

Ph.D Thesis

ESSAYS ON THE POLICY IMPLICATIONS OF
MIGRATION

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"Wherever I am, let me be,
The sky is mine."

Sohrab Sepehri

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Dedicated to the memory of my grandparents:

Tahsin and Arife Kayaoğlu

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Hasgül and Azize Koç

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Overview

Managing migration- whether it is national or international; temporary or permanent - is one of the main concerns of today's nation-states. Inter- and intra-country population movements are forcing states to focus more on certain policy areas such as security, citizenship, integration, education, and urbanization together with a number of others. This first goal of this thesis is to shed light on some of these policy areas in a framework of migration. The second goal of it is to implement recent migration data sets using proper suitable econometric applications. The central aim of the thesis is therefore to provide a valuable contribution to the economics of migration literature which hopefully could help readers to put more detailed analysis on the subject.

The thesis is structured as follows: Chapter 1 argues that human capital accumulation and urbanization play a central role in the analysis of economic growth and development. The importance of human capital has considerably considerably because it determines a country's capacity to invent and adopt new technologies. Hence, migration out of traditional agricultural regions became a central factor of growth, both as a cause and as a consequence. Cities are places where most highly-skilled workers are located, interacting with each other, innovating and adopting modern technologies. Besides, urban areas are also places where access to schooling is better. Thus, the aim of this chapter is to calibrate a model with endogenized human capital accumulation, urbanization and economic development. An adjustment-cost hypothesis is put forward here to explain the following paradox: Africa is the region with the highest increase in human capital and urban population but has the slowest economic growth. According to this hypothesis, low or negative social return to education in the short run is linked to the transitory adjustment or urbanization costs. The chapter then confronts data to theory and presents the calibration of the model parameters using panel regressions and identification strategies.

Simulation exercises in Chapter 1 show that countries in each region converge towards a specific steady state. In other words, only conditional convergence can be obtained in the long-run and developing countries do not catch up the leading region (high-income countries). Besides, it is found that sub-Saharan Africa is actually a distinct case. Comparatively higher levels of educational investment in that region could not be realized in the short-run in terms of economic growth. Chapter 1 argues

that these investments in education are not a deadweight loss even though they have not generated growth in the short-run but instead they hide a *latent growth potential*, and this time lag of realization is due to temporary adjustment costs of urbanization on human capital. Thus, it is predicted greater growth rates in future decades (*backlog*) but a limited convergence with high-income countries. In the pessimistic scenario in which education and urbanization growth rates decline, it takes about 30 years for GDP per capita to reach its long-run value that is only 1.5 times larger than the current level.

Chapter 2 is concerned to fill in the gap in the literature about the policy implications of high-skilled emigration and it specifically focuses on its interactions with the education policies in developing countries. If we name the international migration after the Gulf War years as the “*contemporary age of migration*”, we can argue that one of its characteristics is the increasing portion of highly-educated migrants, in general, from low- and middle-income countries to high-income OECD countries. It is a strongly accepted fact that higher levels of income per capita can be attained most importantly through higher physical capital per worker, higher levels of total factor productivity and higher human capital. Therefore, the importance of the high-skilled workers cannot be ignored for the growth of an economy. The problems associated with the emigration of high-skilled individuals from developing countries are stressed since the beginning of the 1960s especially in the economics literature. There exist mainly three waves in the literature: the first strand focuses on non-negative aspects of high- skilled migration (see Grubel and Scott, 1966 and Berry and Soligo, 1969). Second stream starts with the writings and propositions of J.Bhagwati during 1970s and argues that there is negative impact of high-skilled migration on the welfare of developing countries (Bhagwati and Hamada, 1974; Bhagwati and Rodriguez, 1975; Haque and Kim, 1995). After a long recognition of highly skilled emigration as a negative phenomenon for developing countries, a new literature started to emerge suggesting that brain drain can be, in fact, transformed to a brain gain through its positive spillovers such as its stimulating effects on the production of the human capital in source countries (see for example Mountford, 1997; Beine, Docquier and Rapoport, 2001; Stark and Wang, 2002. Docquier, Faye and Pestieau, 2008). Chapter 2 theoretically and empirically investigates the implications of this growing brain drain for education policy in developing countries. It first generalizes and expands the existing theoretical literature to derive a number of theoretical predictions regarding

the optimal policy response to the brain drain in terms of the size and distribution across levels of education expenditures and in terms of quantity-quality tradeoff. It shows that the relationships between the brain drain and education policies depend on the strength of ties with the diaspora and on the quality of home-country institutions. It then tests the predictions using cross-country data. The empirical results are in line with the theoretical predictions as it is found that the brain drain has a negative impact on public education subsidies, except when the links between the diaspora and the home countries (as proxied by remittances) are strong. Moreover, our theoretical predictions are more likely to be confirmed in countries with good governance. To sum up, it concludes that there is an undeniable impact of brain drain on the educational policies of sending countries. Governments' attitudes towards emigrants and the migrants' ties with their origin countries shape this impact in different ways which are all thoroughly explained in Chapter 2 in detail.

Chapter 3 examines the impact of citizenship on the socio-economic integration of Turkish immigrants in France and Germany. The contemporary world is being shaped by tremendous flows of both capital and labor more than ever before. These flows have brought about the need for efficient restructuring in the institutional frameworks of both destination and home countries, and still call for further changes in the structure of existing institutions. International migration of laborers after the World War II had an important impact, especially on the institution of citizenship, which was and still is one of the highly debated issues especially in the post-immigration Europe. The focus of the discussion was first on the ingredients of the skeleton of a nation, and therefore citizenship was granted to those who share common ethnic, religious, linguistic and cultural identities. Citizenship as a prescribed contract signed between a rights-holder and a certain nation-state was actually an exclusionary one, in the sense that migrants from other nations did not have any chance of having it. However, the increasing proportion of immigrants in Europe brought with it new aspects to the discussion of citizenship. Today there are around 3 million Turkish origin migrants in Germany and 400 thousand in France who have already raised their third generations. Nowadays they are even being named with their hyphenated identities, such as German-Turks and French-Turks. In the meantime, they encounter various obstacles in everyday life due to the stigmatization and securitization of migration and Islam. This is why their integration into the receiving societies is of great importance, as better social cohesion helps nurture the economic, political and social

contribution of migrants to their countries of settlement. By providing a link between the two streams of the literature, Chapter 3 aims to analyze the impact of citizenship on employment probabilities and different affiliations of Turkish-origin immigrant populations settled in Germany and France together with revealing the link between employment and citizenship status from an empirical perspective. Although it is argued that post-national membership already provides many social, civil, cultural and ecological rights to migrant populations, which causes devaluation in the importance of holding national citizenship for those migrants, Chapter 3 claims that the institution of citizenship still has power over the social, political and economic integration and assimilation of migrants if the subjective evaluations of migrants towards their own affiliations are taken into consideration. Therefore, citizenship continues to be an important instrument for governments to provide incentives for the migrant population to make them more attached to their countries of residence and more active in the economic setting of the host country. Hence, empirical analysis which investigates the impact of citizenship on socio-economic integration is essential.

After a detailed review of the literature, this chapter proposes three hypotheses;

- 1- More inclusionary policies lead migrants and their descendants to be more affiliated with receiving countries.
- 2- Long-lasting exclusionary migration and integration policies of Germany on migrants and their descendants make German-Turks less affiliated with Germany, however, inclusionary policies of France make French-Turks more affiliated.
- 3- Since citizenship ownership sends a signal to employers about the lower probability of return behavior of migrants and their descendants together with the satisfaction of the other eligibility criteria, especially for the first generation immigrants, it increases the probability of being employed.

In the empirical analysis, a micro data is used which is obtained from the results of structured interviews conducted with 1,065 interlocutors in Germany (2004) and 600 in France (2004). It is found that a statistically significant impact of citizenship both on affiliations and economic integration of immigrant origin populations exists. These findings render citizenship policies crucial for the incorporation policies of Germany and France vis-a-vis immigrants and their descendants. Thus, Chapter 3 concludes that citizenship procedures should be eased in both countries, at least for

those immigrants and their descendants who have strong affiliation with their country of residence. It is also revealed that loyalty and attachment to the country of residence by means of citizenship attainment is likely to have a great impact on the social and economic integration of migrants and their descendants.

Chapter 4 looks at the relationship between security policy and internal migration from a different angle. Instead of analyzing the impact of internal migration on the security policy, Chapter 4 analyzes the impact of conflict on internal migration, more specifically forced migration, in the Eastern and South Eastern regions in Turkey in addition to its effect on unemployment, labour force participation, educational investment in those regions compared to the other regions in Turkey. This paper examines the economic and social costs of the State of Emergency (*Olağanüstü Hal* in Turkish, SOE hereafter) ruling using difference-in-differences (DID) and propensity score matching methods. The data is obtained from the Turkish Institute of Statistics and it is provided at provincial level for the years before and after the SOE ruling. Negative spill-over impacts of the SOE, especially on the forced migration, unemployment, labor force participation, education and crime are analyzed using these data. Thus, this chapter aims to uncover the assumed and widely discussed side effects of the SOE with a quantitative analysis which was a gap in the literature. It is known that Eastern and Southeastern regions of Turkey were neglected until the coup d'état in 1980, by putting forward their unfavorable regional conditions. The escalation of ethnic conflict in the region after the beginning of 1980s caused stagnation for the region's development, since it urged the government to introduce the SOE in 1987 to take control of the region through paying special effort in the prevention of the "terrorism" acts. For many years, the presumed effects of the SOE are discussed both in the media and academia; however, there was no quantitative evidence about its spill-over impacts.

Chapter 4 presents that the SOE had a significant worsening impact both on unemployment rates and labor force participation rates in the Eastern and South Eastern regions in Turkey. Moreover, when the changes in city populations are analyzed, it is seen that the majority of the population from emptied villages flowed towards the urban areas of the SOE cities to a larger extent, in comparison to the control cities. Therefore, downward wage pressure for sure is felt in the SOE region and this can be an important contributor to increased unemployment rates there.

Furthermore, under the common trends assumption, cities that are governed by the SOE rule had comparatively lower investments in public education.

Chapter 1

Urbanization, Education and the Growth Backlog of Africa^{1,2}

Abstract

Human capital accumulation and urbanization play a central role in the analysis of growth and development. Stylized facts reveal a positive association between human capital accumulation, urbanization and growth both over time and across countries. Interestingly, Africa is the region with the slowest economic growth although human capital accumulation and urbanization have increased at the fastest pace. An adjustment-cost hypothesis, which is comparatively more optimistic than other theories, is put forward to explain this paradox. According to this hypothesis, it is argued that low or negative social return to education in the short-run might be due to transitory adjustment or urbanization costs. We build a simple growth model based on this hypothesis, then the model is first calibrated and later used to simulate the African trajectory. We predict greater growth rates in future decades (backlog) but a limited convergence with high-income countries. In the pessimistic scenario in which education and urbanization growth rates decline, it takes about 30 years for GDP per capita to reach its long-run value which is only 1.5 times larger than its current level.

