Annual Report2005

After the completion of EU membership process, economic growth and combined the increase the level of welfare have drawn the attention of foreign insurers to the Turkish insurance industry. The increase in foreign direct investment, which is expected to contribute 1-1,5 % in the annual growth rate of the Turkish economy.²³ In addition when we look at the market share of foreign capital in the insurance sector was more than 34% in five of the top ten companies in premium production last year.²⁴

It is expected that, the investment of foreign will increase in the following years as a result of Turkish economic and financial growth with a strong demographics and the movement towards Europe.

2.3 MARKET OPERATORS

2.3.1 Number of Companies

Number of companies operating in the Turkish industry was 53 and 2 reinsurance companies at the end of 2005. When we looked through to the activity fields of companies, it is seen that 21 of them were operating in life and / or Private

<http://www.tsrsb.org.tr/FaaliyetRaporu.pdf>

²³ BEST, Turkinsurance, Turkish Insurance-Reinsurance- Pensions, 'Turkish Insurance Sector Attracts Foreign Capital', Volume One February 2007, p.4-5.

²⁴ Milli Reasurans T.A.S. 77th year, Annual Report 2005, 'An Overview of the Turkish Insurance Industry', p. 18

Pension companies and of those, 11 were exclusively Private Pension companies. 32 of them were Non Life companies and 6 were inactive.

The market share of the leading company is generally smaller in non life business than in life business, this mainly because there are significantly more companies in the non life sector. Around 64% of the market premium was generated by the top ten companies in the Turkish insurance industry. Seven out of these ten companies are backed up with foreign capital.²⁵ The positive business development in Turkey has encouraged many foreign insurers to enter Turkish market.

2.3.2 Number of Employee

The number of employees in the insurance industry has been increased by 10.6% and reached to 12.837 by the end of 2005. People of the 1.277 new employees, 708 of them are women and 519 are men.²⁶

2.3.3 Distribution Channels

Distribution channels are one of the important market operators for insurance sector. While choosing the distribution channels, time and cost factors are very

²⁵ Republic Of Turkey Prime Ministry Undersecretaries of Treasury Insurance Super Visory Board, 'Report about Insurance and Private Pension Activities in Turkey' <http://www.hazine.gov.tr/SDK2005/giris.htm> (2005)

²⁶ Association of Insurance and Reinsurance Companies of Turkey, Annual Report 2005

<http://www.tsrbsb.org.tr/FaaliyetRaporu.pdf>

important for companies.²⁷

In Turkish insurance sector are used two distribution methods; direct and indirect distributions channels. Direct distribution channels cover sale activities realized by highly educated and experienced sale teams. Indirect distribution channels which are outside the company the company like agencies and brokers. For elementary branches mostly use agencies and 70% of Premium productions are supplied by agencies whereas only 15% of the market constitute by brokers in Turkey.

Bankinsurance is also one of the indirect sale and fairly new in Turkish market. Banks started to provide insurance products and services besides traditional banking products and services. Changing competition conditions are encouraging both bank and insurance companies to adopt the bankinsurance concept as a part of their marketing strategies.

2.4 THE POTENTIAL OF INSURANCE SECTOR IN TURKEY

As far as macroeconomic indicators are concerned, insurance market of the Turkey is very attractive with a potential of the population of nearly 73 million and impressive GDP growth (the promising 7 % growth rate of Turkish economy). The result of all positive developments of macroeconomic indicators Turkish insurance

²⁷ BEST, Turkinsurance, Turkish Insurance-Reinsurance- Pensions, 'Distribution Channels and marketing strategies in Turkish

insurance market' Volume Two April 2007, p.5-6.

sector shows a growth over inflation each year and is expecting to continue even faster growth.²⁸

There are also interesting developments in terms of laws and regulation. Sector completed EU norms or requirements; however if we consider differences in insurance structure between Turkey and developed European countries there is a large gap and social security system and favorable stock markets in Europe can explain this gap.

According to Swiss Re research (world insurance sector and Turkey 2005) Turkish insurance market is the second fast growing insurance sector in Europe. Turkish people become aware of importance of insurance in their life and also entry of foreign capital into the sector will bring quality in competition. Companies in Turkey can benefit from foreign investors marketing and product development experience.²⁹

As explained in the previous section, each country is different in terms of its economic strength, population penetration, insurance market size and structure also characteristics.

In the following section of this research we will take a closer look at these differences and analysis facts and figures for each country which we provide on the

²⁸ **BEST, Turkinsurance**, Turkish Insurance-Reinsurance- Pensions, ‘The Potential of Insurance Sector in Turkey’ Volume Three May 2007, p.5-6.

²⁹ **BEST, Turkinsurance**, Turkish Insurance-Reinsurance- Pensions, ‘What Turkish Insurance thinks about foreign investments’ Volume Three May 2007, p.26

Total Premium Income, Investment, Number of Employee, Number of Companies, Population, GDP and Inflation, whereas because of detailed overview of the all EU countries and Turkey we are expecting a strong relationship to exist between Total Premium Income and Investment, GDP.

3. METHODOLOGY

3.1 Aim of the Research

The main purpose of this research is to find out the true typology (the profile) of the Turkish and European Insurance sectors based on the importance of insurance sectors in Turkish and European Economies.

Our aim is to develop an objective of classification of countries (European countries and Turkey) as well as to compare and profile the structure of the Turkish and European Insurance sector.

In the model Total Premium Income is chosen as a dependent variable for these two reasons: (1) Premium Income is comparable to revenue and the best indicator of insurance development in countries and (2) gives an idea to see the place of countries in the European Insurance Business. Whereas, GDP, Number of Companies, Population, Investment, Inflation and Number of Employee is chosen as predictors (independent variables) for Total Premium Income.

While we are examining our data we will use number of different procedures. We can summaries these procedures in these three steps;

1. To test the validation of overall model and see the effect of each independent variable on dependent variable in the model by using multiple regression analysis.

2. Examine Countries (which specified by clusters) in the model, due to their Premium Income and independent variables by using Cluster Analysis. Therefore Clusters will be test for 2 different Profiles. One is based on Premium Income and the other one based on independent variables.

3. To find out whether there are differences among groups (clusters) for each Profile in terms of their Premium Income by using One – Way ANOVA and Kruskal Wallis test.

If we look at Turkish insurance sector in general, the insurance sector in Turkey is well developed in the presence of various insurance products and has been a rapid growth in the five years. With strong demographics, moderate inflation and supportive economic growth make number of foreign insurance companies to gain access to the Turkish market. The proportion of the premiums to gross national product is 9% in developed countries and 3.6% in developing countries. The same proportion is measured in Turkey as 1,73 % end of 2006. While the premiums per person are around USD 514 in the world, this size is USD 93 in Turkey. This shows that although Turkish insurance sector is very promising and attractive needs more time for real growth.³⁰

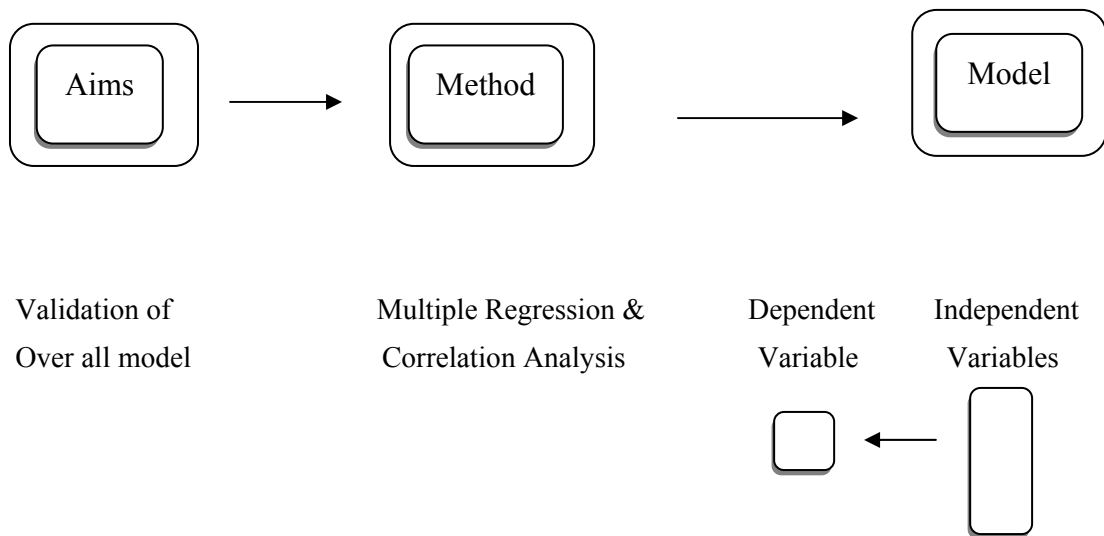
³⁰ BEST, Turkinsurance, Turkish Insurance-Reinsurance- Pensions, 'Where is the Turkish Insurance Sector on the World?

Furthermore, Insurance makes a major contribution to Europe's economic growth and development. According to figures published by Swiss Re in a sigma inquiry, with 36.9% of the world insurance business in 2004, Europe (Eastern and western taken together) is the world's largest insurance market, just ahead of North America which accounts for 36%. The development of life insurance in Europe and the increase in insurance penetration rate in Eastern countries allowed Europe to overtake North America in this ranking for the first time. Behind these two leaders, Asia accounts for 22.7% of world premium income.³¹

3.2 Characteristics of the Research Model

For the purpose of this analysis we have defined one dependent and six independent variables comprised of 30 countries. The model will be tested for two different perspectives. One is validation test for overall model and the other one; validation test for specified country profiles related to their Total Premium Income. Therefore in this research model, within both test levels the characteristics of the research will be paid attention in equal ways.

³¹ Swiss Re, Sigma No 5 / 2006 'World Insurance in 2005': moderate premium growth, attractive profitability.



With regression analysis we will test the validation of overall model and choose to add or remove variables depending on the significance of their F values (all statistical tests were evaluated at the 0.05 level of statistical significance). So, all the variables which we will use in this analysis are selected in line with their relationship with the dependent variable. One at a time one variable is removed while the second variable is chosen till the results are significant for the order in which the variables are added in the analysis.

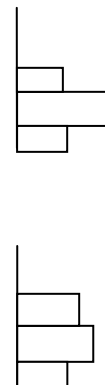
Classification of Countries
based on dependent variable
(Profile 1) and independent
variables (Profile 2)

Cluster Analysis

Profile 1



Profile 2



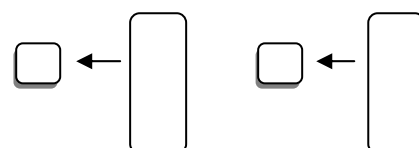
After testing the validation of our model in the second stage of analysis we will use Cluster analysis. Cluster analysis has been used to group countries into clusters that are similar in terms of some relevant characteristic. Typically, these clusters have been developed based on Profile 1 and Profile 2. Thus, Profiles of clusters will help us to understand the existing strengths of the local insurance sectors as well as provide insights for devising potential cluster-based Total Premium Income in each country.

Validation of
Research Model
based on Profiles
Turkey

Multiple Regression &
Correlation Analysis

Profile 1
Cluster of

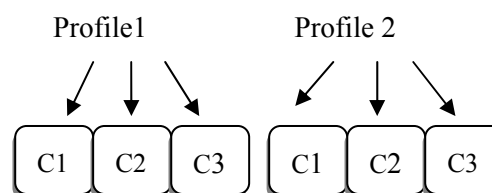
Profile 2
Cluster of
Turkey



Using Cluster analysis we specified 2 Profiles. In this stage of research we would like to know validation of model; however this time, it is based on Profile 1 and 2.

Test for difference
between clusters
in terms of Total Premium
Income

ANOVA & Kruskal
Wallis Test



End of Cluster Analysis we obtained three clusters for each Profiles. After being also sure for validation of the model in terms of Profiles, we apply to ANOVA and Kruskal Wallis test to distinguish differences between and within countries due to Profiles.

As noted above, there are one dependent variable (Premium Income) and six independent variables (Population, GDP, Inflation, Number of Employees, Number of Companies, and Investment) that form the basis of the analysis.

These are described and interpreted below.

Total Premium Income: Total Premium Income is a payment, or one of the periodical payments, a policyholder makes for an insurance policy.³² There is an important relation between premium income and economy. Premium Income generates significant economic growth for developing countries; moreover it is one of the most important indicators for the development process of a country.

Investments: Investment is a return received by insurers from their investment portfolios including interest, dividends and realized capital gains on stocks. It doesn't include the value of any stocks or bonds that the company currently owns. According to CEA³³ insurance figures total investment by the insurance industry (estimated at their market value) amounted to €6 371 bn in 2005 and it reflects the dynamism of insurers in investment activities and the performance of the stock market. There is a positive relation between investment and Premium Income which provides a long – term source of

³² Insurance Dictionary 'The Insurance Centre' <http://www.nauticom.net/www/insctr/glossary.htm#sectN> (December 1999)

³³ CEA collects analyses and compiles annually a substantial amount of general, financial and technical data relating to insurance and obtained from its members).

finance for investment in the economy and encourages employers for an investment.

GDP: GDP is; gross domestic product per capita in USD, which one of the main drivers for economic growth. The ratio of investments to GDP constitutes another indicator that allows an estimation of the relative importance of the insurance sector in the economy and mainly that allows comparison of the development of the insurance sector from country to country. When insurance premium grow is more slowly than GDP insurance penetration decline and the insurance density increases as the nominal value of premium grew faster than population.

Population: In all industrialized countries, the population structure is changing. There is a growth in elderly people and falling birth – rate. When we compare total premium amounts to the number of inhabitants in each country is a good indicator of insurance development in those countries. However, this ratio should be carefully analyzed. Not only does it not correspond to sums actually paid by insurers but in addition it does not always include premiums paid by the inhabitants of the country concerned. ³⁴

³⁴ Association of Insurance and Reinsurance Companies of Turkey, Annual Report2005

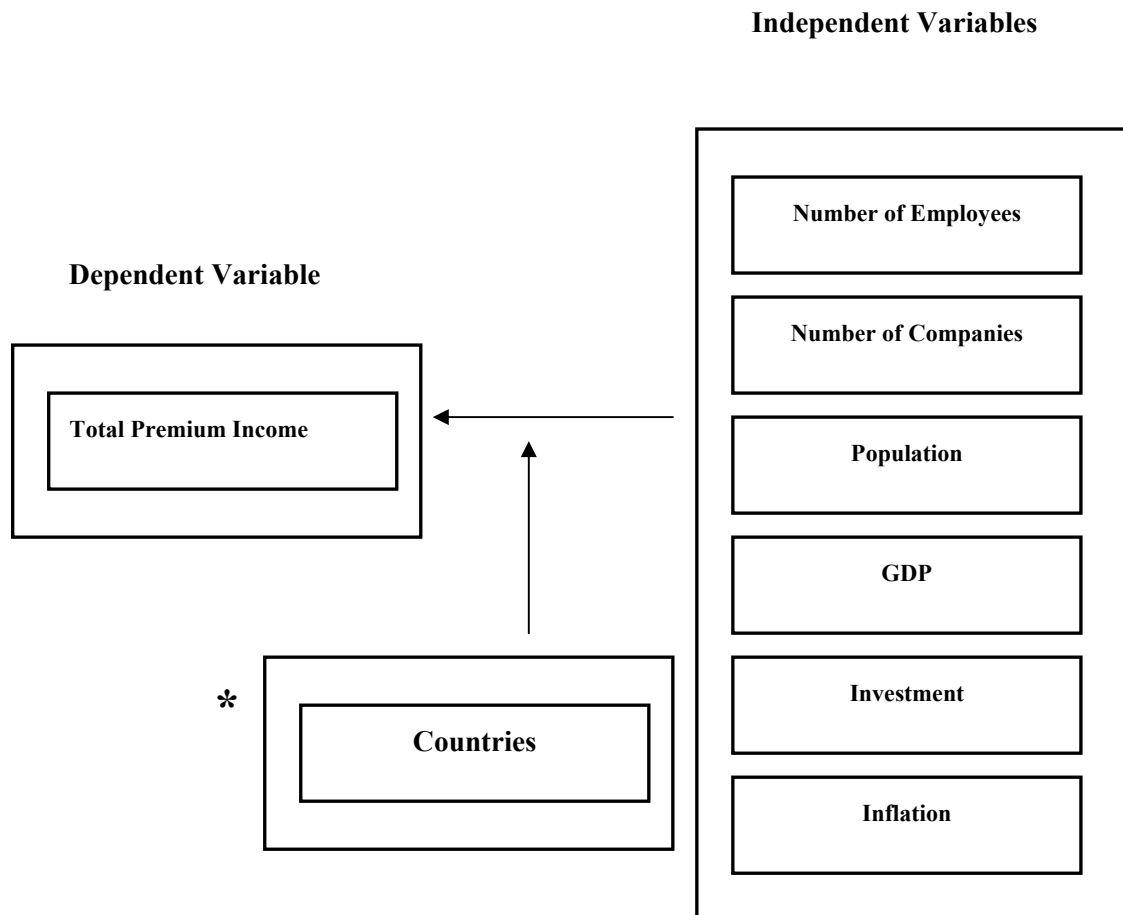
The population of Turkey is in the 19th order among the most crowded countries in the world. Approximately 60 percent of the population in Turkey is composed of people below 30; however this ratio is 22% in the European countries. This is the most important reason why foreign companies are interested in the Turkish insurance sector.