Key words: Urbanization, economic development, human capital, transitory shocks, growth backlog, Sub-Saharan Africa

JEL codes: E27, O11, O47, R11

¹Written jointly with Joaquin Naval (Universitat Autònoma de Barcelona).

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1 Introduction

Since Lucas (1988) and Azariadis and Drazen (1990), human capital disparities play a central role in the analysis of growth and development. Historical analyzes confirm that the transition from economic stagnation to growth was preceded (Cipolla, 1969) and then accompanied (Maddison, 1995) by enormous increases in literacy and average level of schooling. In addition, it has long been argued that there is a close connection between urbanization and economic growth. Lucas (1988) discussed the leading effects of cities and urban development on national economic growth. Cities are places where most high-skilled workers are located, interacting with each other, innovating and adopting modern technologies. Moreover, urban areas are also places where access to schooling is better. Bertinelli (2003) argues that “urbanization plays a non-negligible role in spending human capital accumulation. Closeness between people favors interactions, which may be at roots of spillovers from human capital. In return, incentives to invest in education are reinforced, leading hence to higher levels of education.” Lucas (2009) also analyzes the link between urbanization and human capital accumulation. He builds a model with two sectors (rural and urban) and assumes that more educated workers reside in the urban sector. Hence, according to his model, countries with a large share of their population working in rural sector (due to agriculture still being traditional) have a low ability to absorb technology from leading economies. It implies that migration out of traditional agriculture is crucial for growth and that countries with low initial endowment in human capital, or high proportion of rural workers, will have a late take-off. Moreover, he focuses on the reasons for cross-country spillover effects which play an important role for the growth behavior of economies. After the calibration analysis, he argues that among several economic forces which contribute to the cross-country growth effects, migration from rural to urban areas seems to be a very important factor for the convergence mechanism.

As the literature on growth suggests the nexus between urbanization, human capital investment and development is an important source of take-off for countries. This is especially the case in the developed regions of the world where we see urbanization as an important phase of economic development and growth. Rural-to-urban migration is also rapidly accelerating across Africa. Although there are many differ-

ent factors behind this large influx of population towards urban areas such as climate change and social conflict and so on, the main reason is rooted in economic reasoning; in other words, employment seeking and chance of having a better life. However, the process of urbanization in Africa is far from being able to contribute to the pursuit of higher life standards for migrants and, in macroeconomic terms, has also disadvantages for the African economies in general. Rapid urbanization phenomenon pushes African governments to have an "urban bias" in their development policies (Todaro (2000)) which in turn results in deepening of the income inequality between regions and, thus, the disadvantages of rapid urbanization accrue. The challenges due to this rapid urbanization are various such as the inadequacy of infrastructure, social, educational and healthcare facilities, crime, pollution, congestion, food and water shortages as an African Development Bank article in 2012 discusses. Todaro (2000) argues that both rapid urbanization and urban bias in development strategies causes a "prolific growth of huge slums and shantytowns" in African urban areas which can also be seen as an important burden of rapid urbanization. AfDB (2012) puts forward that 65 percent of dwellings in Sub-Saharan Africa are slum dwellers which is the highest proportion in the world. Besides, the inability of urban sector to absorb additions to the labour force due to urbanization results in a massive growth in informal sector which also brings about some disadvantages. The most important downside of it is the role of informal sector in the continuation of rural-urban migration due to its absorption capacity of the new-comers. Moreover, "increased densities in slums and low-income neighbourhoods, coupled with poor urban services, could cause enormous health and environmental problems for urban areas" as Todaro (2000) argues. Keiser et al. (2004) study the impact of rapid urbanization in Sub-Saharan African countries on malaria control and they conclude that "rapid and unprecedented urbanization, going hand-in-hand with often declining economies, might have profound implications for the epidemiology and control of malaria, as the relative disease burden increases among urban dwellers."

The aim of our paper is to build a growth model with endogenized human capital accumulation, urbanization and economic development and forecast the growth prospective of Sub-Saharan African countries in order to understand when the investments in education and urbanization will be realized as a growth potential. As in Lucas (2009), a structural macroeconometric assessment of the relationship between human capital accumulation, urbanization and growth is presented in the pa-

per rather than a model with a microfoundation. This strategy will be enough to serve the aim of the paper which is presenting the forecast of the growth potential in Sub-Saharan Africa. An adjustment-cost hypothesis is put forward to explain the following paradox: Africa is the region with the highest increase in human capital and urban population but has the slowest economic growth. According to the adjustment-cost hypothesis, low or negative social returns to education in the short run might be due to the transitory adjustment or urbanization costs. We then confront data to theory and calibrate the parameters of our model using panel regressions and identification strategies. Hence, we can analyze the dynamics of the model, which enables us to make predictions about growth and convergence. The calibrated model does an excellent job in fitting historical data on the proportion of college graduates, share of urban population and growth in GDP per capita. Therefore, the model can be seen as a good source to forecast the evolution of the key variables in the next decades. Such a quantitative theory approach is now the dominant research paradigm used by economists since it incorporates rational expectations and dynamic choice into short-run macroeconomic and monetary economics models (King 1995).

Forecasting exercises show that countries in each region converge towards a specific steady state. In other words, only conditional convergence can be obtained in the long-run and developing countries do not catch up the leading region (high-income countries). Besides, we find sub-Saharan Africa to be a distinct case. Comparatively higher levels of educational investment in that region could not be realized in the short-run in terms of economic growth. Although, many explanations can be put forward to explain this paradox such as institutional structure, political instability, low level of investment in infrastructure and so on, our paper argues that high level of investment in education should not be seen as a deadweight loss even though it has not generated growth in the short-run. In fact, it is argued to hide a latent growth potential, and this time lag of realization is due to temporary adjustment costs of urbanization on human capital. However, apart from the optimistic prediction about the African backlog, our analysis foresees also a pessimistic result, which is the situation of the no long-run convergence in income levels in sub-Saharan Africa with respect to the leading region. This pessimistic result can be attributed to the current development strategies of SSA governments which has an obvious urban bias and therefore resulting high rates of urban unemployment in urban centers together with the growth of informal sector. The latter can be thought of a panacea for the unem-

ployment problem although it also has various disadvantages for the development of SSA countries.

The remainder of the paper is organized as follows. Section 2 provides some stylized facts on urbanization, education and development. The model and its calibration are described in Section 3. Section 4 presents the explanations for the growth backlog of Africa and Section 5 concludes.

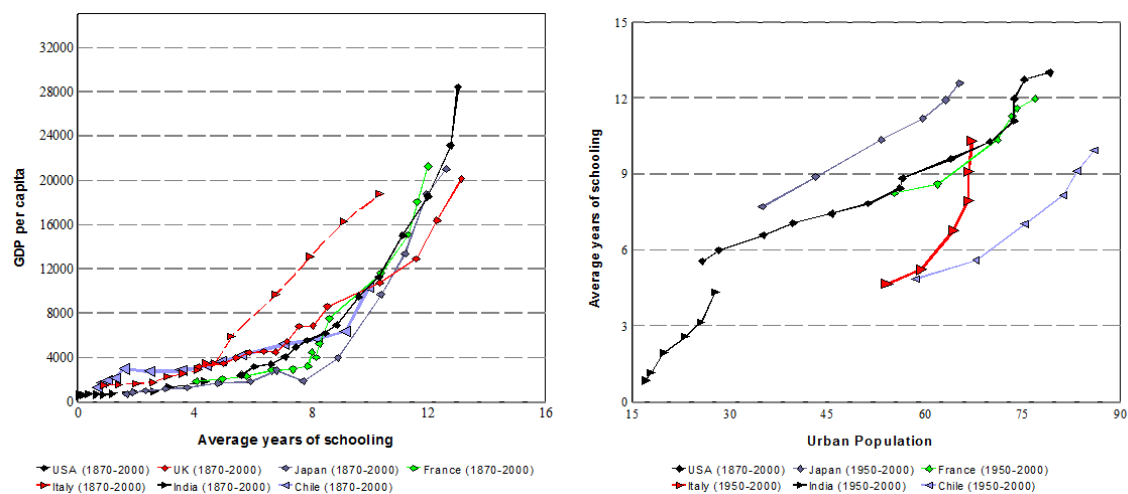
2 Stylized facts and the African Paradox

Historically, Cipolla (1969) documents that the spread of literacy started between the 17th and 19th century, 5,000 years after the first rudimentary appearance of writing. Before that period, the arts of writing and reading remained the monopoly of small elites. But it is mainly in the 19th century that the advance of literacy and the development of education occurred in the west, and it was invariably connected with the condition of urbanization, the emergence of public schools, and the industrial revolution.

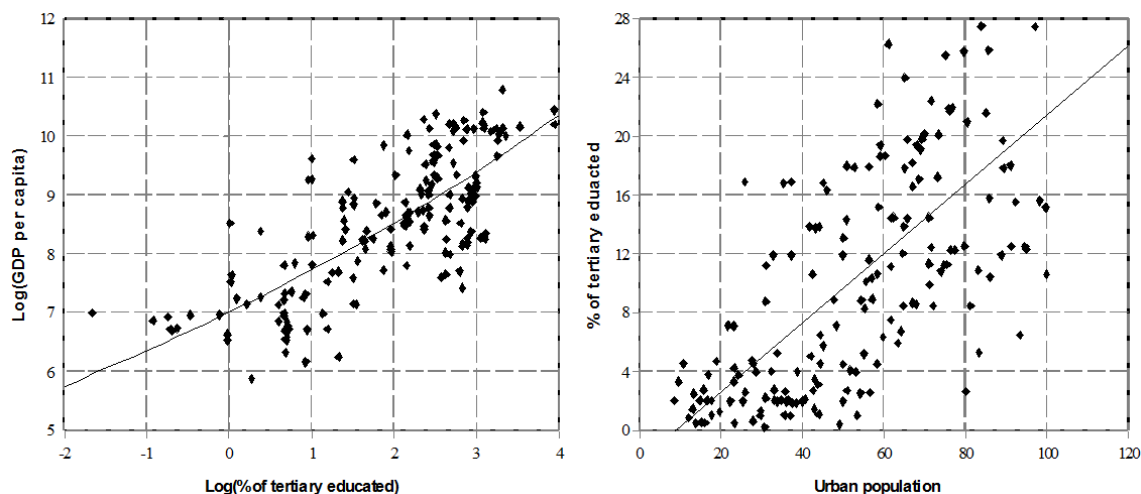
Causation is obviously hard to establish. On the one hand, urbanization facilitated access to schooling and the industrial revolution drastically sparked the demand for skills and human capital. On the other hand, education increased workers' capacity of adaptation to new technologies and faculty to innovate. Figures 1(a) and 1(b) illustrate historical associations between education and GDP per capita, urbanization and education. We report data from 1870 to 2000 for four industrialized countries (the US, the UK, Italy and France) and data again from 1870 to 2000 for Japan, India and Chile. Figure 1(a) shows that the rise in years of schooling preceded the rise in income, except in Italy. Figure 1(a) also shows that accumulation of human capital stimulates the GDP per capita and therefore the growth of GDP per capita becomes much higher when countries have better educational prospects. Figure 1(b) shows that urbanization increased at a faster pace than education in the early stage of development. This conclusion cannot be applied to developing countries such as India. The US was clearly a pioneer in the processes of urbanization and adult literacy and it is also used as the leading region in the calibration analysis. Country-specific factors such as the population density and religion (e.g. protestantism) may have facilitated the takeoff.