Number of Companies: The number of companies operating in the European market is approximately 5 300 and it is rather high rate. Earned Premium Income allows companies to expand and take economic risks and let them to operate also in other countries inside or out – side Europe.

Number of Employees: According to provisional figures for 2005, the total number of people directly employed in the insurance industry was over 1 million. Furthermore, insurers provide work for approximately 1 million agents, brokers and financial intermediaries and deal with several thousand experts, computer firms, prevention officers, etc.

Inflation: An optional property coverage endorsement offered by some insurers that increases the policy's limits (premium) of insurance during the policy term to keep pace with inflation.

Figure1. The Initial Regression Model



*We are going to restructure model after performing resulting in cluster analysis. We did two cluster analysis, first analysis with Profile 1 (based on dependent variable; Total Premium Income) and second with Profile 2 (based on independent variables; GDP, Investment and Number of Employee which have significant effect on the Total Premium Income).

3.2.1 Scale Characteristics of the Data

Characteristics of techniques which we will use for our data and objectives of our research permit us use quantitative (metric) variables (which are measured interval scales are going to be used as criterion variables for the classification of the countries). The data we will use in this research is a secondary data.

All possible variables which research cover are provided by the CEA (The European Insurances and Reinsurance Federation) and they include values from European Insurance complete data 2004).

3.3 Statistical Methods to Be Used in Research Analysis

3.3.1 Multiple Regression Analysis

In our research by regression analysis, first we will check if our model fits the data then test the significance of each independent variable and the validation of overall model for all countries which are entered to the analysis.

Regression analysis is a statistical technique that is used to relate two or more variables. The dependent or response variable (Y) is a variable of interest and related to one or more independent or predictor variables (X's).³⁵

The objective in regression analysis is to form a regression model or a

³⁵ MALHOTRA, N.K., Marketing Research: An Applied Orientation, 3th Edition, 1999 p 530

prediction equation concerning the independent variables. Then the model can be used to determine, predict and control the variable of relation to the basis of the independent variables.

The general form of the multiple regression model can be expressed as:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_k X_k + e$$

where $\beta_1, \beta_2, \dots, \beta_k$ are coefficients combined with the independent variables $X_1,$

$X_2, \dots, X_k$ and e is the error or residual which is the difference between the independent variables and observed values of Y).

The prediction equation in multiple regression analysis is:

$$\hat{Y} = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + \dots + b_k X_k$$

which $\hat{Y}$ is the predicted Y value, and $b_1, \dots, b_k$ are the partial regression coefficients.³⁶

³⁶ MALHOTRA, N.K., Marketing Research: An Applied Orientation, 3th Edition, 1999 p 539

The meaning of the partial regression coefficient, b_1 , is that it represents the expected change in Y when X_1 is changed by one unit keeping X_2 stable or controlling for its effects. Likewise, b_2 represents the expected change in Y for a unit change in X_2 , when X_1 is held constant. Thus, b_1 and b_2 are called partial regression coefficients.

Therefore, the initial regression model for our data is,

$$\text{Total Premium Income} = \text{Constant} + \beta_1 \text{ GDP} + \beta_2 \text{ Investment} + \beta_3 \text{ Number of Companies} + \beta_4 \text{ Number of Employees} + \beta_5 \text{ Inflation} + \beta_6 \text{ Population} + \text{Error}$$

$$\begin{aligned} \text{Total Premium Income} = & - 27397,7 + 4,320\text{E-}02 \text{ GDP} + 0,109 \text{ Investment} + 105242,0 \\ & \text{Number of Companies} + -,248 \text{ Number of Employees} + - 1076,864 \text{ Inflation} + - 8,37\text{E-}02 \text{ Population} + \\ & \text{Error (we get coefficient values from SPSS Out-put, Appendix- Table A5, p 130)} \end{aligned}$$

Assumptions for Regression Analysis

The regression model makes a number of assumptions in estimating the parameters and in significance testing.

1. The error term is normally distributed.

2. The relationship between Y and X is a linear (straight line).
3. The mean of the error term is 0.
4. The variance of the error term is constant.
5. The error terms are uncorrelated. In other words, the observations have been drawn by chance.

Stages of Multiple Regression and Correlation Analysis

1-Linearity: First we will check if there is linearity between dependent and independent variables in regression analysis. It is assumed that the relationship between Y and X which we are modeling is a linear (straight line). The relationship between dependent variable (Y) and independent variable (X) should be 0.70 but not less than 0.70. If there is any relation less than 0.70 then we conclude that independent variable should be removed from the model. Another definition for linearity could be that the regression model is linear in the parameters α , β , but it may or may not be linear in the independent variable X. This means that in a linear regression model the parameters α and β cannot be expressed as $\sqrt{\beta}$, β^3 or β/α .³⁷

³⁷ **BAGOZZI, R.P.**, Principles of Marketing Research, “Regression Analysis for Marketing Decisions, Dipak Jain,

2-Multicollinearity: After checking linearity we should also look for multicollinearity between independent variables in a regression equation. The existence of relationships (>70) between the ‘independent’ variables is called multicollinearity. One way of identifying multicollinearity is to scan a correlation matrix of all the predictor variables and see if there are any correlations of above 0.70. If multicollinearity is greater than 0.70 then the variable is unstable. Its value and the associated t statistic may be deleted from regression analysis.

When multicollinearity occurs there are several ways of reducing its effects. The simplest approach is to remove variables from regression model. For example, X_1 and X_2 are highly correlated (>70) then it may be simply to use only one of them, mainly all of the information which X_1 has also the X_2 contains (Kumar). Another approach is combined the correlated variables into a single scale. Like income, education and occupation are often combined into a “Socio economic status”

3 - Validation of Regression Model

In this stage of regression analysis now we would like to test the significance of each variable in regression model as well as the validation of overall model. In this case, we have two hypothesis, one is null ($H_0: R^2_{pop} = 0$) hypothesis and the other one is alternative hypothesis ($H_a: R^2_{pop} \neq 0$). The null hypothesis for the coefficient of multiple determination in the population, R^2_{pop} , is zero.

$H_0: R^2_{pop} = 0$ (All the independent variables are not important for predicting Y)

$H_a: R^2_{pop} \neq 0$ (At least one independent variable is important for predicting Y)

Thus,

$$H_0: \beta_1 = \beta_2 = \beta_3 = \dots = \beta_k = 0$$

$$H_a: \beta_1 \neq \beta_2 \neq \beta_3 \neq \dots = \beta_k \text{ (not all are equal to zero).}$$

To test these hypotheses and the validation of our model, we use the following F test.

F-test: The F test is used to test the null hypothesis that the coefficient of multiple determination in the population R^2_{pop} is zero.³⁸

If p - value < 0.05, the overall null hypothesis is rejected, therefore our model is valid and at least one independent variable is important for predicting Y in the model. Moreover, if the independent variables are independent (uncorrelated), and then R^2 will be the sum of bivariate r^2 of each independent variable with the dependent variable.

³⁸ MALHOTRA, N.K., Marketing Research: An Applied Orientation, 3th Edition, 1999 p 539

$$F = \frac{SS_{\text{reg}}/k}{SS_{\text{res}}/(n - k - 1)}$$

$$= \frac{R^2/k}{(1 - R^2)/(n - k - 1)}$$

k and $(n - k - 1)$: degrees of freedom

k : number of independent variables

n : sample size

Where, SS_{reg} is Sum of Squares Regression and SS_{res} Residual of Sum of Squares.

Sum of Squares Regression (SS_{reg}): The amount of variability in Y that is accounted for by the regression model.

Residual of Sum of Squares (SS_{res}): The variation in Y not accounted for by the regression model.³⁹

³⁹ Model Building and Regression Analysis / Treasury Board Secretariat of Canada

http://www.psagency-agencefp.gc.ca/hr-rh/psds-dfps/dwnld/dafps_basic_stat2_e.doc

4-Explanatory Power of Regression Model and Auto – Correlation Analysis

So far, we have discussed the validation of overall model and significance of each variable in the model. However, in this part we would like to know degree of explanatory power of our regression model. In other words, how well do X's explain Y? To answer this question we consider measures R Square and adjusted R² from SPSS out-put.

Then, we will also check Auto-Correlation according to the result of *F* test.

R Square: The statistical significance of regression model is represented by the square of the multiple correlation coefficient, R², which is also called the *coefficient of multiple determination* and takes value between 0 and 1(always positive). R² indicates how well the regression model explains changes in the value of the dependent variable. In our model R² is 98% shows that 98 percent of the variation in the dependent variable (Total Premium Income) is explained by independent variables.

$$R^2 = \frac{SS_{\text{reg}}}{SS_y}$$

$$R^2 = \text{variance explained by the regression model} / \text{Total variation in } Y^{40}$$

⁴⁰ MALHOTRA, N.K., Marketing Research: An Applied Orientation, 3th Edition, 1999 p 540

$$SS_y = SS_{reg} + SS_{res}$$

Where, SS_y is called Total Sum of Squares (the differences between the observed values and the mean value)⁴¹

The multiple correlation coefficient, R , can also be viewed as the simple correlation coefficient, r , between dependent and independent variables. The sign of simple correlation coefficient (+ r , - r) shows the slope of the regression line. The coefficient of multiple determination, R^2 , cannot be less than the highest bivariate, r^2 of any individual independent variable with the dependent variable. R^2 will be larger when the correlations between the independent variables are low. If the independent variables are statistically independent (uncorrelated), then R^2 will be the sum of bivariate r^2 of each independent variable with the dependent variable. R^2 can not decrease as more independent variables are added to the regression equation. After the first few variables, the additional independent variables do not make much of a contribution. For this reason, R^2 is adjusted for the number of independent variables and the sample size by using the following formula:

$$\text{Adjusted } R^2 = R^2 - \frac{k(1 - R^2)}{n - k - 1}$$

⁴¹ MALHOTRA, N.K., Marketing Research: An Applied Orientation, 3th Edition, 1999 p 541-542

Auto – Correlation (Durbin Watson): The Durbin–Watson test tests for correlation between errors. If the values are less than 1 or greater than 3 then the data should definitely be checked again. If the values are close to 2 this is better and it represents no auto-correlation area which we look for our data.⁴²

5- Contribution of External Variables to the Explanatory power of the Regression Model

End of all these analyses, we can conclude that our model is valid (F test = 0.00) and some of variable is important predicting in Y . In this last stage of regression analysis we want to learn, how strong relationship between X (dependent variable) and Y (independent variable), for this reason we will apply to Correlation matrix table and t test.

Correlation: Correlation shows the degree of relationship between the variables. It takes value between 0 and +1. If there is one dependent and more than one independent variables for the model then relationship is called multiple correlation coefficient.

Beta Coefficient: In the Correlation matrix table β coefficients indicate the individual contribution of each predictor (independent variables) to the model and explain the relationship between Premium Income (dependent variable) and each

⁴² **BAGOZZI, R.P.**, Principles of Marketing Research, “Regression Analysis for Marketing Decisions, Dipak Jain, Basil Blackwell Ltd.1994 p 137

independent variable. If the value is positive then there is a positive relationship between the independent variables and the dependent variable whereas a negative coefficient represents a negative relationship.

Standard Error of Estimate (Residual): A residual is the difference between the observed value of Y_i and the value predicted by the regression equation $\hat{Y}_i$.

t – Test (test of regression coefficient): t - tests measure whether the independent variables are making a significant contribution to the model. If the value in the column labeled Sig. (SPSS-Output) is less than 0.05, then the independent variables make a significant contribution to the model. In case one or more population partial regression coefficients have a value different from zero then overall null hypothesis is rejected. To define which specific coefficients (β_{is}) are non zero, could be apply to additional tests. The significance of the partial regression coefficient is tested by using t - test. Where,

$$t = \frac{b}{SE_b}$$

b : Parameter Estimate

SE_b : Standard Error

which has a t distribution with $n - k - 1$ degrees of freedom. This coefficient

is significant at $\alpha = 0.05$.

We can use this test when only the overall model of the test is significant (valid). According to the result of F test our model is valid and at least one of the independent variable is significant, so we can use t test to examine each independent variable (separately) which one has a strong relation with dependent variable.

3.3.2. Cluster Analysis

We apply to Cluster (hierarchical) method to find out a classification of countries (European countries and Turkey) as well as to compare and profile the structure of the Turkish and European Insurance sector.

Cluster Analysis is a technique used for classifying objects into groups. This can be used to sort data (a number of people, companies, cities, brands or any other objects) into homogeneous groups based on their characteristics.⁴³

The variables should be measured on an interval or ratio scale. This is because the clustering techniques use a distance measure to find the closest objects to group into a cluster.

Cluster analysis has been referred to as Q-analysis, typology, classification

⁴³ Cluster Analysis / 2007 Flatworld Solutions Pvt. Ltd.

<http://www.outsource2india.com/kpo/spss-data-analysis/cluster-analysis.asp>

analysis, numerical taxonomy, grouping, clumping and unsupervised pattern recognition. This variety of names is due in part to the usage of clustering methods in such diverse disciplines as business, economics, psychology, biology, sociology, and engineering. Although the names differ across disciplines, they all have a common dimension: classification according to natural relationship.⁴⁴

Statistics Associated with Cluster Analysis

Agglomeration schedule: Provides information on the objects or cases being combined at each stage of hierarchical clustering process. In our model Agglomeration table will help us to see which countries are entered to which clusters.

Cluster centroid: The centroids represent the mean values of the variables for all the cases or objects in a particular cluster.

Cluster membership: Shows the cluster to which each object or case belongs.

Dendrogram: Also called a tree graph, a graphical device shows clustering results. Vertical lines represent clusters that are joined together. The position of the

⁴⁴ NISEL, R. N., Statistical Classification of Information in Business Organizations by Cluster Analysis, Istanbul,

line on the scale indicates the distances at which clusters were joined.⁴⁵

Distance Measure: The distance measure determines how similar or dissimilar the objects being clustered are. The most common approach is to measure similarity in terms of distance between pairs of objects. Objects with smaller distances between them are more similar to each other than are those at larger distances.

Euclidean distance: The Euclidean distance is the square root of the sum of the squared differences in values for each variable.