Figure 1: Nexuses between urbanization, education and development.

- (a) Historical data on GDP per capita and educa- (b) Historical data on education and urban popu-
tion lation



- (c) Cross-country data on education and GDP per (d) Cross-country data on education and urban
capita population



Data Sources: GDP per capita in PPP is taken from Maddison (1995) in Figures 1(a) and 1(b), from Penn World Tables in Figures 1(c) and 1(d); average years of schooling in Figures 1(a) and 1(b) is taken from Morrison and Murtin (2009); urban population data in Figure 1(b) is obtained from U.S Census for the US (<http://www.census.gov/population/censusdata/table-4.pdf>) and from United Nations (<http://esa.un.org/wup2009/unup/index.asp?panel=1>) for the other countries; proportion of college graduates in the population aged 25 and over in Figures 1(c) and 1(d) is taken from Docquier et al. (2007); and urban population as a percentage of total population is taken from World Bank World Development Indicators (2008). Observations on Figures 1(a) and 1(b) are available for each decade starting from 1870. Observations on Figures 1(c) and 1(d) are obtained using the data on 2000.

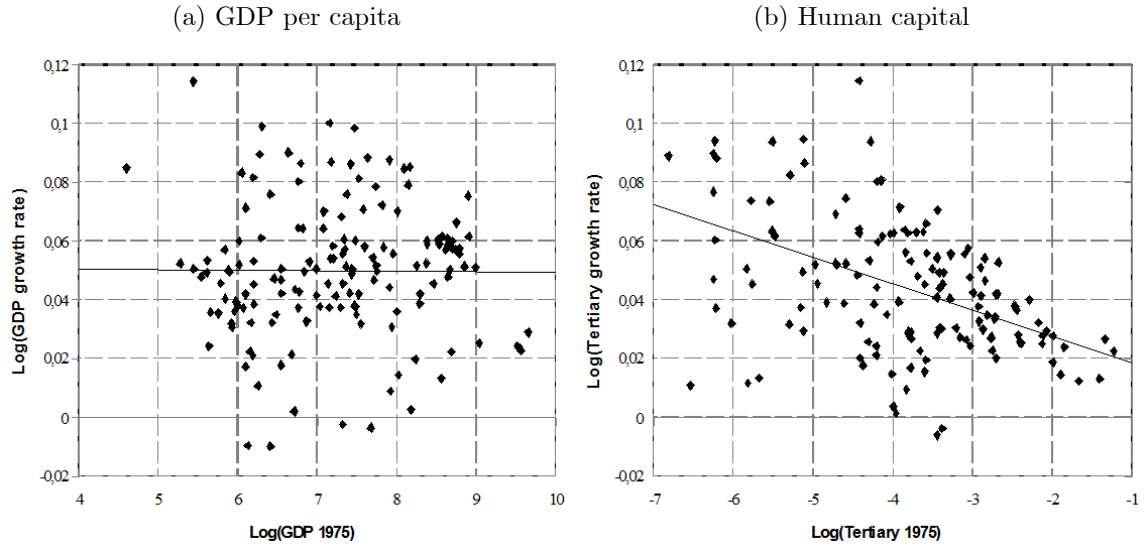
The same patterns arise when using a cross-country perspective based on recent data. Figure 1(c) shows the association between the proportion of college graduates in the population aged 25 and over and the level of GDP per capita in 2000 (both in logs). In our sample of 177 countries the coefficient of correlation is close to 0.60. Turning to the association between the urbanization rate (proportion of population living in urban areas) and the proportion of college graduates, Figure 1(d) shows a coefficient of correlation that amounts to 0.40. From these stylized facts and the correlations that are presented above, we can conclude that promoting education and urbanization should help developing countries to take off.

In the Millennium Declaration, the United Nations' member states and international organizations agreed to achieve eight human development goals (United Nations, 2008). Achieving 100 percent of enrollment in primary education, reducing illiteracy rates and gender discriminations in the access to schooling are among the top priorities. In addition, the World Bank is committed to promoting sustainable cities and towns that fulfill the promise of development for their inhabitants. The effectiveness of such policies depends on the intensity of causal links between urbanization, education and growth, as well as on the timing of development process.

A quick look at the data also reveals that the links between urbanization, education and growth are more complex. Figure 2 studies convergence in income and human capital. In Figure 2(b), we regress the average annual growth rate 1975 – 2000 of the proportion of college graduates in the adult population on its level of 1975 (in logs). The slope is clearly negative and the speed of convergence of human capital is equal to one percent per year. Figure 2(a) does the same exercise on GDP per capita. There is no sign of convergence: the 1975 – 2000 growth rate is independent on the level observed in 1975. We could add that urbanization (proportion of population in urban areas) tripled in sub-Saharan Africa between 1950 and 2000 (from 11 to 33 percent), while it was multiplied by 1.4 in high-income countries (from 53 to 73 percent), 1.9 in South-Central Asia (from 16 to 30 percent), and 1.1 in Latin America (from 73 to 80 percent).

We also look at the stylized facts on the development and the urban-to-rural productivity ratio. To construct the urban-to-rural productivity ratio, we divide total GDP per capita (constant 2000 US\$) in the urban sector in 2000 by the total GDP per capita (constant 2000 US\$) in rural sector at the same year. Moreover, total

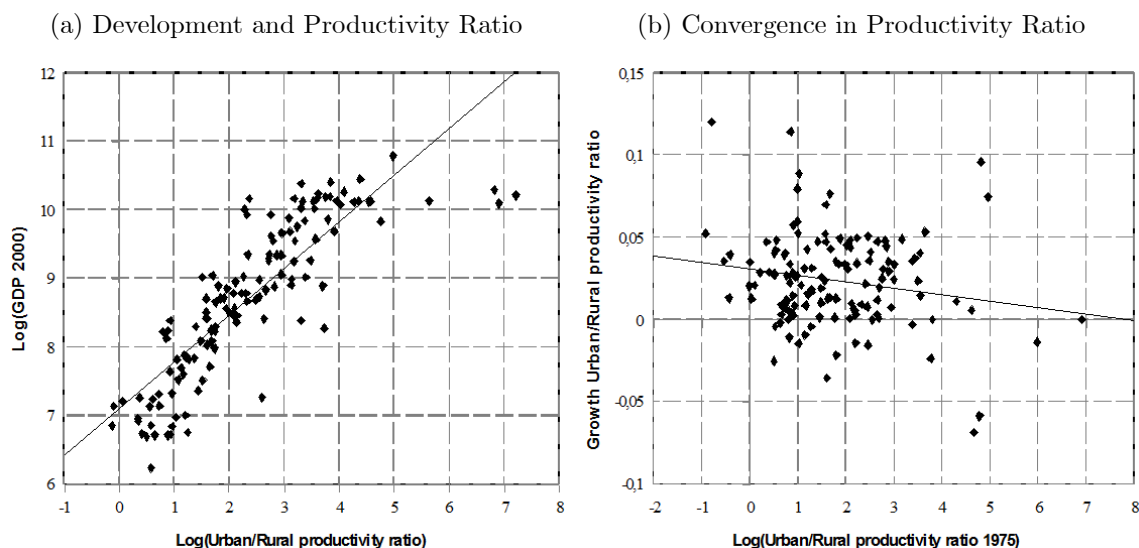
Figure 2: Convergence in income and human capital.



Notes: On Figure 2(a), we plot the log of the average annual rate of growth of GDP per capita from 1975 to 2000 as a function of the log of their 1975 initial value (beta-convergence analysis). Similarly, on Figure 2(b), we plot the log of the proportion of college graduates in the population aged 25 and over as a function of the log of their 1975 initial value. We also provide the linear fitted curve. A negative slope (resp. positive slope) reflects convergence (resp. divergence).

GDP per capita in each sector is calculated by the product of the GDP per capita in a specific sector with the value added of that sector. Data on agricultural value added (as % of GDP) is obtained from WDI (2008). As it can be seen from the graph, the slope is negative and, thus, there is convergence of urban-to-rural productivity ratios among countries. First of all, we check the association between the urban-to-rural productivity ratio and the level of GDP per capita. As we can observe in Figure 3(a), the slope is clearly positive. Moreover, in Figure 3(b), we regress the average annual growth rate between the years 1975 and 2000 of the urban-to-rural productivity ratio on its level in 1975 (in logs).

Figure 3: Development and urban-to-rural productivity ratio.



Notes: On Figure 3(a), we plot GDP per capita in 2000 (in logs) against the urban-to-rural productivity ratio in 2000 (in logs). And on Figure 3(b), we plot the growth of the productivity ratio between 1975 and 2000 as a function of the log of their 1975 initial value (beta-convergence analysis). We also provide the linear fitted curve. A negative slope (resp. positive slope) reflects convergence (resp. divergence).