Objectives of Cluster Analysis

The main purpose of cluster analysis, as mentioned before is to group variables, objects, or individuals into clusters that are more similar to each other than to other variables, objects, or individuals in another cluster. Therefore, in our research, Cluster Analysis is used to classify countries into similar clusters.

Assumptions for Cluster Analysis

1. All of the variables that are used in a cluster analysis should be quantitative (though ordinal variables and dummy variables generally give satisfactory results). The procedure relies upon calculation of distances among items, and distances

⁴⁵ MALHOTRA, N.K., Marketing Research: An Applied Orientation, 3th Edition, 1999.

are meaningful only for variables with interval or ratio scaling.

2. In conducting a cluster analysis, it must be decided (1) whether to aggregate or disaggregate at successive stages of the analysis, (2) which distance measure to use, and (3) how to measure distances among clusters.⁴⁶

Types of Cluster Analysis Techniques

We classify the techniques of cluster analysis into two groups as hierarchical and nonhierarchical cluster analysis techniques. Hierarchical cluster analysis techniques can be classified into two sub-categories as agglomerative methods and divisive methods, and nonhierarchical cluster analysis techniques can be classified into three sub-categories as sequential threshold procedure, parallel threshold procedure and optimizing procedure.

Hierarchical method is appropriate method for our model as our sample size is $30 < 200$.

⁴⁶ SUDMAN, S., BLAIR, E., Marketing Research, A problem Solving Approach, International Additions, USA: Mc

Grow-Hill, Inc., 1998

1. Hierarchical Methods

Hierarchical clustering is characterized by the development of a hierarchy or tree-like structure.⁴⁷ Hierarchical cluster analysis attempts to identify relatively homogeneous groups of cases based on selected characteristics using an algorithm that starts with each case in a separate cluster and combines cluster until only one is left.⁴⁸

Hierarchical techniques as mentioned before can be agglomerative or divisive. For our research model we will apply to Agglomerative (Average Linkage) method.

1.1. Agglomerative Clustering

Hierarchical (Agglomerative) clustering is a procedure in which each object starts out in a separate cluster. Clusters are formed by grouping objects into bigger and bigger clusters. This process is continued until all objects are members of a single cluster. Agglomerative Clustering divide into six sub-categories as Single Linkage, Complete Linkage, Centroid Method, Median Method, Group – Average Linkage Method, The Ward Method.

⁴⁷ MALHOTRA, N.K., Marketing Research: An Applied Orientation, 3th Edition, 1999 p 435

⁴⁸ NISEL, R. N., Statistical Classification of Information in Business Organizations by Cluster Analysis, Istanbul, 2000 p 7

1.1.1. Average linkage

The average linkage method starts out the same as single linkage and complete linkage, but the clustering criterion is the average distance from individuals in one cluster to individuals in another. Such techniques do not use extreme values, as do single linkage or complete linkage, and partitioning is based on all members of the clusters rather than on a single pair of extreme members.

3.3.3 One - Way ANOVA (Analysis of Variance) and Kruskal Wallis Test

3.3.3.1 One – Way ANOVA

Analysis of variance will be used to test for the significance of differences within a country sample or between different means samples of countries by using variances in our model.

ANOVA is one of the best approaches to use when multiple sample means are compared to see if one of them is significantly different from one or more of the others. It provides global test to show significant differences between group means.⁴⁹

⁴⁹ Analysis of variance (ANOVA) for comparing means of three or more variables

After Cluster Analysis we obtained 2 Profiles. With ANOVA test we would like to test differences between and within countries due to their Total Premium Income for these 2 Profiles.

Statistics Associated with the One – Way Analysis of Variance

F statistic: The null hypothesis ‘the category means are same in the population’ ($H_0: \mu_1 = \mu_2 = \mu_3$) is tested by an **F statistic** based on the ratio of mean square related to X and mean square related to residuals. If F test is significant, we reject

the null hypothesis.

Mean square: This is the sum of squares divided by the appropriate degrees of freedom.

Standard Deviation: Root mean square deviation of values from their arithmetic mean.

SS_{between} : It can be defined as SS_x , The effects of X on Y are measured by SS_x . it shows variation among the categories of X. This is the variation in Y related to the variation in the means of the categories of X, or the portion of the sum of squares in Y

related to X.⁵⁰

SS_{within}: It is also referred to as **SS_{error}**, this is the variation in Y due to the variation within each of the categories of X.

SS_y: This is the total variation in Y.

To test the differences between means, one-way analysis of variance involves the decomposition of the total variation observed in the dependent variable. This variation is measured by the sums of squares. Analysis of variance tests the variation in the sample.

$$SS_y = SS_{\text{between}} + SS_{\text{within}}$$

$$SS_y = SS_x + SS_{\text{error}}$$

Where,

⁵⁰ **HOOLEY, G.J., HUSSEY, M.K.**, Quantitative Methods in Marketing, Harcourt Brace & Company, Ltd. 1994 p

$$SS_y = \sum_{i=1}^N (Y_i - \bar{Y})^2$$

Within Category Variation = SS Total Variation = SS_y

$$SS_x = \sum_{j=1}^c n(\bar{Y}_j - \bar{Y})^2$$

$$SS_{\text{error}} = \sum_j^c \sum_i^n (Y_{ij} - \bar{Y}_j)^2$$

Y_i = individual observation

$\bar{Y}_j$ = mean for category j

$\bar{Y}$ = mean over the whole sample, or grand mean

Y_{ij} = i th observation in the j th category

In order to test differences in group means, the total variation in Y , SS_y separate into SS_{between} and SS_{within} .⁵¹

Levene's Test: Levene's Test is used to test the homogeneity of variances. It tests the null hypothesis that the population variances are equal. If the result of p-value

⁵¹HOOLEY, G.J., HUSSEY, M.K., Quantitative Methods in Marketing, Harcourt Brace & Company, Ltd. 1994 p

less than 0.05 then we reject the null hypothesis ($H_0: \mu_1 = \mu_2 = \mu_3 = \dots = \mu_c$) and it is concluded that there is a difference between the variances in the population.

Scheffe's Test: When the result from One -Way ANOVA is to reject the null hypothesis, it means that one of the means is not same as the other means (H_a : At least one μ is different from one or more of the others). We apply to Scheffe's test to figure out where the differences lie. Scheffe's test will help us analyse pairs of means to see if there is a difference. Although Scheffe's test is used with unequal sample sizes, it could be used equal sample sizes.

Assumptions for Analysis of Variance

Some assumptions in analysis of variance can be summarized as follows.

1. The categories of the independent variable are assumed to be fixed. In the model, samples are considered randomly drawn from their respected population.
2. The error term is normally distributed, with a zero mean and a constant variance.
3. Samples have approximately equal variances.

Significance Testing

One-way analysis of variance will be used as a test of means for Country groups in the population.

Therefore,

$H_0: \mu_1 = \mu_2 = \mu_3 = \dots = \mu_c$ (the means are the same between the groups)

H_a : At least one μ is different from one or more of the others

SS_x and SS_{error} come from the same variation. The estimate of the population variance of Y can be based on either between-group variation or within-group variation. In other words, the estimate of the population variance of Y,

$$S_y^2 = \frac{SS_x}{(c-1)}$$

= mean square due to X

$$= MS_x$$

$$S_y^2 = \frac{SS_{error}}{(N-c)}$$

= mean square due to error

$$= MS_{error}$$

The null hypothesis can be tested by the F statistic due to these two equations:

$$F = \frac{SS_x}{SS_{\text{error}}/(N - c)} = \frac{MS_x}{MS_{\text{error}}}$$

Interpretation of Results

If the null hypothesis ($H_0: \mu_1 = \mu_2 = \mu_3 = \dots = \mu_c$) is true (not rejected), it means that the independent variable does not have a significant effect on the dependent variable. However, if the null hypothesis is rejected, then the effect of the independent variable is significant, so the mean value of the dependent variable will be different for different groups of the independent variable.

3.3.3.2 Kruskal Wallis Test

In this analyse, we want to examine if our model makes any difference related Countries which entered the model and also to test the effect of Profiles (1 and 2) on the Total Premium Income.

Furthermore, we have unequal sample sizes. When sample sizes are unequal or smaller than 5 in each group (second and third group has 4 countries) we apply to Kruskal Wallis test (as an alternative to One-Way Analysis of variance for the F test) to compare groups of our sample data.

Kruskal Wallis Test uses ranks (place of order) of the data while calculating

groups mean ranks and analyse the null hypothesis (H_0 : Countries do not differ in mean rank for the Premium Income).⁵²

In order to use this method, the level of scale should be at least ordinal, the characteristic of the samples are independent and the number of samples should be at least two. The critical value for the Kruskal-Wallis test is given by a chi-squared table.

Assumptions of Kruskal Wallis Test

1. Number of samples have been drawn independently (by chance) from their respected population.
2. For the X^2 approximation to be adequate there should ideally be 5 or more observation in each sample.
3. Tied observation are assigned ranks equal to the average of the ranks that could have been assign to the observations which had not been tied.
4. The data must be independent from each other.

The Kruskal-Wallis test statistic, K , compares the variations of the ranks of

⁵² MOUTINHO, L., GOODE, M. and DAVIES, F., Quantitative Analysis in Marketing Management, Great Britain:

John Wiley & Sons Ltd., 1998 p 138

the sample groups,

thus,

$$K = \frac{12}{n(n+1)} \sum_{i=1}^c \frac{R_i^2}{n_i} - 3(n+1)$$

Where,

n_i = number of observations in the i th sample

$n = n_1 + n_2 + \dots + n_c$ = total number of observations in the c samples

R_i = sum of the ranks for the i th sample

The sampling distribution of K is approximately the same as the chi-square distribution with $v = c - 1$ degrees of freedom (where c is the number of sample groups) if the null hypothesis of equal populations is true.

We reject the null hypothesis of equal population means if the test statistic is in the critical region.

Critical Region: $K > \text{Chi} - \text{square percent point function } (\alpha, c-1)$

Kruskal-Wallis can only tell us whether there is a difference between two or more of our groups and not which ones. To find out which groups are different we will use multiple comparison test.

Multiple Comparison Test: This test will help us determining which groups are different with pairwise comparisons.

Degrees of freedom;

Between Groups: Number of Samples / Groups – 1

Within Groups: n - Number of Samples / Group

Where we have 3 groups with 30 countries (total n = 30),

Between Group df = 3 – 1 = 2 and Within Group df = 30 – 3 = 27.

3.4 Findings of Results of the Research Analysis

3.4.1 Findings of Results of the Regression Analysis

3.4.1.1 Initial Regression Analysis (data 2005)

With regression analysis we have chosen to add or remove variables depending on the significance of their F values. First all predictors are entered into the model and we examine the output to see which predictors have a strong ability to predict the outcome. Then regression analysis is repeated until all predictors are significant.

As we mentioned in literature part, first we will check if there is a linear (linearity) relationship between dependent (X) and independent variables (Y). As it is shown from the **table 3.1** all the variables has strong relation (>70) with dependent variable, except Inflation has value 0.224. So, we conclude that there is a linear (straight line) relationship between X and Y which we are modeling.

After checking linearity we should also check multicollinearity (between independent variables). When we check multicollinearity from **table 3.1** we see that Number of Companies, Population and Inflation are weakly correlated to the remaining predictors variables.

To avoid multicollinearity we will start by removing the variables which have the strongest multicollinearity (greater 0.70) with other independent variables and the ones with the weakest relationship with the dependent variable and cause an insignificant value in t-test.

Starting with the smallest one (Population), $t = 0.643$ with P – value 0.527 (Appendix, Table A5, p 113), so we do not reject $H_0: \beta_1 = 0$ at any reasonable significant level. We conclude that the variable Population is not significant provided the other predictor variables remain in the regression function, also variable Population has a high multicollinearity (0.849 which is greater than 0.70) with GDP. After checking their relations with dependent variable we see that GDP (0.952) has the strongest relation with Total Premium Income while Population has 0.748, so we keep the variable has strongest relation with dependent variable (GDP) in the model and remove weakest one (Population) from the model in the second stage of regression analysis.

Although all the variables together are significant in the F test (Sig. 0.00) from the coefficient (Appendix, Table A5), we see that some of the t statistics for each of the individual variables in the regression function are not significant at the 0.05

level of confidence (Number of Companies has a P-value 0.335, Population P-value = 0.527 and Inflation P-value = 0.251 which are all greater than 0.05, insignificant), therefore after removing Population and Inflation we will also remove Number of Companies from our model.

Correlations

		PREMIUM	COMPANIE	EMPLOYEE	INVESTMENT	POPULATION	GDP	INFLATION
Pearson Correlation	PREMIUM	1.000	.902	.915	.981	.748	.952	.224
	COMPANIE	.902	1.000	.873	.926	.621	.830	.254
	EMPLOYEE	.915	.873	1.000	.939	.755	.919	.136
	INVESTMENT	.981	.926	.939	1.000	.697	.915	.242
	POPULATION	.748	.621	.755	.697	1.000	.849	-.174
	GDP	.952	.830	.919	.915	.849	1.000	.179
	INFLATION	.224	.254	.136	.242	-.174	.179	1.000
Sig. (1-tailed)	PREMIUM	.	.000	.000	.000	.000	.000	.122
	COMPANIE	.000	.	.000	.000	.000	.000	.092
	EMPLOYEE	.000	.000	.	.000	.000	.000	.241
	INVESTMENT	.000	.000	.000	.	.000	.000	.103
	POPULATION	.000	.000	.000	.000	.	.000	.184
	GDP	.000	.000	.000	.000	.000	.	.177
	INFLATION	.122	.092	.241	.103	.184	.177	.
N	PREMIUM	29	29	29	29	29	29	29
	COMPANIE	29	29	29	29	29	29	29
	EMPLOYEE	29	29	29	29	29	29	29
	INVESTMENT	29	29	29	29	29	29	29
	POPULATION	29	29	29	29	29	29	29
	GDP	29	29	29	29	29	29	29
	INFLATION	29	29	29	29	29	29	29

Table 3.1 Table for Linearity and Multicollinearity Analysis for Overall Model

3.4.1.2 Second Stage

As we mentioned above, according to result of linearity and multicollinearity we removed the variable (Population) from our model, and also removed “Inflation”, which has the weakest relation (0.224) with the dependent variable. After deleting the variables which have multicollinearity and linearity, we did a new analysis with the rest of the variables.

		Correlations				
		PREMIUM	COMPANIE	EMPLOYEE	INVESTME	GDP
Pearson Correlation	PREMIUM	1,000	,902	,918	,984	,952
	COMPANIE	,902	1,000	,876	,918	,830
	EMPLOYEE	,918	,876	1,000	,935	,918
	INVESTME	,984	,918	,935	1,000	,916
	GDP	,952	,830	,918	,916	1,000
Sig. (1-tailed)	PREMIUM	,	,000	,000	,000	,000
	COMPANIE	,000	,	,000	,000	,000
	EMPLOYEE	,000	,000	,	,000	,000
	INVESTME	,000	,000	,000	,	,000
	GDP	,000	,000	,000	,000	,
N	PREMIUM	29	29	29	29	29
	COMPANIE	29	29	29	29	29
	EMPLOYEE	29	29	29	29	29
	INVESTME	29	29	29	29	29
	GDP	29	29	29	29	29

Table 3.2 Table for Linearity and Multicollinearity Analyses for Overall Model 2

Table 3.2 shows that our model still includes a variable which has a multicollinearity (Number of Companies) with Investment (0.926 which is greater than 0.70), so Number of Companies will also be removed from the model.

3.4.1.3 Third Stage

All variables which have multicollinearity and linearity have been removed from our data. Now we can test the validation of the overall model better.

The Correlation matrix **table 3.3** shows the Pearson Correlation Coefficient between every pair of variables. There is a large positive correlation between all the variables (> 91) and Sig. (1-tailed) of each correlation is significant $p < 0.05$.