The stylized facts presented above demonstrate that economic development is connected with urbanization and education. However, Figures 2 and 3 show that there is no convergence in GDP even though we observe a convergence pattern in urban/rural productivity ratio and educational investment in tertiary level which have a positive impact on GDP. Hence, it is also a paradox that, in the second half

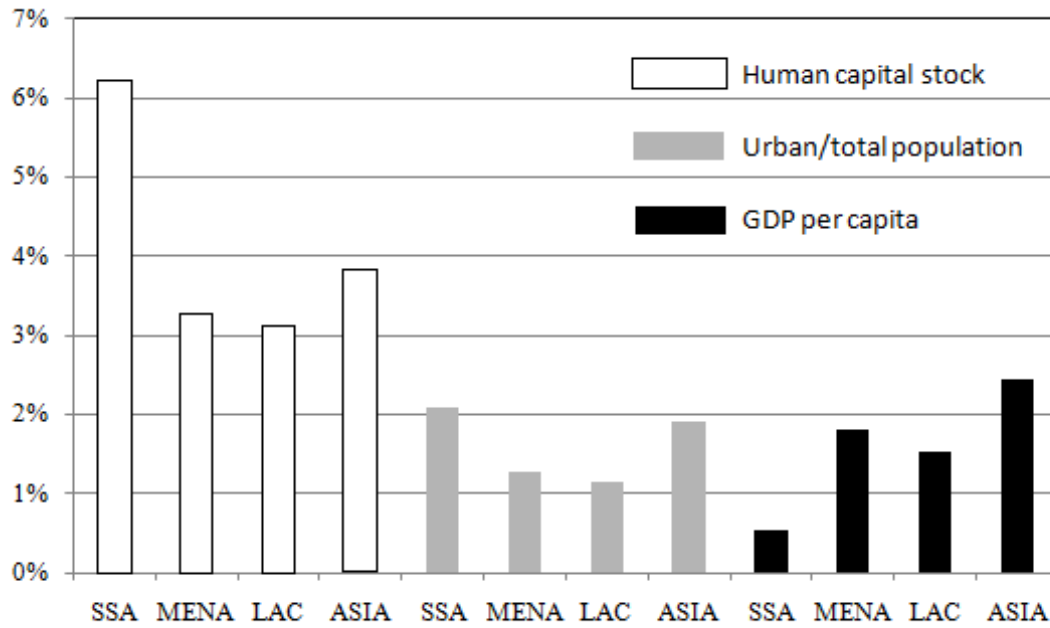
of the past century, even the highest progress in schooling and urbanization had been observed in sub-Saharan Africa (henceforth referred to as SSA), it is still the region with the lowest GDP per capita growth rates. As shown on Figure 4 below, the proportion of college graduates grew by 6.2 percent a year in SSA between 1955 and 2000, to be compared with 3.2 percent in the Middle East and Northern Africa (MENA), 3.1 percent in Latin America and the Caribbean (LAC) and 3.8 percent in South Asia (ASIA). Over the same period, the urban-to-total population increased by 2.1 percent in SSA, to be compared with 1.3 percent in MENA, 1.1 percent in LAC and 1.9 percent in ASIA. Surprisingly, the annual GDP growth rates were 0.5 percent in SSA, 1.8 in MENA, 1.5 percent in LAC and 2.4 in Asia. Thus, why educational investment and urbanization have not necessarily delivered on its promise of higher economic development in SSA is a very crucial question to be answered in order to find a way to bypass the lodjam stalling economic development in the region.

Pritchett (2001) documented the negative association between educational investment and output growth rates and asked: *where has all education gone?* Other empirical studies bring into question the existence and the magnitude of the causal impact of education on development.³ How can this be reconciled with the strong cross-country or historical associations between literacy, schooling and development?

There are some traditional explanations for this African growth paradox. One of the arguments is that quality of education does not follow the quantity of investment in SSA. Therefore, educational investments cannot be efficiently transferred to productivity gains. Manuelli and Seshadri (2007) show that effective human capital has a strong impact on economic performances when corrected for differences in the quality of education. Another straightforward claim is the impact of congestion costs as negative externalities. Jones (2009) shows that despite rises in educational attainment, technology adoption is slower when knowledge traps are at work: poor countries invest too much in “generalist” education and not enough in “specialist” education, given the coordination cost imposed by a “specialist” economy. In the same vein, Vandenbussche et al. (2006) show that different types of human capital are needed at various stages of development. Pritchett (2001) argues that the institutional environment in poor countries has been sufficiently perverse that the accumulated human capital has been applied to activities that served to reduce eco-

³See, among others, Klenow and Rodriguez-Clare (1997), Hall and Jones (1999), Parente and Prescott (2000), Bils and Klenow (2000), Caselli (2005).

Figure 4: Average annual growth rate of human capital, urban population and GDP per capita in developing regions (1955-2000).



Definitions and data sources: Human capital = proportion of college graduates in the population aged 25 and over (Barro and Lee, 2009); Urban/total population = urban population / total population (World Urban Population Prospects, United Nations); GDP per capita in constant 2000 US\$ (World Development Indicators); SSA = sub-Saharan Africa; MENA = Middle East and Northern Africa; LAC = Latin America and the Caribbean; ASIA = South Asia.

conomic growth. Furthermore, Easterly and Levine (1997) point out the importance of public policies in the growth processes and argue that “Africa’s growth tragedy is associated with low schooling, political instability, underdeveloped financial systems, distorted foreign exchange markets, high government deficits, and insufficient infrastructure.”

As it can be already realized, these explanations are very pessimistic because they lead to the conclusion that investments in Africa so far were deadweight losses. There is, however, an appealing and more optimistic explanation for the situation of Africa. This paper focuses on the nexus between human capital accumulation and urbanization, and argues that low or negative social return to education observed in the short run might be due to transitory adjustment or urbanization costs. High-skilled workers mainly operate in cities and more education increases labor demand for low-skilled employees in urban areas. Urbanization makes access to schooling easier, increases schooling level, accentuates the urbanization process (virtuous circle), but generates adjustment and congestion costs. As argued by Henderson (2003), the shift of population from rural to urban areas is typically a transitory process which can be socially and economically traumatic. Increasing cities’ size, number of firms and urban employment requires enormous public infrastructure investments which affect urban quality of life, in particular, health, safety, commuting, and congestion costs. Moreover, rapid urbanization has often occurred in the face of low or negative economic growth over some decades, and over- or under-concentration can be very costly in terms of productivity growth.

Hypothesis. *Rapid urbanization and human capital development in SSA have not yet given rise to high economic growth rates due to temporary urbanization costs. However, they create a latent growth potential which will materialize when urban population and human capital growth rates will be slower. We name this latent growth potential as the African growth backlog.*

This deceleration will automatically come as the rate of urbanization and proportion of college graduates increase, or could come sooner if development policies become less generous after the redemption date of the Millennium Declaration (1990 – 2015). In the latter case, our calibrated model predicts that GDP per capita in SSA could be multiplied by 4 within about 30 years. The region would reach the income level

of current middle income countries. In another scenario where progress in schooling keeps on until 2030, the African takeoff will be delayed but the long-run GDP per capita will be multiplied by 6 in comparison with the current level.

3 Model

In this section, we describe a theoretical model of endogenous human capital formation, urbanization and development. Then, we calibrate its general parameters using panel data econometric techniques. Finally, the dynamics of human capital accumulation, urbanization and GDP per capita for high-income countries and developing regions are depicted.

3.1 Theory

We consider an economy with two sectors, urban and rural, producing a single homogeneous good. The price of the homogeneous good is the numeraire. Population is made of two types of individuals, the highly educated and the less educated. The proportion of highly educated workers at time t is denoted by h_t . We assume that highly skilled people work in the urban sector, whereas the remaining $1 - h_t$ less educated workers can freely choose between the two sectors. Hence, less educated workers either work in the agricultural sector in rural areas or in low-skilled jobs in urban areas.

Human capital accumulation. Since we mainly focus on the role of urbanization, we formalize human capital accumulation using the following predetermined process:

$$h_{t+1} = a_t h_t^{1-\beta} H_t^\beta \phi(u_t), \quad (1)$$

where H_t is the proportion of highly educated workers in the leading countries, β is the speed of convergence towards the long-run equilibrium, $\phi(u_t)$ is an increasing function of the variable u_t , which measures the degree of urban concentration of less educated workers, and a_t is a scale factor representing the quality and quantity of

education infrastructure in the country.⁴ Looking at the urban concentration of less educated workers is equivalent, in our model, to look at the urban concentration of overall people in the country because all high-skilled workers are assumed to work in the urban sector. Hence, we consider the flow of ideas among people in two dimensions. On the one hand, we take into account the transmission of knowledge from leading countries to developing countries. And on the other hand, we consider the concentration of people in urban areas as a mean to transfer knowledge among people out of the traditional agricultural sector.

Equation (1) is compatible with the stylized facts sketched above: there are convergence forces guiding the dynamics of human capital, and urbanization facilitates the access to schooling. Lucas (2009) uses a similar hypothesis. The econometric calibration exercise revealed that log-linear form of $\phi(u_t)$ is better in fitting the data; therefore, we have only presented the regression outcomes with $\phi(u_t) = \exp(u_t)$.

Entrepreneurs' behavior. At any time t , highly skilled workers, in proportion h_t , are entrepreneurs operating in the urban area. Each of them hires ℓ_t less educated workers to produce $y_{ut} = A_{ut}\ell_t^\alpha$ units of output, where A_{ut} is the total factor productivity in the urban sector, and $\alpha \in [0, 1]$ is a parameter of decreasing marginal productivity of labor in the urban sector. The labor market for less educated workers is competitive and the urban wage rate equals the marginal productivity of labor. Moreover, when the proportion of entrepreneurs increases, each entrepreneur incurs a congestion cost per firm, c_t , which is proportional to the change in the number $h_t - h_{t-1}$ of firms and divided by the number h_t of entrepreneurs,

$$c_t = qA_{ut} \frac{h_t - h_{t-1}}{h_t}.$$

Note that the introduction of A_{ut} in the cost function reflects the higher costs associated to produce in a more productive and specialized urban sector. Besides, q is the adjustment scale factor in urban areas. Furthermore, note that c_t is equal to zero at any steady state.

⁴Although σ -convergence directly informs about the equitableness of the distribution of income across economies, we preferred to use a β -convergence model since β -convergence is, firstly, a necessary condition for σ -convergence and, secondly, it is of main concern for the empirical literature on growth.

The profit function of each entrepreneur is

$$\pi_{u,t} = A_{ut}\ell_t^\alpha - w_{ut}\ell_t - c_t,$$

provided that $\pi_{u,t} \geq 0$, otherwise entrepreneurs do not have incentives to produce. Congestion costs are also deducted from the earnings so as to reach the profit per firm. These congestion costs can be interpreted as either the opportunity cost of time that is spent in training the immigrants from rural areas, so as the cost of reduction in market share due to increase in firm number in cities.

Maximizing $\pi_{u,t}$ with respect to ℓ_t determines the equilibrium wage rate

$$w_{ut} = \alpha A_{ut}\ell_t^{\alpha-1}. \quad (2)$$

Then, the profit rate in the urban sector is

$$\pi_{u,t} = (1 - \alpha)A_{ut}\ell_t^\alpha - c_t.$$

We can observe that in the steady state ($c_t = 0$), income inequality between highly educated and less educated workers is

$$\pi_{u,t}/w_{u,t} = \ell_t(1 - \alpha)/\alpha,$$

which is increasing in ℓ_t .