The values for correlation coefficients are all 1.00 as it can be seen there is a perfect positive correlation between them. Investment ($R = 0.984$, $p < 0.05$) can best predict Premium Income, then follow GDP ($R = 0.952$, $p < 0.005$), and Employee ($R = 0.918$, $p < 0.05$).

To test the validation of overall model ANOVA **table 3.4** will help us. This table is split into two parts. The value of Sum of Squares and the Residual Sum of Squares represents the total difference between the model and the observed data. We also have been given the degrees of freedom (df) for each term.

For the first regression analysis model F ratio is 358.908 with $p < 0.05$ (Appendix Table A 4, p 112), however, for the last model the value of F is higher (743.179) which is also significant $p < 0.05$. It means that the first model has been significantly improved to predict the Total Premium Income (dependent variable) and our model is valid.

Now we know that our model is valid but we also would like to know how good a choice or successful independent variables in predicting the “dependent

variable” Premium Income and explanatory power of regression model. This is answered by looking at the model summary **table 3.5**.

The first column, called R, is the value of the Multiple Correlation between the dependent and independent variables. $R = 0.994$, which is highly correlated. The next column is a value of R^2 ($R^2 = 0.989$), which means independent variables explain the dependent variable (Premium Income) quite well. Furthermore, the value of Durbin Watson is 2.286 which is value between 1,5 and 2,5 and not in Auto-Correlation area, so there is no Auto – Correlation in the model and the values are independent.

In the following equation β values present the individual contribution of each independent variable to the model. Thus, Investment and GDP have a positive relationship with the dependent variable while Employee has a negative relation.

Thus, finalized regression equation for our data is;

Premium Income = $\beta_0 + (3.823E-02)$ **GDP** + $(.114)$ **Investment** + $(- .219)$ **Number of Employee**

All independent variables are < 0.05 , which means that all predictors are significant in the model.

GDP: ($\beta_1 = 3.823E - 02$) this value also shows that if GDP increases by one unit then Premium Income will increase by $3.823E - 02$ units. This comment is true only if the effects of Investment and Employee are held constant.

Investment: ($\beta_2 = .114$) this value indicates that as Investment increases by

one unit, Premium Income increases by 0.114 units. Both variables are measured in euro million, thus, every 1 million euro spent on Investment will cause 0.114 units of extra Premium Income. This comment is true only if the effects of GDP and Employee are held constant.

Employee: ($\beta_3 = .219$) this value indicates that as Employee increases by one unit then Premium Income will increase by .219 units. This comment is also true only if the effects of investment and GDP are held constant.

For our model, it can be seen that (table 3.6) Investment ($t = 12.639$, $p < 0.05$) is significant and has the biggest impact on the Premium Income. GDP has ($t = 6.869$, $p < 0.05$) impact, whereas Employee has ($t = - 3.316$, $p < 0.05$) less impact on Total Premium Income but still is significant.

Correlations

		PREMIUM	EMPLOYEE	INVESTME	GDP
Pearson Correlation	PREMIUM	1,000	,918	,984	,952
	EMPLOYEE	,918	1,000	,935	,918
	INVESTME	,984	,935	1,000	,916
	GDP	,952	,918	,916	1,000
Sig. (1-tailed)	PREMIUM	,	,000	,000	,000
	EMPLOYEE	,000	,	,000	,000
	INVESTME	,000	,000	,	,000
	GDP	,000	,000	,000	,
N	PREMIUM	29	29	29	29
	EMPLOYEE	29	29	29	29
	INVESTME	29	29	29	29
	GDP	29	29	29	29

Table 3.3 Table for Linearity and Multicollinearity Analyses for Overall Model 3

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9,14E+10	3	3,046E+10	743,179	,000 ^a
	Residual	1,02E+09	25	40982813,04		
	Total	9,24E+10	28			

a. Predictors: (Constant), GDP, INVESTME, EMPLOYEE

b. Dependent Variable: PREMIUM

Table 3.4 Table for Validation of Regression Model

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,994 ^a	,989	,988	6401,7820	2,286

a. Predictors: (Constant), GDP, INVESTME, EMPLOYEE

b. Dependent Variable: PREMIUM

Table 3.5 Table for Explanatory Power of Regression Model and Auto-Correlation Analysis

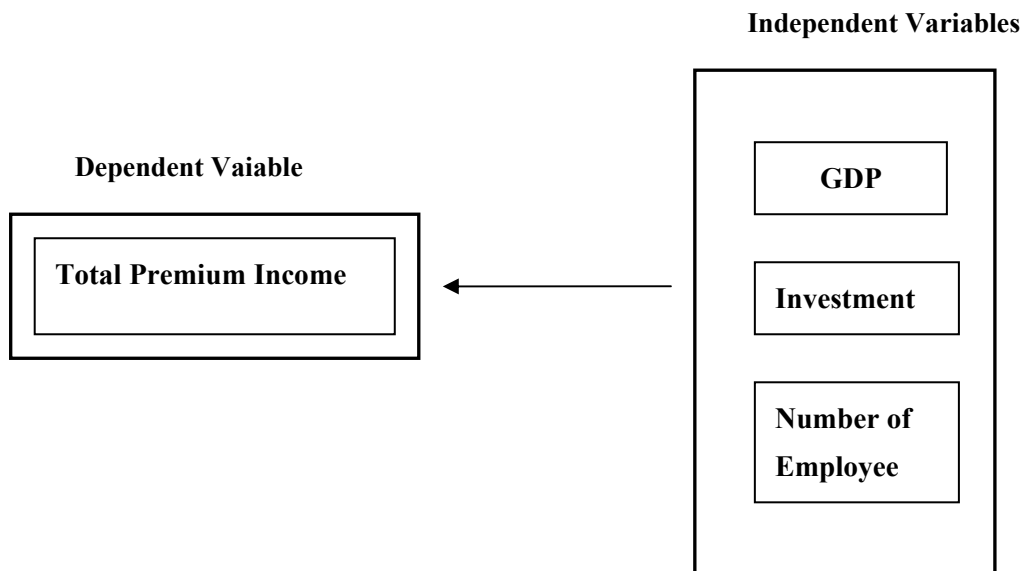
Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	949,788	1476,536		,643	,526
	EMPLOYEE	-,219	,066	-,219	-3,316	,003
	INVESTME	,114	,009	,823	12,639	,000
	GDP	3,823E-02	,006	,400	6,869	,000

a. Dependent Variable: PREMIUM

Table 3.6 Contributions of External Variables to the Explanatory Power of the Regression Model

Figure 2 Finalized Regression Model for Total Data



3.4.2 Findings of Results of the Cluster Analysis

3.4.2.1 Cluster Analysis for Profile 1 (based on Total Premium Income)

In our analysis, we have two cluster analysis; one for Profile 1 (Total Premium Income) and second for Profile 2 (GDP, Investment and Employee) to test the effect of these variables on countries classification and also see whether there will be any difference the position of Turkey in the cluster (within groups) related to dependent variable and independent variables.

We choose the Average Linkage (Between Groups) method, to see the homogeneity within clusters. The following **table 3.7** shows agglomeration schedule. In agglomerative clustering uses a distance measure squared Euclidean distance.

As we can see from the Agglomeration table in every stage, 2 country is combined where countries are numbered from 1 to 29 (at stage 11, in cluster 1 Czech Republic and in cluster 2 Turkey is combined have very close Premium Income CZ 3.887 and TR 4.697 in euro million). One important thing we should aware in cluster analysis is when the distance measures are low and coefficients are high then the countries are similar. In addition, Agglomeration table help us to see which countries are entered to which clusters.

The Dendogram obtained from Average Linkage (Between Groups) method shows the cases in the first cluster as Czech Republic, Greece, Turkey, Hungary, Lichtenstein, Latvia, Malta, Iceland, Cyprus, Croatia, Romania, Slovenia, Slovakia, Luxembourg, Norway, Ireland, Portugal, Austria, Finland, Denmark, Poland and

Sweden, in the second cluster Spain, The Netherlands, Belgium, Switzerland and in the third cluster Germany, France, United Kingdom and Italy respectively. Countries with low distance and high coefficients are close each other.

This dendogram also gives a picture of the interaction between insurance and economic growth. Clearly, we can analyse that countries in the third and second group are amongst the most developed insurance markets in Europe. By the end of year 2005 United Kingdom (22.6%) is leading and the largest insurance market in Europe, followed by France (17.9%) and Germany (16.1%) and Total Premium Income reached 978 billion euros grew by 4.5% after growth of 3.1% in 2004 in Europe. The largest markets, the UK and Germany reported high premium income because of shipping motor rates in Germany and widespread attrition of insurance prices in the UK. In the France and Italy premium increased because of growing demand for liability.⁵³

Insurance penetration rate display very different patterns across countries. There are large gaps between the different insurance markets within EU. According to CEA Premium Income data (2005) is in United Kingdom (220.876 in € million), France (174.920 in € million), Germany (157.800 in € million) and Italy (109.901 in € million) share together big amount of Premium Income between European countries in the third cluster, then The Netherlands (49.690 in € million), Spain (48.687 in € million), Switzerland (31.590 in € million), and Belgium (33.829 in € million with double digit

⁵³ Swiss Re, Sigma No 5 / 2006 'World Insurance in 2005': moderate premium growth, attractive profitability.p

growth '16.1%' according to previous year) follow them in the second cluster.⁵⁴

Turkey is being in the first cluster with 4.697 in € million (premium income increased by 15.9% in 2005). However the amount is still considered rather insufficient when compared to other European countries, in the last several years, there is a strong growth in Premium Income in Turkey (especially, after the completion of EU membership processes) due to strong underlying economies, generally low interest, tax related incentives and new Turkish insurance law.

Beside all other sectors, insurance sector of Turkey is a young market and getting close to a satisfaction point in the European countries for full membership to the EU. There are many developments in terms of laws and regulations which cause rapid growth in Turkish insurance sector compared to the more mature markets of Europe.

There are a few more things we should look at that before concluding that is, be aware of countries in the first cluster is almost include all Eastern European Countries and Turkey. In terms of premiums Poland, Czech Republic, Hungary, Slovenia, Slovakia then Bulgaria, Romania and Croatia were the most important markets with an aggregate premium volume of USD 325 million in 2004 and there is a strong premium growth in Poland and Slovenia as well as Southeast Europe by 2005

⁵⁴ CEA Statistics No 24, 'European Insurance in Figures' <http://www.cea.assur.org/cea/download/publ/article243.pdf> (June 2006)

Average Linkage (Between Groups)

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	5	12	289,000	0	0	11
2	20	21	324,000	0	0	4
3	14	18	2916,000	0	0	15
4	16	20	6322,000	0	2	8
5	19	23	14400,000	0	0	18
6	13	26	17689,000	0	0	10
7	28	29	75076,000	0	0	10
8	4	16	106201,000	0	4	12
9	15	25	212521,000	0	0	16
10	13	28	321853,500	6	7	12
11	5	30	642474,500	1	0	15
12	4	13	889324,625	8	10	19
13	8	22	1006009,00	0	0	24
14	1	9	1040400,00	0	0	16
15	5	14	2167513,75	11	3	19
16	1	15	2910162,50	14	9	18
17	2	3	5013121,00	0	0	24
18	1	19	7581153,00	16	5	20
19	4	5	8695004,00	12	15	21
20	1	7	15257692,0	18	0	22
21	4	24	37014224,0	19	0	23
22	1	27	77378608,0	20	0	23
23	1	4	170317264	22	21	26
24	2	8	273062240	17	13	26
25	6	10	293094400	0	0	27
26	1	2	1,277E+09	23	24	29
27	6	11	3,045E+09	25	0	28
28	6	17	6,279E+09	27	0	29
29	1	6	2,543E+10	26	28	0

Table 3.7 Average Linkage (Between Groups), Agglomeration Schedule

Dendrogram HIERARCHICAL CLUSTER ANALYSIS

Dendrogram using Average Linkage (Between Groups), (Group Premium-2005 Data),
Rescaled Distance Cluster Combine

CZECH REPUBLIC

GREECE

TURKEY

HUNGARY

LICHTENSTEIN

LATVIA

MALTA

ICELAND

BULGARIA

CYPRUS

CROATIA

ROMANIA

SLOVENIA

SLOVAKIA

LUXEMBOURG

NORWAY

IRELAND

PORTUGAL

AUSTRIA

FINLAND

DENMARK

POLAND

SWEDEN

SPAIN

THE NETHERLANDS

BELGIUM

SWITZERLAND

GERMANY

FRANCE

UNITED KINGDOM

ITALY

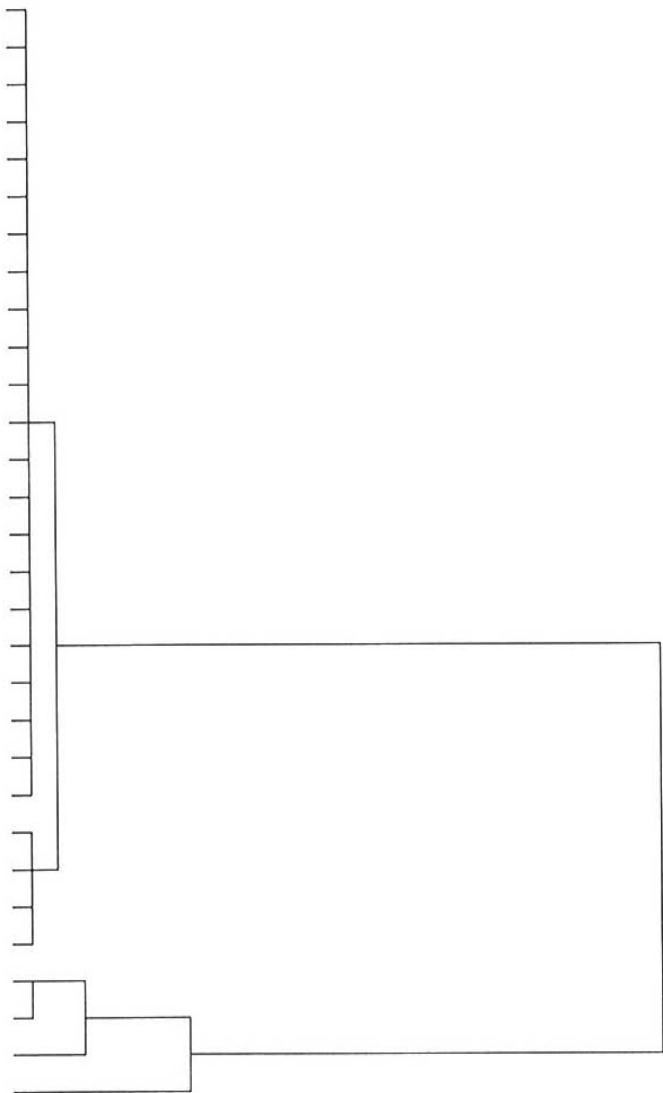


Table 3.8. Dendrogram using Average Linkage (Between Groups), GroupPremium-2005 Data

3.4.2.2 Cluster Analysis for Profile 2 (based on Independent Variables)

Second cluster analysis also with Average Linkage method but with Profile 2 (independent variables) which we selected after performing regression analysis. In this analysis we will find out the effect of independent variables on countries and place of Turkey in the cluster.

In this time, it is clearly seen that place of Turkey in the cluster changed and Turkey became closer to the other European countries which have high income in GDP and Investment. Agglomeration **table 3.9** shows Turkey (30) combined with Poland (24) at the 14th stage. Turkey and Poland have similar insurance sector structure concerning GDP, Investment and Number of Employee. Turkey and Poland are both have developing insurance and emerging markets. Turkey has GDP (290 503 in million euro), Investment (5 163 in million euro) Number of Employees (12 837) and Poland has GDP (240 540 in million euro), Investment (19 841 in million euro), Number of Employees (28 500).⁵⁵

There is no so much difference the position of the countries between the cluster 1 and cluster 2. The dendogram (table 3.10.) obtained from Average Linkage (Between Groups) method shows the cases in the first cluster as Czech Republic, Greece, Turkey, Hungary, Lichtenstein, Latvia, Malta, Iceland, Cyprus, Croatia, Romania, Slovenia, Slovakia, Luxembourg, Norway, Ireland, Portugal, Austria,

⁵⁵ CEA Statistics No 24, 'European Insurance in Figures' <http://www.cea.assur.org/cea/download/publ/article243.pdf> (June 2006)

Finland, Denmark, Poland, The Netherlands, Belgium, Switzerland and Sweden, in the second cluster Spain and Italy and in the third cluster Germany, France and United Kingdom respectively.

In the second cluster analysis The Netherlands, Belgium and Switzerland joined from group 1 to group 2 and Italy from group 1 to group 2. The highest GDP penetration rates are observed in Luxembourg, UK, Netherlands, and Belgium which all have ratios above 10% while most of the countries have lower rates.⁵⁶ Heterogeneity appears as well between EU countries.

Like in the first cluster analysis the biggest share of investment 63% is provided by the UK, France and Germany.⁵⁷ Turkey has only 5 163 in € million by 2005. The total investment in Europe is 6.371 bn euros.

GDP and Investment has a positive correlation between each others. The relation between GDP and Investment allow us to compare the development of the insurance sector from country to country. Countries joined to the third and second cluster have highly different and high Investment and GDP level compare to first cluster. This situation shows that in terms of Investment and GDP in the first cluster insurance sector is not yet as developed as it is in the other European countries are

⁵⁶ CEA (European Insurance and Reinsurance Federation), 'The Contribution of the Insurance Sector to Economic Growth and Employment in the EU <http://www.cea.assur.org/> (June 2006)

⁵⁷ CEA (European Insurance and Reinsurance Federation) Annual Report 2005 - 2006

<http://www.cea.assur.org/cea/download/publ/article242.pdf>

entered to cluster 2 and 3.

For the countries like Turkey, has very low amount of total premium production and lack of insurance awareness, is very difficult to compete with the European Union single insurance market. However, if we look at the developments in the Turkish economy and insurance industry in 2005, there are number of foreign insurance companies are looking to gain access to the Turkish market for young and growing population , so this cause a big growth in the economy.⁵⁸

⁵⁸ BEST, Turkinsurance, Turkish Insurance-Reinsurance- Pensions, ‘The Potential of Insurance Sector in Turkey’ Volume

Three May 2007, p.5-6.

Dendrogram HIERARCHICAL CLUSTER ANALYSIS

Dendrogram using Average Linkage (Between Groups), (Profile 2 - 2005 Data) .Rescaled Distance Cluster Combine

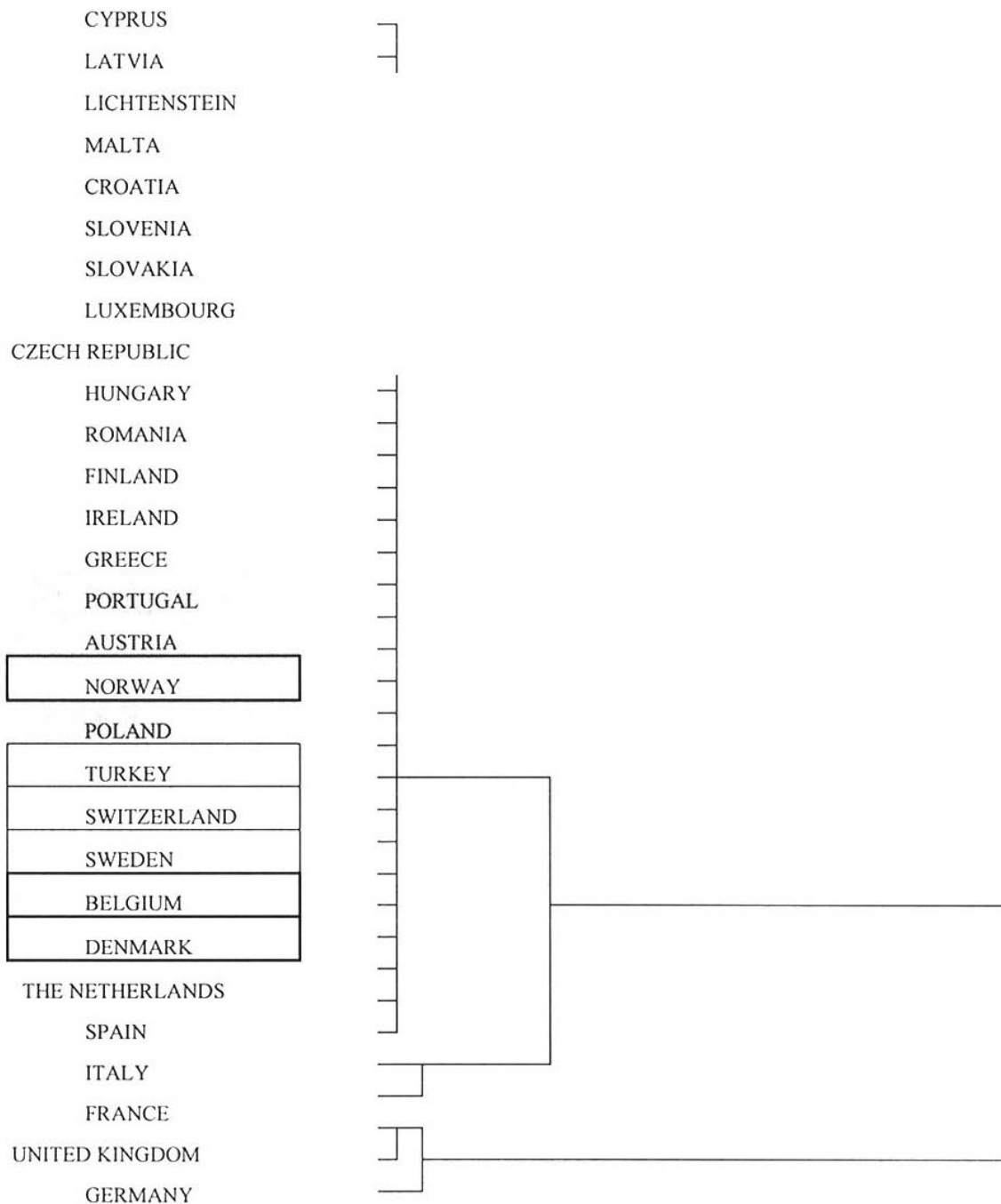


Table 3.10. Dendrogram using Average Linkage (Between Groups), Profile 2 - 2005 Data

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	4	20	4273866,00	0	0	5
2	13	28	13934813,0	0	0	4
3	18	21	34557600,0	0	0	5
4	13	29	82577520,0	2	0	8
5	4	18	109465088	1	3	8
6	14	26	127931896	0	0	9
7	9	15	590617472	0	0	15
8	4	13	603910336	5	4	10
9	5	14	633867648	0	6	17
10	4	19	1,379E+09	8	0	17
11	1	23	1,429E+09	0	0	16
12	12	25	2,043E+09	0	0	15
13	3	27	2,563E+09	0	0	18
14	24	30	2,957E+09	0	0	16
15	9	12	5,318E+09	7	12	19
16	1	24	5,696E+09	11	14	19
17	4	5	5,733E+09	10	9	21
18	2	3	6,900E+09	0	13	20
19	1	9	1,205E+10	16	15	21
20	2	7	1,228E+10	18	0	22
21	1	4	3,574E+10	19	17	24
22	2	22	6,717E+10	20	0	24
23	10	11	1,122E+11	0	0	26
24	1	2	1,140E+11	21	22	27
25	8	17	3,624E+11	0	0	27
26	6	10	3,807E+11	0	23	28
27	1	8	1,193E+12	24	25	28
28	1	6	4,626E+12	27	26	0

Table 3.9 Average Linkage (Between Groups), Agglomeration Schedule

3.4.3 Finalized Regression Analysis

3.4.3.1 Finalized Regression Analysis based on Profile 1 (Cluster of Turkey and other European Countries)

First Stage

After clustering analysis we found out two profiles (we classified countries in Profile 1 and Profile 2 after clustering analysis) and now in our model we want to see if there is any difference between first (before clustering analysis) and second (after clustering analysis) regression analysis by using Profiles 1 and 2. If we can not find any difference in level of relation (sig.), (the composition of variable which have strong effect on dependent variable) we will conclude that we do not need cluster analysis in our model. We did first regression analysis with all countries together but in this time we only consider the countries which entered to cluster 1 with Turkey in cluster analysis due to Profile 1 (based on Premium Income) and Profile 2 (based on GDP, Investment and The Number of Employees).

21 countries have been selected for this model. Like in the first regression analysis variables Population, Inflation have weak relation with Premium Income whereas contrast to first regression analysis Number of Employee have also weak relation with dependent variable follow by this Number of Companies has multicollinearity (0.90) with Investment. Therefore, we removed all these variables from the model in second stage of regression analysis.

Correlations

	PREMIUM	COMPANY	EMPLOYEE	INVESTMENT	POPULATION	GDP	INFLATION
Pearson Correlation	1,000	,798	,225	,884	-,039	,700	.47
	,798	1,000	,170	,901	-,044	,599	.35
	,225	,170	1,000	,130	,403	,489	-.2
I	,884	,901	,130	1,000	-,135	,601	.46
	-,039	-,044	,403	-,135	1,000	,553	-.5
	,700	,599	,489	,601	,553	1,000	.11
I	,474	,348	-,239	,458	-,522	,105	1.0
Sig. (1-tailed)	,	,000	,163	,000	,434	,000	.01
	,000	,	,231	,000	,425	,002	.06
	,163	,231	,	,287	,035	,012	.15
I	,000	,000	,287	,	,280	,002	.02
	,434	,425	,035	,280	,	,005	.01
	,000	,002	,012	,002	,005	,	.33
I	,015	,061	,148	,018	,008	,325	,
N	21	21	21	21	21	21	21
	21	21	21	21	21	21	21
	21	21	21	21	21	21	21
I	21	21	21	21	21	21	21
	21	21	21	21	21	21	21
	21	21	21	21	21	21	21
I	21	21	21	21	21	21	21

Table 3.11 Table for Linearity and Multicollinearity Analyses for Cluster of Countries (in terms of Total Premium Income / first stage)

Second Stage

In the second stage of regression analysis we removed all the variables which are unnecessary for our model. When the relationship of dependent and independent variables is examined, it is seen that from the **table 3.12** Investment (.88) and GDP (.70) have a strong relation with Premium Income. As we compared first (before cluster analysis) and second (after cluster analysis) regression analyses the effect of

GDP and Investment level on Premium Income is lower. In addition in the first analysis the Number of Employee is one of the significant variables; however in this model is not.

Correlations

		PREMIUM	INVESTME	GDP
Pearson Correlation	PREMIUM	1,000	,884	,700
	INVESTME	,884	1,000	,601
	GDP	,700	,601	1,000
Sig. (1-tailed)	PREMIUM	,	,000	,000
	INVESTME	,000	,	,002
	GDP	,000	,002	,
N	PREMIUM	21	21	21
	INVESTME	21	21	21
	GDP	21	21	21

Table 3.12 Table for Linearity and Multicollinearity Analyses for Cluster of Countries (in terms for Total Premium Income / Second Stage)

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7,39E+08	2	369373078,5	42,815	,000 ^a
	Residual	1,55E+08	18	8627113,276		
	Total	8,94E+08	20			

a. Predictors: (Constant), GDP, INVESTME

b. Dependent Variable: PREMIUM

Table 3.13 Table for Validation of Regression Model

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,909 ^a	,826	,807	2937,1948	2,028

a. Predictors: (Constant), GDP, INVESTME

b. Dependent Variable: PREMIUM

Table 3.14 Table for Explanatory Power of Regression Model and Auto-Correlation Analysis

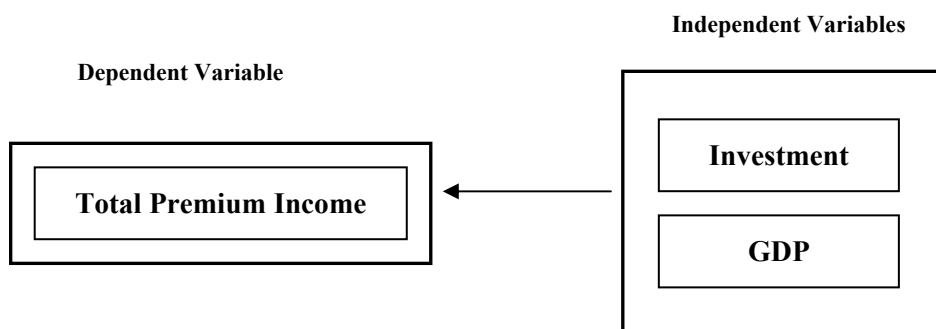
Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1788,748	1029,384		1,738	,099
	INVESTME	7,443E-02	,013	,725	5,898	,000
	GDP	1,763E-02	,008	,265	2,154	,045

a. Dependent Variable: PREMIUM

Table 3.15 Contributions of External Variables to the Explanatory Power of the Regression Model

Figure 3 Finalized Regression Model for Profile 1



3.4.3.2 Finalized Regression Analysis based on Profile 2 (Cluster of Turkey and other European Countries)

In this model 24 countries have been selected for this analysis. Although we use different profile (Profile2) the result of analysis is the same and investment and GDP variables have significant value only . The rest of the values which are insignificant is removed from the model in the second stage of regression analysis.

Correlations

	PREMI UM	COMP ANIE	EMP LOYE E	INV EST ME	POPU LATI	GDP	INFL ATIO
Pearson Correlation	1,000	,751	,656	,936	,012	,844	,406
	,751	1,000	,410	,832	-,012	,709	,386
	,656	,410	1,000	,602	,308	,712	-,011
I	,936	,832	,602	1,00	-,063	,790	,450
	,012	-,012	,308	-,063	1,000	,430	-,503
	,844	,709	,712	,790	,430	1,000	,213
I	,406	,386	-,011	,450	-,503	,213	1,000
Sig. (1-tailed)	,	,000	,000	,000	,477	,000	,025
	,000	,	,023	,000	,477	,000	,031
	,000	,023	,	,001	,072	,000	,480
I	,000	,000	,001	,	,384	,000	,014
	,477	,477	,072	,384	,	,018	,006
	,000	,000	,000	,000	,018	,	,159
I	,025	,031	,480	,014	,006	,159	,
N	24	24	24	24	24	24	24
	24	24	24	24	24	24	24
	24	24	24	24	24	24	24
I	24	24	24	24	24	24	24
	24	24	24	24	24	24	24
	24	24	24	24	24	24	24
I	24	24	24	24	24	24	24

Table 3.16 Table for Linearity and Multicollinearity Analyses for Cluster of

Countries (based on independent Variables)

Second Stage

We removed variables which have insignificant values from second stage of regression analysis. Investment has the biggest effect on the Premium income with 93% relation then GDP with 84%. Like in the first regression analysis with Profile 1 The Number of Employee also has insignificant value contras in regression analysis performed before cluster analysis. So we can conclude that there is a difference in variables are entered to the first regression analysis and second(after clustering analysis).