Less educated worker's location decisions. Less educated can work either in the urban sector, described above, so as in the rural sector, where productivity of each worker is $w_{ft} = A_{ft}$. The assumption of not having a decreasing marginal productivity in the rural sector is rooted in the idea of surplus labour or surplus land. Sen (1966) also discusses that output does not decrease if workers migrate from rural to urban areas, especially in LDCs, and this is due to the disguised unemployment in rural sector. Moreover, we assume that less educated workers are freely mobile between sectors and are allocated so as to equalize net wages. Thus, the equilibrium number of less educated employees per entrepreneur is

$$\ell_t = \left(\frac{\alpha A_{ut}}{A_{ft}} \right)^{1/(1-\alpha)}. \quad (3)$$

Note that the number of less educated workers is bounded by $(1 - h_t)$. Hence, in case that the total demand $\ell_t^D = h_t \ell_t$ of workers in the urban sector is higher than $(1 - h_t)$, the equilibrium number ℓ_t of less educated workers per entrepreneur is $(1 - h_t)/h_t$, wages in the urban sector are given by (2) with $\ell_t = (1 - h_t)/h_t$, and the rural sector disappears. This case would happen if the wage in the urban sector for low skilled workers is higher than the one in the rural sector. We disregard this case because it requires no rural population, which only happens in a very limited number of countries such as Singapore or Hong Kong, which are small in land area terms and highly industrialized.

From the previous expressions, we can obtain income per capita to be

$$y_t = h_t \pi_{u,t} + (1 - h_t) w_{ut},$$

and the degree of urban concentration of less educated workers

$$u_t = \frac{h_t \ell_t}{1 - h_t}, \quad (4)$$

and measures the proportion of less educated workers in the urban sector. Knowing that majority of rural-urban migrants is very low educated in sub-Saharan Africa (Todaro (2000)), u_t can be regarded as a good measurement of urbanization especially in SSA. Besides, since our model assumes that all high-skilled workers live in urban areas, the urbanization measurement above denotes the urban concentration of total population in a country. In fact, other measurements for urbanization are also used such as proportion of low-skilled to high-skilled in cities and proportion of workers living in urban areas and their various mathematical transformations but u_t provided better results in the econometric calibration analysis.

Endogenous growth. The levels of total factor productivity in the urban and rural sectors are endogenous. Following Lucas (1988), Azariadis and Drazen (1990), or Benhabib and Spiegel (2005), we assume that they are determined by the proportion of highly educated workers in the country, i.e.

$$\begin{aligned} A_{ut} &= \gamma^t A_u(h_t), \\ A_{ft} &= \gamma^t A_f(h_t). \end{aligned}$$

Where γ is the common trend of technological progress. As Tacoli (1998) states "populations and activities described either as 'rural' or 'urban' are more closely linked both across space and across sectors than is usually thought and that distinctions are often arbitrary." This common trend assumption shows the close link between urban and rural areas and, thus, spillovers of economic development in both regions in a country. Moreover, in line with the stylized facts above, the derivative of A_f with respect to h_t is assumed to be larger than the derivative of A_u . In other words, the productivity gap between urban and rural sectors decreases with the level of development.

From (3), this implies

$$\ell_t \equiv \ell(h_t) = \left(\frac{\alpha A_u(h_t)}{A_f(h_t)} \right)^{1/(1-\alpha)} \quad (5)$$

with $\partial \ell_t / \partial h_t < 0$. It follows that income inequality between high-skilled and less educated workers ($\pi_{u,t}/w_{u,t}$) decreases with the level of development.

Dynamics. Plugging (1) into (4), we can rewrite the dynamics of the economy as follows:

$$h_{t+1} = a_t \times h_t^{1-\beta} \times H_t^\beta \times \phi \left[\frac{h_t \ell(h_t)}{1 - h_t} \right], \quad (6)$$

where a_t denotes the efficiency of the education system. Hence, along the transition path, income per capita is given by

$$y_t = h_t A_{ut} \left[(1 - \alpha) [\ell(h_t)]^\alpha - q \frac{h_t - h_{t-1}}{h_t} \right] + (1 - h_t) \alpha A_{ut} [\ell(h_t)]^{\alpha-1}.$$

It clearly appears that a rise in h_t increases the levels of total factor productivity A_{ut} and A_{ft} ; increases the number of entrepreneurs in the urban sector; but reduces the number of employees per entrepreneur ℓ_t and induces congestion costs c_t .

3.2 Calibration

In this section, we confront data to theory for the calibration of the parameters of equations (1) and (5) using panel data. Then, other parameters are calibrated so as to match certain data moments.

Human capital accumulation. First, we look at the impact of urbanization on human capital accumulation. With this aim, we estimate an empirical convergence model in line with a logarithmic transformation of equation (1). In particular, we estimate the equation below:

$$\ln \left(\frac{h_{i,t+1}}{h_{i,t}} \right) = a_0 + \beta \ln \left(\frac{H_t}{h_{i,t}} \right) + \delta u_{i,t} + a_i + a_t + \varepsilon_{i,t}^h, \quad (7)$$

where H_t stands for the proportion of highly skilled workers in the leader economy (the U.S.A. in our case), $h_{i,t}$ is the percentage of highly skilled workers in the resident population of country i at time t , $u_{i,t}$ is the proportion of less educated workers living in cities in country i at time t , as defined in (4), a_0 is the general intercept, a_i is the country fixed effects, a_t is time fixed effects which capture common time-dependent shocks, β is a parameter that captures the speed of convergence to the level in long-run equilibrium (the higher it is, the faster human capital level of the country i converges to the human capital level of the U.S.A.), and δ measures the effect of urbanization on human capital accumulation. Note that we assume the following functional form: $\phi(u_{i,t}) = \exp(u_{i,t})$.

We use data from Docquier, Lowell and Marfouk (2009) (henceforth referred to as DLM (2009)) for the highly skilled workers H_t and $h_{i,t}$. The proportion of high skilled workers corresponds to people with tertiary education and 25 percent of the total secondary educated population as a percentage of total population. DLM (2009) construct human capital indicators from De La Fuente and Domenech (2002) for OECD countries and from Barro and Lee (2001) for non-OECD countries. In addition, for countries where Barro and Lee measures are missing, they predict the proportion of educated using Cohen-Soto's measures (see Cohen and Soto, 2007). Urbanization parameter $u_{i,t}$ is defined as a function of $h_{i,t}$ and $\ell_{i,t}$. The data for the low-skilled labor in urban areas is calculated as the difference of high-skilled population from the urban population and the data on urban population is obtained from WDI (2008). Urban population is defined by WDI (2008) as "the midyear population of areas defined as urban in each country and reported to the United Nations". Data is available for each five-year time period between 1975 to 2000. Number of countries in the data is 136. (Total number of countries in DLM (2009) is 195. Countries in conflict (19), with insufficient statistics (16) and newly created countries (24) are excluded from the DLM (2009) dataset.)

To supplement the stylized facts depicted on Figure 2 and check whether there is absolute or conditional convergence in human capital, the model without urbanization effects is estimated at the first step. Table 1(a) presents the results. In the model without fixed effects, we obtain a significant convergence rate of 8 percent a year to a common steady state (column 1). This is in line with Figure 2(b). However, this simple regression suffers from two important problems: *i*) unobserved heterogeneity, and *ii*) a Nickell bias (Nickell, 1981) due to the presence of $\ln(h_{i,t})$ on both sides of equation (7).

We can solve the first problem by adding country and time fixed effects. Islam (1995) points out the importance of capturing unobserved individual effects in studying the convergence (since they are positively correlated with the initial level of human capital) and argues that ignoring them will result in a biased convergence coefficient β . In the second column of Table 1(a), we show that the convergence speed increases from 8 to 50 percent if unobserved heterogeneity is dealt with; country fixed effects are highly significant. This means that the model generates conditional convergence: each country converges to a specific steady state, increasing with the level of human capital of the leader.

To solve the Nickell bias, we use IV and GMM techniques. In IV estimations, we use the lagged value of the suspected endogenous variable as instrument. The choice of instruments, however, is different in GMM estimations and depends on which GMM technique we prefer. In difference-GMM (Arellano and Bond, 1991) we instrument the differences (or orthogonal deviations) with the levels of the suspected endogenous variables. In system-GMM (Blundell and Bond, 1998), the level of suspected endogenous variable is instrumented with their differenced values (current value minus the lagged value of the same variable). Combining these techniques with fixed effects does not change the conclusions.

In the second step, we introduce the urbanization effect. Among the several specifications with a linear, logarithmic or exponential functional forms we have tried in the calibration, we have found that the linear specification defined in (4) provides the best fit. The results show that there is a significant convergence rate of 9 percent without fixed effects which rises to above 50 percent when we control for the country and year fixed effects. Thus, we can argue that there is conditional convergence even after controlling for the impact of urbanization, which is significantly positive.

Table 1: Modeling human capital accumulation.

(a) Beta-convergence model without urbanization

	OLS1	OLS2	IV1	IV2	Diff GMM	System GMM
$\ln(H/h)$	.080***	.504***	.065***	.512**	.391***	.225***
Constant	.050**	-.557***	.061***	-.409***	-.183**	
Country FE	no	yes	no	yes	no	no
Year FE	no	yes	no	yes	yes	yes
Nb obs.	679	679	543	543	543	679
Nb countries	136	136	136	136	136	136
R^2 / Wald stat ⁺	.137	.486	.11	.57	429.74 ⁺	443.12 ⁺

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Wald chi2 statistic is given for GMM estimations. Instrument in IV method: a lagged value of the deviation from the frontier is used as an external instrument. Results of the first stage regressions confirm the validity and relevance of the instrument. Diff GMM and System GMM: two step GMM and Windmeijer finite-sample correction is done for the calculation of standard errors. Hansen-J statistic does not support the validity of the instruments although there is no specification problem according to Arellano-Bond test statistic.

(b) Beta-convergence model with urbanization

	IV1	IV2	IV3
Urbanization	.136***	.591**	.627**
$\ln(H/h)$	.087***	.534***	.565***
Constant	-.037	-.594***	-.638***
Country FE	no	yes	yes
Year FE	no	yes	yes
Nb obs.	543	543	543
Nb countries	136	136	136
R^2	.552	.837	.838

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Instruments in IV methods: the lagged value of the deviation from the frontier and the lagged value of urbanization variable are used as an external instrument for IV_FE (1). In IV_FE (3), only urbanization variable is instrumented again with its lagged value. Results of all the first stage regressions confirm the validity and relevance of the instrument. First-stage F statistics are well above the rule of thumb value of 10. Under-identification null hypothesis is rejected at the 1% level. Hansen-J statistic does support the validity of the instruments.