Correlations

		PREMIUM	INVESTME	GDP
Pearson Correlation	PREMIUM	1,000	,936	,844
	INVESTME	,936	1,000	,790
	GDP	,844	,790	1,000
Sig. (1-tailed)	PREMIUM	,	,000	,000
	INVESTME	,000	,	,000
	GDP	,000	,000	,
N	PREMIUM	24	24	24
	INVESTME	24	24	24
	GDP	24	24	24

Table 3.17 able for Linearity and Multicollinearity Analyses for Cluster of Countries (based on independent Variables/Second Stage)

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3,31E+09	2	1652834564	100,309	,000 ^a
	Residual	3,46E+08	21	16477441,23		
	Total	3,65E+09	23			

a. Predictors: (Constant), GDP, INVESTME

b. Dependent Variable: PREMIUM

Table 3.18 Table for Validation of Regression Model**Model Summary^b**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,951 ^a	,905	,896	4059,2415	2,017

a. Predictors: (Constant), GDP, INVESTME

b. Dependent Variable: PREMIUM

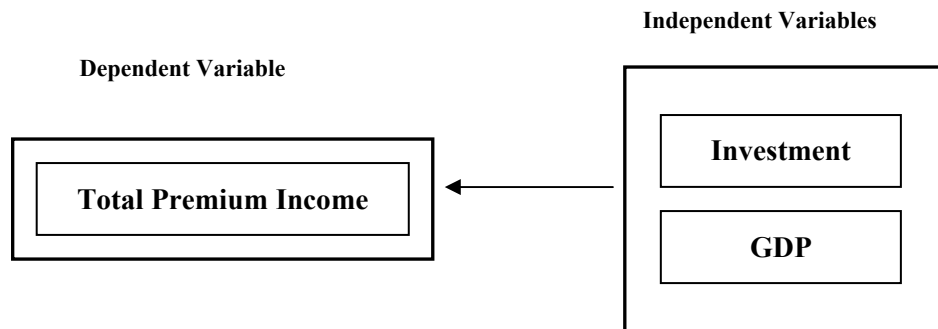
Table 3.19 Table for Explanatory Power of Regression Model and Auto-Correlation Analysis**Coefficients^a**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	450,945	1336,951		,337	,739
	INVESTME	9,136E-02	,014	,716	6,534	,000
	GDP	2,716E-02	,011	,278	2,541	,019

a. Dependent Variable: PREMIUM

Table 3.20 Contributions of External Variables to the Explanatory Power of the Regression Model

Figure 4 Finalized Regression Model for Profile 2



As we mentioned before, our main reason to do regression analysis again is to find out if there is any difference between first (before clustering) and second (after clustering) regression analysis by using Profiles 1 and 2. The independent variables Investment and GDP have strong relation with dependent variable (Total Premium Income) while Number of Employee has not in contrast to the first regression analysis. There is a significant linear relationship between Investment, GDP and Total Premium Income, $F(2, 21) = 100.30, p < 0.05$. The sample multiple correlation coefficient is .90. About 90 % of the variance of Total Premium Income in the sample is accounted for by Investment and GDP. Both independent variables are still important for better prediction after cluster analysis.

3.4.3 One - Way ANOVA

3.4.3.1 One -Way ANOVA for Profile1

One –Way ANOVA Analysis will show us if there are any differences between the means of countries based on Premium Income at our chosen probability level for Profile 1.

The following output shows (table 3.21.) descriptive statistics for each of the groups. From this table we are told the mean and standard deviation of the data. In addition, we are told the standard error, which is the standard deviation of the sampling distribution of our data. As we can see the data are divided into three groups. 22 variables have been joined to the first group whereas 4 variables each have been joined to the second and to the third group after performing cluster analysis. For the first group if we choose some sample from the population, the means of these samples would have a standard deviation of 1425, 0771. We are also given confidence intervals for the mean. 95 % of the first group samples have a mean between 3850.0262 and 9777.2465.

Next we see the results of the Levene's Test of Homogeneity of Variance. Levene test shows the Homogeneity of variances. If test is insignificant (Sig. is greater than 0.05), then variances are not significantly different and equal; however in this case Levene test is significant 0.00 (Sig. is less than 0.05) and there is a heterogeneity of variance (variances are significantly different). For this reason, after ANOVA test we will apply to most appropriate Non – parametric Kruskal Wallis test, as an alternative to One-Way Anova to see differences between groups.

Descriptives

PREMIUM								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1,00	22	6813,6364	6684,2042	1425,0771	3850,0262	9777,2465	229,00	22261,00
2,00	4	40949,00	9566,7307	4783,3653	25726,20	56171,80	31590,00	49690,00
3,00	4	165874,3	45844,72	22922,36	92925,06	238823,4	109901,0	220876,0
Total	30	32573,10	56773,46	10365,37	11373,54	53772,66	229,00	220876,0

Table 3.21 Descriptives for One-Way ANOVA (Profile 1)

Test of Homogeneity of Variances

PREMIUM			
Levene Statistic	df1	df2	Sig.
13,140	2	27	,000

Table 3.22 Test of Homogeneity of Variances

ANOVA

PREMIUM					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8,60E+10	2	4,298E+10	154,349	,000
Within Groups	7,52E+09	27	278445690,1		
Total	9,35E+10	29			

Table 3.23 ANOVA Table for One-Way ANOVA (Profile 1)

This table is a main ANOVA summary table and divided into “Between groups” and “Within groups”. In the, first row we are told that the Sums of Squares for

the model is 8.60E+10, and the degrees of freedom are 2 and the Mean Squares for the model is 4.298E+10.

The row labeled Within Groups gives information about unsystematic variation within the data.⁵⁹ Within Groups has 7.52E+09 value of the Sum of Squares, with the degrees of freedom 27 and Mean Squares of 278445690.1.

In order to test whether the group means are different, the F ratio is used. F is the ratio between Between-Groups variance and Within-Groups variance. The value of F ratio is 154.349 and the final column labeled Sig. says whether the result of the F ratio occurs by chance. The observed significant value is less than 0.05; therefore we reject the null hypothesis ($H_0: \mu_1 = \mu_2 = \mu_3$). It means that at least one of the means is not the same as the other means and there is a significant difference between groups. When the F ratio is statistically significant, we need to look at the Multiple Comparisons output to see where the differences occur. Scheffe's test will help us analyse pairs of means to see difference between groups.⁶⁰

⁵⁹ FIELD, A., Discovering Statistics using SPSS for Windows, SAGE publications Ltd 2000 p 284-85

⁶⁰ One way ANOVA - Analysis of variance

http://homepages.inf.ed.ac.uk/rbf/CVonline/LOCAL_COPIES/SHUTLER2/node1.html

$$F(2,27) = 154.349; p = 0.000$$

Post Hoc Tests

Multiple Comparisons

Dependent Variable: PREMIUM

Scheffe

(I) PROFIL1	(J) PROFIL1	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1,00	2,00	-34135,364*	9070,1734	,003	-57627,3957	-10643,3316
	3,00	-159060,61*	9070,1734	,000	-182552,6457	-135568,5816
2,00	1,00	34135,3636*	9070,1734	,003	10643,3316	57627,3957
	3,00	-124925,25*	11799,27	,000	-155485,7355	-94364,7645
3,00	1,00	159060,61*	9070,1734	,000	135568,5816	182552,6457
	2,00	124925,25*	11799,27	,000	94364,7645	155485,7355

*. The mean difference is significant at the .05 level.

Table 3.24 Multiple Comparisons

We use Post Hoc Tests to compare all groups of subjects with each other. It is clear from the **table 3.24** that each group of subjects is compared to all of the remaining groups. The difference between group means for each pair of groups is illustrated. First, the first group (Countries in Europe and Turkey) is compared to the second (Switzerland, Belgium, The Netherlands and Spain) and the third group (Italy, UK, France and Germany) and then the other groups is compared to each other respectively at the 0.05 level of significance of confidence interval. P- Value is less than 0.05, so we reject the null hypothesis and in this case there are significant differences based on countries Total Premium Income among groups. Third group has the biggest amount of Total Premium Income then second and first group. The Total Premium Income of Italy

is 109 901(euro million), UK 220 876(euro million) and Germany 157 800(euro million) in the third group. **Source** (Country guide 2005, CEA Statistics)

Homogeneous Subsets

PREMIUM

Scheffe^{a,b}

PROFIL1	N	Subset for alpha = .05		
		1	2	3
1,00	22	6813,6364		
2,00	4		40949,00	
3,00	4			165874,3
Sig.		1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

- a. Uses Harmonic Mean Sample Size = 5,500.
- b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table 3.25 Scheffe's Test

The **table 3.25** shows the results of Scheffe's test. As is understood from the table when we test the differences of group's mean it is seen that group 3 has the largest mean, (165874, 3) then group 2 (40949.00) and 1 (6813, 6364) respectively. Therefore we conclude that each group has significantly different means due to their Total Premium Income. The group has the largest mean also has the highest Premium income.

3.4.3.2. One-Way ANOVA for Profile 2

We also did second One-Way ANOVA analysis due to Profile 2 to see the effect of Profile 2 on Total Premium Income.

As we mentioned in the first ANOVA analysis the data is divided into three groups. 25 variables have been joined to the first group, whereas 2 variables joined to the second and 3 variables joined to the third group differently from the Profile 1. At 95% of Confidence Interval level, each group has different Mean, Standard Deviation and Standard Error.

The result of Levene Statistic is significant 0.001(less than 0.05) like in the first ANOVA test; it means that variances are not homogeneous and equal so we also apply to Kruskal Wallis Test for Profile 2 after ANOVA Test.

When we look at the value of F ratio (table 3.28.) is 149,046 and the observed significant value is less than 0.05; therefore we reject the null hypothesis ($H_0: \mu_1 = \mu_2 = \mu_3$), so we conclude that at least one of the means is not the same as the other means and there is a significant difference between groups based on their Premium Income.⁶¹

⁶¹ **FIELD, A.**, Discovering Statistics using SPSS for Windows, SAGE publications Ltd 2000 p

$$F(2, 27) = 149,046; p = 0.00$$

In the Multiple Comparison **table 3.29** the difference between group means for each pair of groups is illustrated. First, the first group (Countries in Europe and Turkey) is compared to the second (Italy and Spain) and the third group (UK, France and Germany) and then the other groups are compared to each other respectively at the 0.05 level of significance of confidence interval. P-value is less than 0.05, so we reject the null hypothesis and in this case there are significant differences based on countries Premium Income among groups.

The last table shows the results of Scheffe's test. The group 3 has the largest mean, (165874, 3) then group 2 (40949.00) and 1 (6813, 6364) respectively. It is clear to see from the **table 3.26** that each group has significantly different means due to their Total Premium Income.

Descriptives

PREMIUM								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1,00	22	6813.636	6684,2042	1425.0771	3850,0262	9777,2465	229,00	22261.00
2,00	4	40949.00	9566,7307	4783.3653	25726,1967	56171,8033	31590,00	49690.00
3,00	4	165874.3	45844.725	22922.36	92925,0628	238823.437	109901,0	220876.0
Total	30	32573.10	56773.458	10365.37	11373,5422	53772,6578	229,00	220876.0

Table 3.26 Descriptives for One-Way ANOVA (Profile 2)

Test of Homogeneity of Variances

PREMIUM

Levene Statistic	df1	df2	Sig.
9,088	2	27	,001

Table 3.27 Test of Homogeneity of Variances

ANOVA

PREMIUM

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8,57E+10	2	4,286E+10	149,046	,000
Within Groups	7,76E+09	27	287529727,2		
Total	9,35E+10	29			

Table 3.28 ANOVA Table for One-Way ANOVA (Profile2)

Post Hoc Tests

Multiple Comparisons

Dependent Variable: PREMIUM

Scheffe

(I) PROFIL2	(J) PROFIL2	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1,00	2,00	-68693,640*	12460,58	,000	-100966,9309	-36420,3491
	3,00	-173931,64*	10360,72	,000	-200766,2172	-147097,0628
2,00	1,00	68693,6400*	12460,58	,000	36420,3491	100966,9309
	3,00	-105238,00*	15479,28	,000	-145329,8180	-65146,1820
3,00	1,00	173931,64*	10360,72	,000	147097,0628	200766,2172
	2,00	105238,00*	15479,28	,000	65146,1820	145329,8180

*. The mean difference is significant at the .05 level.

Table 3.29 Multiple Comparisons Table for Profile 2

Homogeneous Subsets

PREMIUM

Scheffe^{a,b}

PROFIL2	N	Subset for alpha = .05		
		1	2	3
1,00	25	10600,36		
2,00	2		79294,00	
3,00	3			184532,0
Sig.		1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,435.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table 3.30 Scheffe's Test

3.4.4. Kruskal-Wallis Test

3.4.4.1. Kruskal- Wallis Test for Profile 1

In the **table 3.32** Chi-Square ‘17.445’ calculates how much the group ranks differ from the average rank of all groups in Kruskal Wallis Test. Chi-Square is significant, so we reject the null hypothesis and it is concluded that there is a significant difference between at least two of the groups, as we also found overall significant difference between groups in ANOVA test. Chi – Square provided us there is significant mean difference between groups; however we do not know which pair or pairs of groups have significantly different proportions. In the **table 3.33** mean rank will help us to compare the means of groups.

Table 3.33 includes Mean Ranks for each group. We can see that Group 1 and 3 differ from each other significantly. Total Premium Income for Group 3 is higher than for Group 1 and 2. However there is no significant difference in Total Premium Income between Groups 3 and 2. The group has the lowest Premium Income gets the lowest rank. Group 1’s mean ranks (11.50) represents the lowest Premium Income among groups which Turkey belongs to this group with (4697 in million euro) the lowest Premium Income.

Test Statistics^{a,b}

	PREMIUM
Chi-Square	17,445
df	2
Asymp. Sig.	,000

a. Kruskal Wallis Test

b. Grouping Variable: PROFIL1

Table 3.32 Test Statistics for Kruskal Wallis (Profile1)**Ranks**

	PROFIL1	N	Mean Rank
PREMIUM	1,00	22	11,50
	2,00	4	24,50
	3,00	4	28,50
	Total	30	

Table 3.33 Kruskal – Wallis (Profile1) Ranks**3.4.4.2. Kruskal Wallis Test for Profile 2**

We did second Kruskal Wallis analysis according to Profile 2. In the following **table 3.35** Chi-Square (11.852) has a significant value 0.03 (less than 0.05), thus we reject the null hypothesis and there is a significant difference between groups (on the basis of the Profile 2).

As we can see (table 3.36.), Group 1 and 3 differ from each other significantly like in the first Kruskal Wallis Analysis for Profile 1. The GDP, Investment and Employee level is in rather differ in Countries at Group 3 than Group 1. However there is no significant difference in GDP, Investment and Employee between group 2 and 3

which have very close and high mean ranks (Group 2 mean rank 26.00, Group 3 mean rank 29.00).

When we look at the countries (Italy, Spain, UK, France and Germany) which joined to the group 2 and 3, after performing cluster analysis have almost same economic and insurance sector structure. As well as their premium income is high in each country, also their GDP, Investment and Employee level is higher than the other countries in group 1. Therefore we conclude that, there is a strong relationship between Premium Income and GDP, Investment and Number of Employee. End of analysis Turkey joined to the Group 1 has the lowest rank, so has the lowest GDP, Investment and Employee level.

According to CEA reports, there is also surprising results in some countries which Luxembourg (Group1) has 2 678 number of employee and 11 464 (in million euro) premium income while Romania (Group1) has 36 000 number of employee and 890 (in million euro) Premium income.

Test Statistics^{a,b}

	PREMIUM
Chi-Square	11,852
df	2
Asymp. Sig.	,003

a. Kruskal Wallis Test

b. Grouping Variable: PROFIL2

Table 3.35 Test Statistics for Kruskal Wallis (Profile 2)

Ranks

	PROFIL2	N	Mean Rank
PREMIUM	1,00	25	13,04
	2,00	2	26,00
	3,00	3	29,00
	Total	30	

Table 3.36 Kruskal – Wallis (Profile 2) Ranks

CONCLUSION

The objective of this thesis is to find out the true typology of the Turkish and European Insurance sectors and to classify countries (European countries and Turkey) for comparing and profiling the structures of the Turkish and European Insurance sector. For this aim we used Regression, Cluster, One – Way ANOVA and Kruskal Wallis Test Analysis in our research respectively.

Second stage of analysis we used Cluster analysis to group countries into cluster. End of analysis we obtained 3 clusters for each Profiles 1,2. It should be noted from the clusters that industrialized countries made third cluster, developed countries second and developing countries first cluster. The reason for this, each country has different Premium Income, GDP, Employee and Investment level.

Furthermore, insurance penetration tends to be higher in wealthier countries. Also being aware of the insurance system is another factor in holding insurance policies. Improvements in living standards, benchmarking with Western Europe, new corporate governance rules, new trends such as globalization and the rise of the middle income class also support economic and insurance growth in developing countries. This development was supported by new capital flowing into the markets.

There is important relationship between insurance development and economic growth for developing countries. Thus, for example in Turkey economic growth allows societies to afford more insurance protection. However; large of the population is not fully aware of their social benefits, health care and pensions in Turkey contrast other European countries, however this situation is slowly changing. Comparing to other developed countries Total Premium Income is very low but seems promising in Turkey because of attractive market, young and growing population, supportive economic environment, EU candidate (custom union with the EU since 1996) and changes in taxation and pension system has also helped premium growth and flowing foreign investment into the market.

The rapid increasing trend of premium and Gross National Product comparing to previous years show the insurance awareness in Turkey is raising. Especially EU adaptation process made Turkish insurance market more competitive. When we considered the real premium increase, the real growth in the developing countries is 7.5% while 2.5% in developed countries; whereas this percent is around 14 in the Turkish insurance sector and had grown 16% in 2005 comparing to the year 2004.⁶²

⁶² BEST, Turkinsurance, Turkish Insurance-Reinsurance- Pensions, 'Where is the Turkish Insurance Sector on the World?

Result of all these analyses when we look at the position of Turkey in all European countries insurance sector in Turkish GDP is 1.8% if we compare to some other European countries such as Poland, Czech Republic or Slovakia their insurance penetration is 2,3% so a lot higher than Turkey. And if we compare to other countries Germany, UK which has largest insurance market in Europe, it's even higher.⁶³ Turkish insurance sector will grow and increase its Penetration in Turkish GDP due to significant achievements in the Investment, economy and insurance market structure, so especially second cluster analysis shows that the place of Turkey in Europe is changing and insurance sector is getting close to a satisfaction point in the European countries.

⁶³ **Olphen, G.,V.,** BEST, Turkininsurance, Turkish Insurance-Reinsurance- Pensions, 'Turkey is an attractive market and a lot foreign investors have a huge trust in Turkey' Volume Two April 2007, p.27-28.

IMPLICATIONS

Although this study which have been done with quantitative data which may cause unreliable results due to lack of homogeneity in the data and premium rates between different countries influenced by currency factors.

Measurement of insurance sector structure seems controversial because countries differ in their economic structure and insurance market size according to their development stage so it is quite difficult to explain if one relates it to the generally accepted idea because many countries have different economic and insurance structure.

It follows clearly from these results that gross domestic product, number of employee and investment are the only variables explaining the Total Premium Income well, and the economic importance of the insurance sector in the Europe and Turkey.

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Appendix

1. Tables for the first regression analysis before cluster analysis

Descriptive Statistics

	Mean	Std. Deviation	N
PREMIUM	33685.38	57444.7586	29
COMPANIE	181.5172	247.4764	29
EMPLOYEE	36122.07	58634.4867	29
INVESTME	199408.9	378156.8635	29
POPULATI	19465.00	24339.1265	29
GDP	403632.0	600499.7332	29
INFLATIO	97.3034	1.8108	29

Table A 1 Descriptive Statistics

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-3830,60	207428,2	33685,38	57125,3850	29
Std. Predicted Value	-,657	3,041	,000	1,000	29
Standard Error of Predicted Value	1332,8915	5758,5220	2324,8422	1423,0726	29
Adjusted Predicted Value	-4775,52	203467,8	34311,91	58175,6611	29
Residual	-12908,3	13447,79	-7,53E-13	6049,0232	29
Std. Residual	-1,976	2,058	,000	,926	29
Stud. Residual	-3,302	3,279	-,022	1,295	29
Deleted Residual	-45667,8	34127,63	-626,5305	13690,8498	29
Stud. Deleted Residual	-4,376	4,320	-,027	1,532	29
Mahal. Distance	,200	20,785	3,862	6,393	29
Cook's Distance	,000	7,590	,526	1,554	29
Centered Leverage Value	,007	,742	,138	,228	29

a. Dependent Variable: PREMIUM

Table A 2 Residuals Statistics

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,995 ^a	,990	,987	6517,1061	2,167

a. Predictors: (Constant), GDP, INFLATIO, COMPANIE, POPULATI, EMPLOYEE, INVESTME

b. Dependent Variable: PREMIUM

Table A 3 Table for Explanatory Power and Regression Model and Autocorrelation Analysis.

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9,15E+10	6	1,524E+10	358,908	,000 ^a
	Residual	9,34E+08	22	42472672,34		
	Total	9,24E+10	28			

a. Predictors: (Constant), GDP, INFLATIO, COMPANIE, POPULATI, EMPLOYEE, INVESTME

b. Dependent Variable: PREMIUM

Table A 4. Table for Validation of Regression Model**Coefficients^a**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	105242,0	89080,900		1,181	,250
	COMPANIE	12,684	12,879	,055	,985	,335
	EMPLOYEE	-,248	,071	-,248	-3,506	,002
	INVESTME	,109	,012	,785	9,226	,000
	POPULATI	-8,37E-02	,130	-,035	-,643	,527
	INFLATIO	-1076,864	913,486	-,034	-1,179	,251
	GDP	4,320E-02	,009	,452	5,002	,000

a. Dependent Variable: PREMIUM

Table A 5. Contributions of External variables to the Explanatory Power of the Regression Model

Second Regression Analysis

Descriptive Statistics

	Mean	Std. Deviation	N
PREMIUM	33685,38	57444,7586	29
COMPANIE	181,5172	247,4764	29
EMPLOYEE	35838,24	57558,4891	29
INVESTME	219687,9	413012,5025	29
GDP	403632,0	600499,7332	29

Table A 6. Descriptive Statistics for Regression Analysis

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	GDP, COMPANIE, EMPLOYEE, INVESTME ^a		Enter

a. All requested variables entered.

b. Dependent Variable: PREMIUM

Table A 7. Variables entered the Model

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,995 ^a	,989	,987	6434,4544	2,206

a. Predictors: (Constant), GDP, COMPANIE, EMPLOYEE, INVESTME

b. Dependent Variable: PREMIUM

Table A 8. Model Summary for Regression Analysis

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9,14E+10	4	2,285E+10	551,924	,000 ^a
	Residual	9,94E+08	24	41402202,89		
	Total	9,24E+10	28			

a. Predictors: (Constant), GDP, COMPANIE, EMPLOYEE, INVESTME

b. Dependent Variable: PREMIUM

Table A 9. Regression ANOVA Table

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	285,514	1671,338		,171	,866
	COMPANIE	10,900	12,614	,047	,864	,396
	EMPLOYEE	-,229	,067	-,229	-3,397	,002
	INVESTME	,109	,011	,783	9,739	,000
	GDP	3,889E-02	,006	,407	6,888	,000

a. Dependent Variable: PREMIUM

Table A 10. Coefficients for Regression Analysis

Third Regression Analysis

Descriptive Statistics

	Mean	Std. Deviation	N
PREMIUM	33685,38	57444,7586	29
EMPLOYEE	35838,24	57558,4891	29
INVESTME	219687,9	413012,5025	29
GDP	403632,0	600499,7332	29

Table A 11. Descriptive Statistics for Regression Analysis

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	GDP, INVESTME, EMPLOYEE ^a	,	Enter

a. All requested variables entered.

b. Dependent Variable: PREMIUM

Table A 12. Variables entered the Model

Residuals Statistics ^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-5400.00	208701.5	33685.38	57091.2197	29
Std. Predicted Value	-.685	3.066	.000	1.000	29
Standard Error of Predicted Value	1295.432	5810.479	2149.100	1302.0329	29
Adjusted Predicted Value	-6462.49	201885.2	33743.46	57986.9234	29
Residual	-17731.3	12174.55	7.527E-13	6363.4058	29
Std. Residual	-2.633	1.808	.000	.945	29
Stud. Residual	-3.309	2.875	.004	1.230	29
Deleted Residual	-44085.2	30789.05	-58.0814	12446.2342	29
Stud. Deleted Residual	-4.326	3.443	-.027	1.429	29
Mahal. Distance	.071	19.879	2.897	5.460	29
Cook's Distance	.000	7.975	.460	1.584	29
Centered Leverage Value	.003	.710	.103	.195	29

a. Dependent Variable: PREMIUM

Table A 13. Residuals Statistics

2. Tables for Cluster Analysis

Case Processing Summary^{a,b}

Cases					
Valid		Missing		Total	
N	Percent	N	Percent	N	Percent
30	100,0	0	,0	30	100,0

a. Squared Euclidean Distance used

b. Average Linkage (Between Groups)

Table A 14. Cluster Analysis Case Processing Summary for Profile 1

Case Processing Summary^{a,b}

Cases					
Valid		Missing		Total	
N	Percent	N	Percent	N	Percent
29	96,7	1	3,3	30	100,0

a. Squared Euclidean Distance used

b. Average Linkage (Between Groups)

Table A 15. Cluster Analysis Case Processing Summary for Profile 2

3. Tables for Finalized Regression Analysis with Profile 1 (based on Total Premium Income)

Descriptive Statistics

	Mean	Std. Deviation	N
PREMIUM	7123,0000	6685,9337	21
COMPANIE	84,1905	94,6592	21
EMPLOYEE	12439,62	10206,0191	21
INVESTME	42600,24	65122,8611	21
POPULATI	10748,62	16386,2825	21
GDP	122749,5	100425,1721	21
INFLATIO	97,0619	2,0556	21

Table A 16. Descriptive Statistics

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	INFLATIO, GDP, EMPLOYEE, COMPANIE, POPULATI ^a , INVESTME		Enter

a. All requested variables entered.

b. Dependent Variable: PREMIUM

Table A 17. Variables entered the Model

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,923 ^a	,852	,789	3072,1084	2,000

a. Predictors: (Constant), INFLATIO, GDP, EMPLOYEE, COMPANIE, POPULATI, INVESTME

b. Dependent Variable: PREMIUM

Table A 18. Model Summary for Regression Analysis**ANOVA^b**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7,62E+08	6	126984049,0	13,455	,000 ^a
	Residual	1,32E+08	14	9437850,133		
	Total	8,94E+08	20			

a. Predictors: (Constant), INFLATIO, GDP, EMPLOYEE, COMPANIE, POPULATI, INVESTME

b. Dependent Variable: PREMIUM

Table A 19. Regression ANOVA Table**Coefficients^a**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-27397,7	48112,043		-,569	,578
	COMPANIE	-2,659	17,132	-,038	-,155	,879
	EMPLOYEE	1,992E-02	,083	,030	,239	,814
	INVESTME	5,990E-02	,029	,583	2,061	,058
	POPULATI	-6,93E-02	,087	-,170	-,798	,438
	GDP	2,941E-02	,017	,442	1,759	,100
	INFLATIO	299,604	495,096	,092	,605	,555

a. Dependent Variable: PREMIUM

Table A 20. Coefficients for Regression Analysis

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	890,0809	23767,24	7123,0000	6172,1321	21
Std. Predicted Value	-1,010	2,697	,000	1,000	21
Standard Error of Predicted Value	852,2377	2892,3291	1678,9214	586,1158	21
Adjusted Predicted Value	1331,4058	27398,18	7278,4289	6771,0993	21
Residual	-2845,17	7227,5752	3,010E-12	2570,3103	21
Std. Residual	-,926	2,353	,000	,837	21
Stud. Residual	-1,157	2,572	-,024	,967	21
Deleted Residual	-5137,18	8635,2031	-155,4289	3619,4335	21
Stud. Deleted Residual	-1,172	3,411	,031	1,107	21
Mahal. Distance	,587	16,775	5,714	4,459	21
Cook's Distance	,000	,282	,062	,078	21
Centered Leverage Value	,029	,839	,286	,223	21

a. Dependent Variable: PREMIUM

Table A 21. Residuals Statistics**Second Stage****Descriptive Statistics**

	Mean	Std. Deviation	N
PREMIUM	7123,0000	6685,9337	21
INVESTME	42600,24	65122,8611	21
GDP	122749,5	100425,1721	21

Table A 22. Descriptive Statistics**Variables Entered/Removed^d**

Model	Variables Entered	Variables Removed	Method
1	GDP, INVESTME ^a	,	Enter

a. All requested variables entered.

b. Dependent Variable: PREMIUM

Table A 23. Variables entered the Model

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	527,7083	45291,73	11028,83	12108,8075	24
Std. Predicted Value	-,867	2,830	,000	1,000	24
Standard Error of Predicted Value	1103,5520	3803,7996	2059,6480	758,1315	24
Adjusted Predicted Value	38,1921	41966,44	11636,61	12668,0175	24
Residual	-6115,26	7906,5972	1,004E-12	3485,1322	24
Std. Residual	-1,509	1,950	,000	,860	24
Stud. Residual	-1,782	2,113	-,056	1,024	24
Deleted Residual	-10624,0	9277,6055	-607,7734	5199,8227	24
Stud. Deleted Residual	-1,917	2,387	-,043	1,092	24
Mahal. Distance	,746	19,293	5,750	4,982	24
Cook's Distance	,000	,656	,084	,159	24
Centered Leverage Value	,032	,839	,250	,217	24

a. Dependent Variable: PREMIUM

Table A 24. Residuals Statistics

4. Tables for Finalized Regression Model with Profile 2

Descriptive Statistics

	Mean	Std. Deviation	N
PREMIUM	11028,83	12600,3716	24
COMPANIE	99,7917	100,6786	24
EMPLOYEE	15578,04	13234,8548	24
INVESTME	70284,63	98744,6333	24
POPULATI	10828,67	15339,8322	24
GDP	153039,9	129201,8174	24
INFLATIO	97,2125	1,9698	24

Table A 25. Descriptive Statistics

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	INFLATIO, EMPLOYEE, COMPANIE, POPULATI, INVESTME ^a , GDP ^b		Enter

a. All requested variables entered.

b. Dependent Variable: PREMIUM

Table A 26. Variables entered the Model**Model Summary^b**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,961 ^a	,923	,896	4053,7664	2,341

a. Predictors: (Constant), INFLATIO, EMPLOYEE, COMPANIE, POPULATI, INVESTME, GDP

b. Dependent Variable: PREMIUM

Table A 27. Model Summary for Regression Analysis**ANOVA^b**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3,37E+09	6	562055669,7	34,203	,000 ^a
	Residual	2,79E+08	17	16433022,08		
	Total	3,65E+09	23			

a. Predictors: (Constant), INFLATIO, EMPLOYEE, COMPANIE, POPULATI, INVESTME, GDP

b. Dependent Variable: PREMIUM

Table A 28. Regression ANOVA Table

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	22185,288	61268,025		,362	,722
	COMPANIE	-17,847	16,223	-,143	-1,100	,287
	EMPLOYEE	2,266E-02	,102	,024	,222	,827
	INVESTME	7,994E-02	,024	,626	3,373	,004
	POPULATI	-,165	,108	-,201	-1,537	,143
	GDP	5,142E-02	,020	,527	2,587	,019
	INFLATIO	-220,412	629,515	-,034	-,350	,731

a. Dependent Variable: PREMIUM

Table A 29. Coefficients for Regression Analysis**Second Stage with Profile 2****Descriptive Statistics**

	Mean	Std. Deviation	N
PREMIUM	11028,83	12600,3716	24
INVESTME	70284,63	98744,6333	24
GDP	153039,9	129201,8174	24