This is similar to Lucas (2009) who introduced urbanization externalities and a convergence effect whose strength depends on the width of the gap between the level of human capital in the U.S. and in the country under study. Table 1(b) provides the results. The columns IV1, IV2 and IV3 show that urbanization has a positive and significant impact on human capital accumulation. Again, the model predicts conditional convergence. As urbanization is likely to be an endogenous process, we prefer the IV specification based on internal instrumentation. In order to determine the parameter values for the simulation exercises we preferred to use the parameter values from IV2 since that specification performs internal instrumentation for both the urbanization and the deviation of human capital from the leader country.

Urban employment. To explain urban employment in (5), we need to specify and estimate the TFP function in the urban and rural sectors. We assume the following functional forms: $A_{ut} = \gamma^t A_{u0} h_t^z$ and $A_{ft} = \gamma^t A_{f0} h_t^v$. From (5), this gives $\ell_t^{1-\alpha} = \frac{\alpha A_{u0}}{A_{f0}} (h_t)^{z-v}$, or equivalently

$$\ln \ell_t = \ln \rho_0 + \epsilon \ln h_t + \ln \rho_i + \ln \rho_t + \varepsilon_{i,t}^l, \quad (8)$$

where $\rho_0 = \left(\frac{\alpha A_{u0}}{A_{f0}} \right)^{1/(1-\alpha)}$, $\epsilon = (z - v)/(1 - \alpha)$, ρ_i is the country fixed effects, and ρ_t stands for time fixed effects.

To estimate (8), we use data on the proportion h_t of highly educated workers and the number ℓ_t of less educated in cities for each country in our dataset from 1975 to 2000. Data sources for h_t and l_t are the ones defined in the previous section.

Table 2 shows the results. Firstly, the result of a cross-country regression on 2000 data is presented; then the panel estimate results with fixed effects are provided. Both cross-country and panel data estimates show that the higher the number of entrepreneurs in cities the lower will be the number of less educated workers per entrepreneur which is in line with the parameter definitions. Besides, it is found that urban/rural productivity ratio has a positive impact on the development. (Taking the exponential of $\ln \rho_0$ provides positive coefficients in both regression specifications)

The remainder of parameters used in the numerical simulation do not come from panel data estimation techniques. For every country or region i , we calibrate the initial urban TFP A_{u0}^i and the adjustment scale parameter q^i . We choose the parameter values that match the level of GDP per capita observed in 1975 and in 2000.

Table 2: Modeling low-skilled workers's education choices. Dependent = $\ln l_t$.

	OLS (2000 data)	OLS (1975-2000 data)
ϵ	-.747***	-.969***
$\ln \rho_0$	-.645***	-1.091***
Country fixed effects	no	yes
Time fixed effects	no	yes
Nb observations	136	815
R^2	.491	.964
$\ln \rho$ - High-income countries ^a	-.512	-.792
$\ln \rho$ - Latin America and Caribbean ^a	-.542	-.953
$\ln \rho$ - Middle East and Northern Africa ^a	-.208	-.645
$\ln \rho$ - South Asia ^a	-1.214	-1.744
$\ln \rho$ - Sub-Saharan Africa ^a	-.606	-1.248

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. ^aRegional intercepts are obtained by subtracting $\epsilon \cdot \ln(h_{2000})$ from $\ln l_t$.

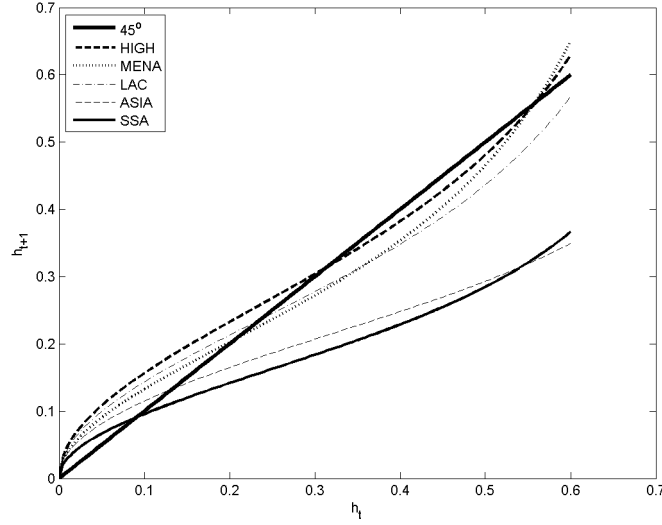
Finally, we choose as benchmark parameters α equal to 0.6 and z equal to 0.2. We choose these two values because they produce the better fit for the SSA region. As we can observe in the Figures A.2 and A.3 in the appendix, these values seem to match quite well the data for SSA. Moreover, these parameter values affect slightly the volatility of the simulated series. However, the effects are stronger for long-run outcomes than for the initial periods where we can compare predictions of the model with the data.

3.3 Human capital dynamics per region

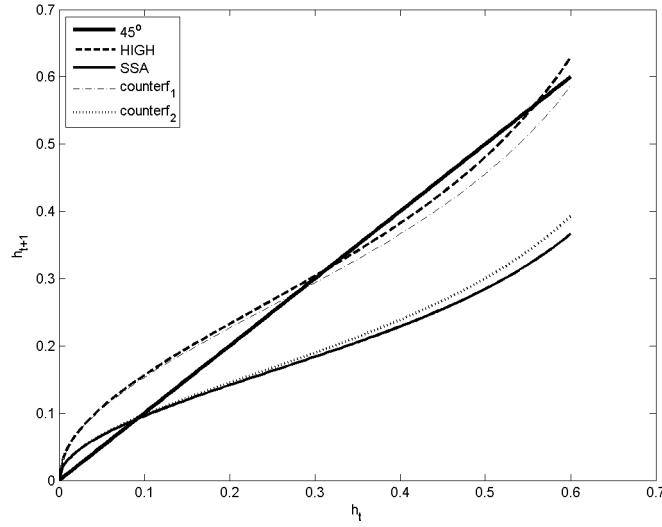
Once all parameters are calibrated, they can be included in the dynamic equation (6). Figure 5(a) depicts the dynamics of human capital in each developing region and in high-income countries. Regional fixed effects are weighted averages of country fixed effects in each region. Given those region-specific parameters, the steady state differs across regions. The long-run human capital stock equals 0.32 in high-income countries, 0.25 in LAC, 0.22 in the MENA, 0.13 in South Asia and .09 in sub-Saharan Africa. Those steady states are locally stable. Unbounded growth could be obtained if countries would start with a proportion of college graduates above 60 percent. When we compare these simulation results with the observed human capital levels in each

Figure 5: Dynamics of human capital.

(a) Dynamics per region



(b) Counterfactual dynamics for Africa



Note: On Fig. 5(a), we plot the proportion of high-skilled workers in $t+5$ as a function of the proportion in t , using the fixed effects obtained for different regions. An intersection with the 45 degree line is a long-run steady state. On Fig 5(b), we focus on sub-Saharan Africa and compare the dynamics obtained with regional fixed effects (SSA), with high-income fixed effects for the human capital equation (counterf₁), and with the high-income fixed effect for the urban-to-rural productivity ratio (counterf₂). We also represent the high-income dynamics for a matter of comparison.

region, it seems that LAC and MENA have the highest distance to their steady-state levels compared to other regions. Moreover, as it will be discussed more in detail in Section 4, SSA needs about 20 years to reach its steady-state human capital level. Furthermore, it is predicted that there is no room for the absolute convergence among regions since the efficiency of the education system in each region is different which is an important factor of the human capital dynamics. This is exemplified in Figure 5(b) for SSA.

Figure 5(b) is a counterfactual exercise in which we substitute the sub-Saharan fixed effect by those observed in high-income countries. The simulation *counterf*₂ shows that substituting the value for ρ_i in equation (8) does not modify the steady state that much. On the contrary, substituting the value for a_i in equation (7) has a major impact on human capital accumulation. The counterfactual steady state in simulation *counterf*₁ would be almost identical to that obtained in high-income countries. This shows that the technological function of human capital formation plays a key role in the determination of long-run performances of developing countries.

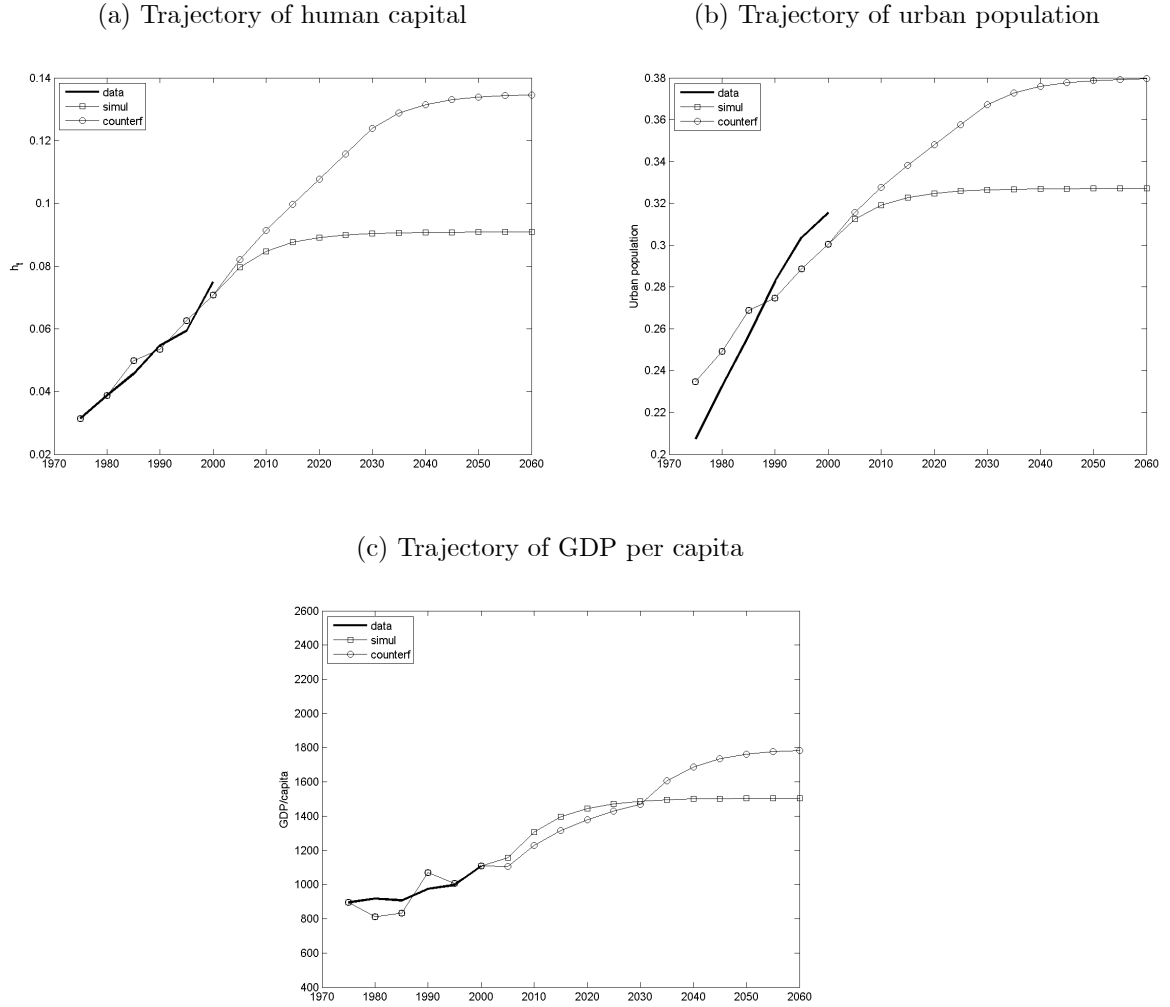
4 The growth backlog of Africa

In this section, the results of the dynamic simulations for sub-Saharan Africa are discussed and interpreted in detail. In the first sub-section, the observed levels of human capital in 1975 are used as the starting point. Then, the model is employed for the simulation from 1975 to 2060 of human capital, urbanization and GDP per capita. In the second sub-section, the comparison of the simulations with and without urbanization costs is presented.