Table A 30. Descriptive Statistics**Variables Entered/Removed^b**

Model	Variables Entered	Variables Removed	Method
1	GDP, INVESTME ^a	,	Enter

a. All requested variables entered.

b. Dependent Variable: PREMIUM

Table A 31. Variables entered the Model

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	648,5341	43775,66	11028,83	11988,5255	24
Std. Predicted Value	-,866	2,732	,000	1,000	24
Standard Error of Predicted Value	833,0414	2507,9226	1365,9757	449,6846	24
Adjusted Predicted Value	695,1471	40124,30	11062,18	11795,1984	24
Residual	-7860,17	8556,3701	-9,47E-13	3878,7395	24
Std. Residual	-1,936	2,108	,000	,956	24
Stud. Residual	-2,138	2,227	-,004	1,050	24
Deleted Residual	-9582,05	9565,7031	-33,3507	4733,2749	24
Stud. Deleted Residual	-2,359	2,487	,006	1,118	24
Mahal. Distance	,010	7,821	1,917	2,107	24
Cook's Distance	,000	,707	,082	,163	24
Centered Leverage Value	,000	,340	,083	,092	24

a. Dependent Variable: PREMIUM

Table A 32. Residuals Statistics

5. Tables for Kruskal Wallis test for Profile 1

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
PREMIUM	30	32573,10	56773,4585	229,00	220876,0
PROFIL1	30	1,4000	,7240	1,00	3,00

Table A 33. Descriptive Statistics for Kruskal Wallis (Profile 1)

6. Tables for Kruskal Wallis test for Profile 2

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
PREMIUM	30	32573,10	56773,4585	229,00	220876,0
PROFIL2	30	1,2667	,6397	1,00	3,00

Table A 34. Descriptive Statistics for Kruskal Wallis (Profile 2)

II GDP

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
AT	155 595	168 108	179 840	182 364	181 645	189 332	191 064	206 671	212 511	218 333	224 270	231 728	246 466
BE	177 226	198 401	211 551	212 474	216 137	223 687	225 713	247 792	253 800	260 011	267 480	277 357	298 180
BG	0	8 162	1 019	7 822	9 168	11 386	12 164	13 704	15 250	16 589	17 655	19 578	21 448
CH	211 463	226 815	240 823	238 532	231 504	240 557	248 637	266 930	279 915	291 607	282 975	284 683	295 117
CY	5 641	6 273	6 795	7 042	7 520	8 120	8 702	9 627	10 205	10 709	11 324	11 940	13 418
CZ	27 099	33 633	42 272	48 195	49 683	54 440	55 345	60 397	67 960	78 368	75 681	79 118	98 418
DE	1 632 083	1 763 731	1 880 207	1 878 151	1 863 458	1 916 659	1 978 600	2 030 000	2 073 700	2 110 400	2 129 200	2 184 517	2 245 500
DK	115 790	128 024	137 793	144 155	149 169	154 069	162 400	171 584	177 871	183 125	188 183	195 776	208 206
EE	1 438	2 038	2 874	3 664	4 349	4 975	5 218	5 926	6 668	7 469	8 042	8 753	10 540
ES	383 400	425 089	446 881	480 535	495 627	525 454	565 419	609 734	653 289	696 208	743 046	791 559	904 323
FI	78 649	84 411	99 220	100 624	108 215	115 596	119 985	130 145	135 468	139 803	142 518	146 782	155 320
FR	1 076 493	1 139 319	1 188 101	1 224 606	1 241 129	1 287 574	1 355 102	1 420 138	1 475 584	1 526 821	1 557 245	1 610 899	1 696 757
GB	834 362	876 967	866 787	937 100	1 170 206	1 269 327	1 371 052	1 559 626	1 598 902	1 660 457	1 589 468	1 727 094	1 768 549
GR	75 908	84 353	89 888	97 973	107 103	108 977	117 850	123 140	131 024	141 334	152 572	164 809	181 088
HR	0	0	0	15 649	17 682	18 824	18 385	19 675	22 115	23 540	24 810	26 184	29 691
HU	31 459	34 910	34 119	35 580	40 352	41 931	45 075	50 655	57 874	68 902	73 235	79 360	87 826
IE	43 010	46 148	50 836	57 649	70 719	77 670	89 614	102 845	114 742	129 344	131 922	139 438	160 322
IS	5 057	5 284	5 339	5 731	6 387	7 138	7 896	9 127	8 524	9 039	9 252	9 936	12 423
IT	812 360	863 368	839 041	971 065	1 029 991	1 068 947	1 107 994	1 166 548	1 218 535	1 260 428	1 300 926	1 347 591	1 417 241
LI	1 948	2 090	2 219	2 198	2 133	2 216	2 501	2 693	2 784	2 857	2 718	2 735	2 835
LT	2 539	3 572	4 887	6 358	8 681	9 896	10 169	12 320	13 505	14 926	16 143	17 511	20 587
LU	11 377	12 951	13 828	14 297	15 417	16 890	18 738	21 278	21 971	22 506	23 476	24 527	28 637
LV	2 186	3 407	3 742	4 399	5 410	5 908	6 752	8 379	9 227	9 795	9 868	10 404	12 789
MT	1 200	1 550	1 900	2 299	2 553	2 752	3 661	4 136	4 321	4 392	4 267	4 380	4 483
NL	268 492	293 571	317 323	332 479	332 654	351 648	374 070	402 291	429 127	444 649	453 795	463 812	501 921
NO	98 209	104 298	113 140	125 287	138 596	133 729	148 373	181 079	189 632	202 724	195 381	193 797	237 984
PL	69 252	84 030	103 948	121 111	135 708	150 483	154 354	180 601	207 128	202 497	185 176	186 447	240 540
PT	67 169	76 303	82 631	86 310	93 901	100 355	108 030	115 548	122 801	129 171	130 428	134 622	147 249
RO	0	0	0	0	0	37 436	33 388	40 346	44 904	48 442	50 688	58 947	79 314
SE	155 474	179 611	189 698	213 177	218 263	221 163	235 768	259 907	244 880	256 237	267 297	278 023	287 977
SI	9 908	12 130	15 319	15 882	17 184	18 634	19 924	20 581	21 845	23 518	24 488	25 565	27 373
SK	9 928	13 003	14 834	16 404	18 699	19 763	19 131	21 926	23 322	25 733	28 822	32 367	37 301
TR	123 190	108 861	129 564	143 121	167 799	177 796	173 096	216 736	161 836	192 803	212 268	235 541	290 503

TABLE 2 | Total Premium Income per Country and Growth Rate

	Total 2004 (in € million)	Total 2005 (in € million)	Growth rate (inflation adjusted)
AT-Austria	13,975	15,322	7.4%
BE-Belgium	28,417	33,829	16.1%
BG-Bulgaria	434	457	0.4%
CH-Switzerland	32,816	31,590	-4.6%
CY-Cyprus	550	588	3.8%
CZ-Czech Republic	3,499	3,887	2.1%
DE-Germany	152,124	157,800	1.8%
DK-Denmark	15,756	16,774	4.8%
EE-Estonia*	189	189	-
ES-Spain	45,224	48,687	4.1%
FI-Finland	13,191	14,302	7.6%
FR-France	158,226	174,920	8.5%
GB-United Kingdom	219,845	220,876	-0.8%
GR-Greece	3,624	3,904	4.1%
HR-Croatia	885	1,023	10.2%
HU-Hungary	2,380	2,767	10.7%
IE-Ireland	11,998	12,970	5.8%
IS-Iceland	281	317	0.1%
IT-Italy	101,038	109,901	6.4%
LI-Lichtenstein	1,490	2,713	80.5%
LT-Lithuania*	269	269	-
LU-Luxembourg	8,972	11,464	23.1%
LV-Latvia	197	229	13.5%
MT-Malta	248	247	-2.6%
NL-The Netherlands	48,695	49,690	0.5%
NO-Norway	10,381	11,344	3.0%
PL-Poland	6,091	7,764	10.9%
PT-Portugal	10,465	13,431	25.7%
RO-Romania	614	890	18.8%
SE-Sweden	19,169	22,251	17.2%
SL-Slovenia	1,457	1,540	10.1%
SK-Slovakia	1,198	1,366	7.0%
TR-Turkey	3,725	4,697	10.1%
CEA	917,424	977,193	4.5%
EU (25)	866,798	924,619	4.6%
Euro (12)	595,949	646,220	6.2%

* 2004 data

Note:
All 2005 figures are provisional data and are subject to change. Growth rates are always inflation-adjusted. The complete data for 2004 and basic data for 2005 will be available on the CEA website by the end of June 2006.

III Population

	1 993	1 994	1 995	1 996	1 997	1 998	1 999	2 000	2 001	2 002	2 003	2 004	2 005
AT	7 863	7 929	7 944	7 953	7 965	7 971	7 983	8 002	8 021	8 039	8 102	8 140	8 207
BE	10 068	10 101	10 131	10 143	10 170	10 192	10 214	10 239	10 263	10 310	10 356	10 396	10 446
BG	8 485	8 460	8 427	8 385	8 341	8 283	8 230	8 191	7 929	7 846	7 801	7 761	7 741
CH	6 908	6 969	7 019	7 062	7 081	7 097	7 124	7 164	7 204	7 261	7 318	7 368	7 415
CY	619	633	645	656	666	675	683	691	698	706	715	731	749
CZ	10 326	10 334	10 333	10 321	10 309	10 299	10 290	10 278	10 267	10 206	10 203	10 212	10 221
DE	80 975	81 338	81 539	81 818	82 012	82 057	82 037	82 164	82 260	82 440	82 537	82 539	82 501
DK	5 181	5 197	5 216	5 251	5 275	5 295	5 314	5 330	5 349	5 368	5 384	5 398	5 411
EE	1 511	1 477	1 448	1 425	1 406	1 393	1 379	1 372	1 367	1 361	1 356	1 351	1 347
ES	39 114	39 219	39 305	39 383	39 468	39 571	39 724	39 961	40 376	40 851	41 664	42 345	43 038
FI	5 055	5 078	5 099	5 117	5 132	5 147	5 160	5 171	5 182	5 195	5 206	5 220	5 237
FR	57 369	57 565	57 753	57 936	58 116	58 299	58 497	58 749	59 043	59 342	59 856	60 200	60 561
GB	58 099	58 293	58 500	58 704	58 905	59 090	59 391	59 623	59 863	59 140	59 329	59 516	60 035
GR	10 420	10 511	10 595	10 674	10 745	10 808	10 861	10 904	10 931	10 988	11 006	11 041	11 076
HR	4 641	4 649	4 669	4 694	4 572	4 501	4 554	4 381	4 437	4 443	4 442	4 496	4 444
HU	10 365	10 350	10 337	10 321	10 301	10 280	10 253	10 222	10 200	10 175	10 142	10 117	10 098
IE	3 569	3 583	3 598	3 620	3 652	3 694	3 735	3 777	3 826	3 900	3 964	4 025	4 109
IS	262	265	267	268	270	272	276	279	283	287	289	291	294
IT	56 960	57 139	57 269	57 333	57 461	57 563	57 613	57 680	57 844	58 994	57 321	57 804	58 462
LI	30	30	31	31	31	31	32	32	33	34	34	34	35
LT	3 694	3 671	3 643	3 615	3 588	3 562	3 536	3 512	3 487	3 476	3 463	3 446	3 425
LU	395	400	406	412	417	422	427	434	439	444	448	452	455
LV	2 586	2 541	2 501	2 470	2 445	2 421	2 399	2 382	2 364	2 346	2 332	2 320	2 306
MT	363	366	370	371	374	377	379	389	391	395	397	400	403
NL	15 239	15 342	15 424	15 494	15 567	15 654	15 760	15 864	15 987	16 105	16 193	16 255	16 306
NO	4 299	4 325	4 348	4 370	4 393	4 418	4 445	4 479	4 503	4 524	4 552	4 577	4 606
PL	38 418	38 505	38 581	38 609	38 639	38 660	38 667	38 654	38 644	38 633	38 219	38 191	38 174
PT	9 965	9 983	10 013	10 041	10 070	10 108	10 150	10 198	10 263	10 329	10 408	10 475	10 529
RO	0	22 748	22 712	22 656	22 582	22 526	22 489	22 456	22 431	21 834	21 773	21 711	21 659
SE	8 692	8 745	8 816	8 838	8 845	8 848	8 854	8 861	8 883	8 909	8 941	8 976	9 011
SI	1 994	1 989	1 990	1 990	1 987	1 985	1 985	1 988	1 990	1 994	1 995	1 996	1 996
SK	5 314	5 337	5 356	5 368	5 379	5 388	5 393	5 399	5 379	5 379	5 379	5 380	5 385
TR	59 489	60 573	61 644	62 695	63 745	64 789	65 819	66 835	68 610	69 260	70 173	71 254	71 608

II.2 Country guide 2005

(Source CEA)		Number		Euro million					
Country		Number of companies	Number of employees	Premium income	Life premium income	Non-life premium income	Investments	Life investments	Non-life investments
AT	Austria	72	26 106	15 295	7 124	8 171	59 873	43 315	16 558
BE	Belgium	181	24 141	33 829	24 964	8 865	183 043	147 007	36 036
BG	Bulgaria								
CH	Switzerland	146	41 000	31 590	18 343	13 247	284 183	201 770	82 413
CY	Cyprus	33	1 700	588	276	312	1 586	1 430	156
CZ	Czech Republic	45	14 119	3 887	1 507	2 380	7 831	0	0
DE	Germany	670	233 300	157 800	72 597	85 203	1 155 655	648 696	506 686
DK	Denmark	210	10 800	16 774	10 736	6 039	182 104	166 403	15 701
EE	Estonia	0	0	189	50	139	0	0	0
ES	Spain	320	48 000	48 687	20 522	28 165	158 000	119 000	39 000
FI	Finland	65	11 600	14 302	11 256	3 046	103 338	93 660	9 678
FR	France	470	138 000	174 920	120 090	54 830	1 288 800	1 131 700	157 100
GB	United Kingdom	1 170	207 000	220 876	150 629	70 247	1 608 658	1 484 352	124 305
GR	Greece	99	9 500	3 923	1 935	1 988	8 716	6 187	0
HR	Croatia	21	6 250	1 023	265	758	1 709	665	1 043
HU	Hungary	28	29 988	2 767	1 218	1 550	4 722	0	0
IE	Ireland	220	15 000	12 970	9 000	3 970	79 800	63 840	15 960
IS	Iceland	11	600	317	35	282	0	0	0
IT	Italy	239	39 136	109 901	73 592	36 309	473 004	397 191	75 813
LI	Lichtenstein	30	0	2 713	2 596	116	6 394	5 813	581
LT	Lithuania	25	0	302	84	219	419	162	257
LU	Luxembourg	95	2 678	11 464	9 800	1 664	35 742	33 463	2 279
LV	Latvia	17	3 100	229	16	213	201	48	152
MT	Malta	21	1 090	247	134	113	830	719	112
NL	The Netherlands	300	47 500	49 690	25 000	24 690	325 000	290 000	35 000
NO	Norway	116	8 700	11 344	6 937	4 407	92 343	75 947	16 396
PL	Poland	74	28 500	7 764	3 812	3 952	19 841	12 341	7 500
PT	Portugal	70	11 800	13 431	9 136	4 295	38 600	32 400	6 200
RO	Romania	37	36 000	890	235	655	325	191	134
SE	Sweden	415	19 000	22 261	15 059	7 202	239 146	197 556	41 590
SI	Slovenia	21	5 750	1 640	543	1 097	4 592	2 588	2 004
SK	Slovakia	26	6 484	1 366	571	795	1 749	1 307	442
TR	Turkey	53	12 837	4 697	740	3 957	5 163	3 033	2 130
CEA		5 300	1 030 679	977 677	598 201	378 876	6 371 366	5 160 783	1 195 228