4.1 Predictions for sub-Saharan Africa

Figure 6 presents the simulated transition paths of human capital (Fig 6a), urbanization (Fig 6b) and GDP per capita (Fig 6c) for sub-Saharan Africa. The bold lines represent observations from 1975 to 2000. The lines with squares depict a simulation with constant time fixed effect after 2000, and the lines with circles assume that the time fixed effect will grow up till 2030, i.e., in case that we consider an expansionary

Figure 6: The growth backlog of sub-Saharan Africa.



Notes: Observed (bold line) and simulated (line with squares) trajectories of the proportion of college graduates (6a), share of urban population (6b) and GDP per capita (6c). The line with circles gives the simulation with a continued expansionary education policy.

education policy until 2030. Before 2000 we use the time fixed effects obtained from the estimation. We first notice that our calibration strategy does an excellent job in matching the data. Figure A.1 in Appendix shows that the model also provides an excellent fit for the other developing regions. Note that urbanization is the less precise because we use the cross-country estimation for the concentration of low skilled workers in the urban sector in year 2000.⁵

At the same time, Figures A.4 and A.5 in the Appendix show how the model fits the data for several SSA countries.⁶ For most of the countries the model fits the data excellent (e.g. Ghana), although there are a few exceptions for which the model does not fit the data so accurately. Similarly to the SSA region we expand the exercise and consider an education policy which would last until 2030. In Figures A.6 and A.7 we can compare the expected outcomes for the countries presented before for the predictions of the model if expansionary education policies are stopped in year 2000 or in year 2030.

Besides, from Figures 6(a) and 6(b), it can be seen that a virtuous circle of urbanization and human capital accumulation will be such that the proportion of college graduates will reach 9 percent in the long-run, and the share of urban population will reach 32 percent in the pessimistic scenario. Basically, those long-run values will be attained around 2020. As education and urbanization growth rates decline, the economic takeoff takes place and GDP per capita will be multiplied by 1.5 in the long-run, as shown on Figure 6(c). It takes about 30 years for GDP per capita to reach its long-run value. As in Lucas (2009), the growth in human capital leads to higher income in the long-run, but induces temporary costs in the medium term and that is why we observe a time lag between reaching the steady-state in GDP per capita, human capital and urbanization..

In the more optimistic scenario, which can be depicted from the lines with circles, the trend in human capital keeps on increasing until 2030, as well as the urbanization

⁵We use this parametrization because long-run outcomes are not modified by changes in parameter ρ , as shown on Figure 5(b), and it enables to decrease the number of parameters used in the simulation exercise.

⁶The adjustment-cost hypothesis is also tested using data for some other countries which has also seen rapid urbanization process preceding or during their take-off. Simulation results for Asian tigers, Brazil and Chile are provided in the Appendix, in Figure A.8 and A.9. Results show that adjustment-cost of urbanization process was an important factor of late take-off of those countries as well.

rate. The takeoff of Africa is then delayed by a few decades or so, but the long-run effect will be stronger since GDP per capita will be multiplied by 2.⁷ In that scenario, it is also interesting to note that the increase in human capital is higher than the increase in urbanization. Thus, it can be argued that temporary urbanization costs are to some extent overwhelmed by the positive externality of urbanization on human capital, which causes a higher GDP per capita growth in the long-run. Therefore, one can conclude that educational investments in Africa cannot be seen as a deadweight loss but rather continued progress in education should be promoted in the region to have higher latent growth potential in the future.

4.2 Different adjustment cost specifications

In this section we perform a robustness analysis on different adjustment cost specifications. To be more precise we consider the following two alternative specifications to the one presented above:

$$c_t^2 = A_{ut} \left(q \frac{h_t - h_{t-1}}{h_t} + q^2 \frac{h_{t-1} - h_{t-2}}{h_{t-1}} \right),$$

$$c_t^3 = A_{ut} \left(q \frac{h_t - h_{t-1}}{h_t} + q^2 \frac{h_{t-1} - h_{t-2}}{h_{t-1}} + q^3 \frac{h_{t-2} - h_{t-3}}{h_t} \right).$$

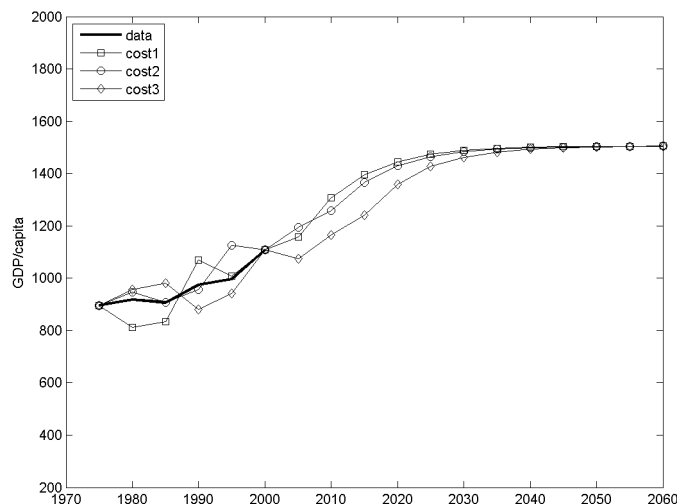
These alternative specifications take into account the change in the number of entrepreneurs in the urban sector not only in the actual period but also in previous periods. To perform a numerical exercise with these specifications we recalibrate parameter q^i to match the level of GDP per capita in 2000.

Figure 7 plots the evolution of GDP per capita under different cost-adjustment functions. First of all, we can note that long-run levels of GDP are not modified due to the different specifications. Next, the convergence to the long-run steady state is slower as more inertia is introduced in the cost function. In this case, we are increasing the time needed for the economy to benefit from the new entrepreneurs,

⁷Figure A.2 in Appendix shows the effects of different possible values of parameter z on the predictions for sub-Saharan Africa. This parameter specification does not affect human capital nor urban population simulations. If the effect of human capital is higher, i.e., z is higher than in the benchmark case, we would expect higher long-run values in the long run.

which increases the time to observe the realization of the increased inertia on the economic growth. At the same time, the introduction of more inertia seems to reduce the volatility of simulations.

Figure 7: Trajectory of GDP per capita.



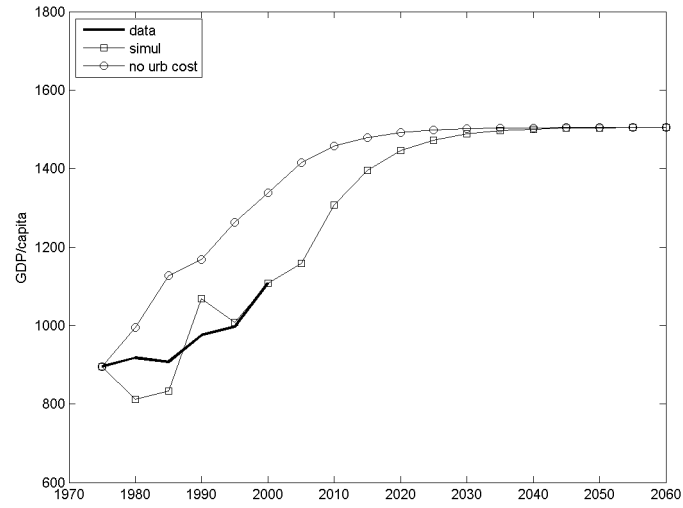
4.3 The counterfactual with no adjustment cost

In the previous sections we have emphasized the role of adjustment costs to explain the fact that GDP per capita in sub-Saharan countries has not been in its expected level given the growth in human capital accumulation and urbanization rates. In this section we perform the following exercise: what would have happened without adjustment costs? Would the results be changing in the long term?

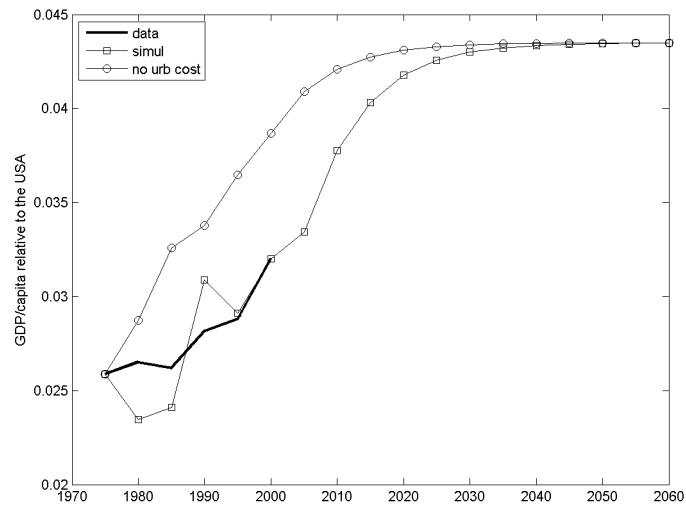
Figure 8(a) clearly shows that in the absence of urbanization costs, the rise in educational attainment would have generated a direct increase in GDP per capita after 1975. Sub-Saharan Africa would be 1.5 times richer in 2000 than its observed level. Furthermore, although the long-run level would not be modified the transition would be smoother than with adjustment costs. The reason behind the fact that the long-run level is not modified is that adjustment costs in the steady state are assumed to be 0. Therefore, this graph reinforces our conclusion that adjustment

Figure 8: Trajectory of GDP per capita without urbanization costs.

(a) Predicted GDP per capita with and without urbanization costs



(b) GDP per capita with respect to the USA



cost of urbanization is one of the main obstacles for the take-off in sub-Saharan Africa.

As a final exercise, we compare the evolution of GDP per capita in SSA with respect to the level in the USA in year 2000 in Figure 8(b). In the absence of urbanization costs, the transition towards the long-run level of income would have been faster.

5 Conclusion

This paper analyzes the impact of urbanization on economic development and growth through its impact on human capital accumulation. We build a theoretical model of endogenous human capital accumulation and calibrate it to account for the effects of urbanization on human capital dynamics.

The theoretical model includes urbanization in human capital dynamics, in such a way that urbanization externalities are taken into account in the convergence process. Besides, negative externalities of urbanization, namely congestion costs, are also considered in the generation process of economic growth. In the model, a rise in human capital increases the level of productivity but also induces congestion costs that may delay the positive effects of the increase in human capital. The positive externality associated to the higher human capital accumulation may be considered as a latent growth potential rather than a deadweight loss. In other words, countries that have experienced a rise in human capital but have not experienced as much growth as expected, according to our theory, will grow when urbanization and human capital accumulation become adjusted. Moreover, the theoretical analysis reveals a negative relation between income inequality (defined as the income ratio between high- and low-skilled workers) and the level of development. Note that our model does not allow for population size changes since we consider a constant labor force.

The calibration exercise for the human capital dynamics per region indicates that there exists conditional convergence between regions: high-income countries, sub-Saharan Africa, Middle East and Northern Africa, Latin America and the Caribbean, and South Asia. Hence, there is no absolute converge, each region converges to a

different steady state and poor countries do not achieve the income levels of rich countries. Moreover, it is found that the technological function of human capital formation plays a key role in determining the long-run performances of developing countries. Furthermore, the counterfactual analysis provides an optimistic view on the growth tragedy of Africa and shows that the reason behind the fact that educational investments in sub-Saharan Africa do not generate an economic growth is the temporary adjustment costs due to urbanization. We perform an exercise that considers the case of absence of these urbanization costs, which shows that the rise in educational investments would trigger a direct increase in GDP. Hence, the calibration exercise reinforces the idea of a latent growth potential in Africa. Different scenarios point out that GDP per capita in Africa could be multiplied by 1.5 to 2 times within about two decades.

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Appendix

Table 3: Parameter values from estimations (in logs)

a_0^*	β	δ	ϵ
-0.594	0.534	0.591	-0.747

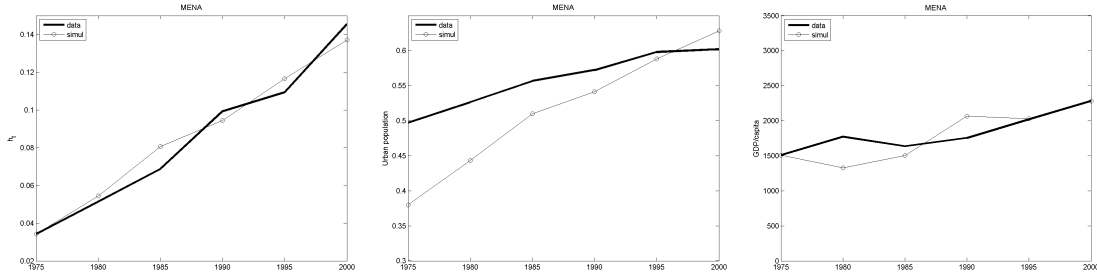
*Notes: We do not report country and time fixed effects for human capital accumulation regression. We use estimated values in simulations for countries and recalibrate parameters for regions.

Table 4: Parameter values from calibration for sub-Saharan Africa

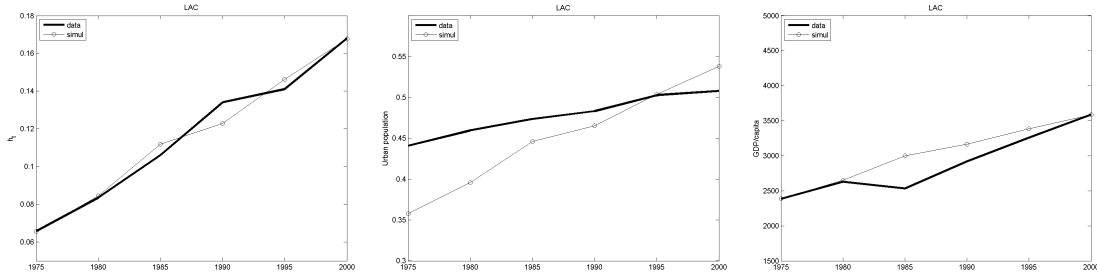
Parameter		Value	Target
Initial urban TFP	A_{u0}	5886	GDP per capita in 1975
Congestion cost	q	8.2	GDP per capita in 2000
Human capital effect on urban TFP	z	0.2	
Marginal productivity of labor	α	0.6	

Figure A.1: Model validation on other developing regions.

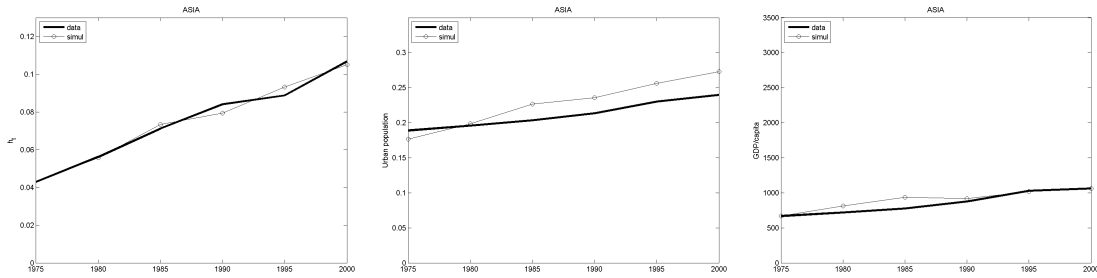
(a) Human capital - MENA. (b) Urban population - MENA. (c) GDP per capita - MENA.



(d) Human capital - LAC. (e) Urban population - LAC. (f) GDP per capita - LAC.



(g) Human capital - ASIA. (h) Urban population - ASIA. (i) GDP per capita - ASIA.



Note: Observed (bold line) and simulated (line with circles).

Figure A.2: Effects of parameter z .

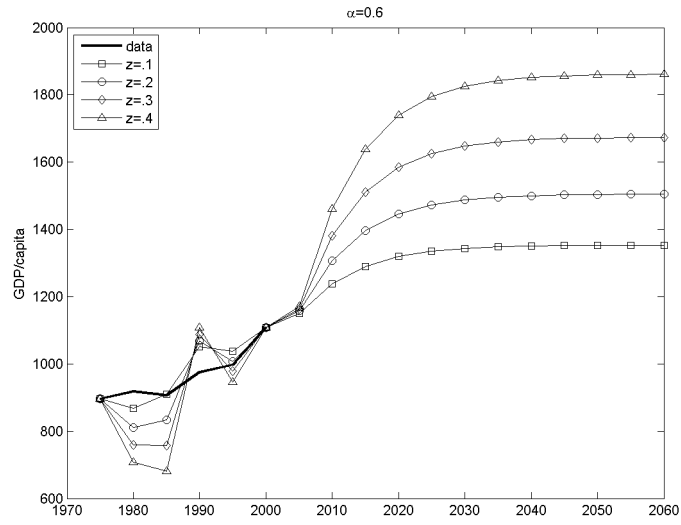


Figure A.3: Effects of parameter α .

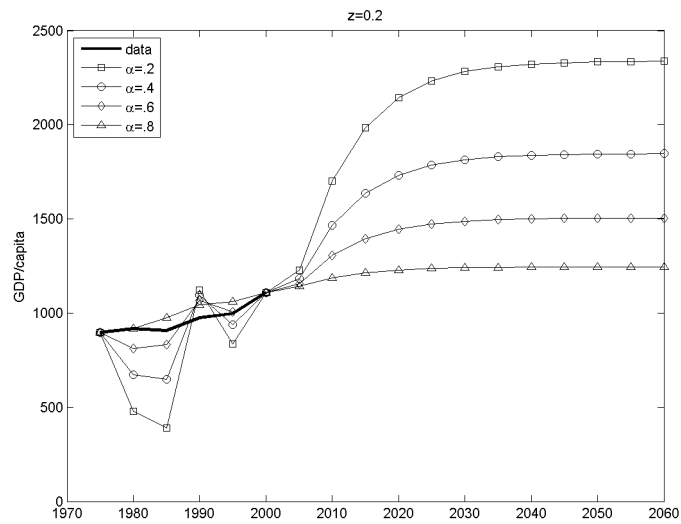
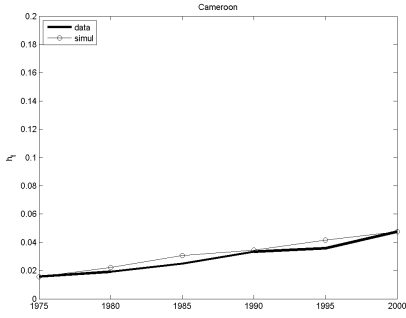
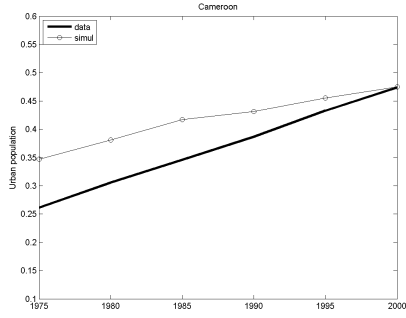


Figure A.4: Model validation on countries.

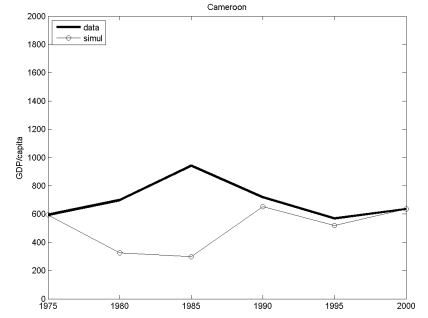
(a) Cameroon - Human capital



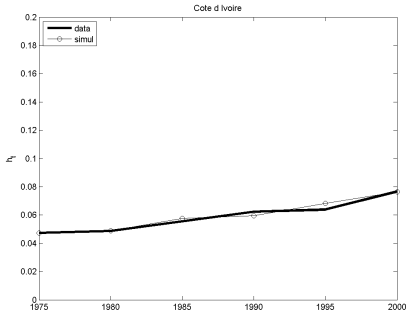
(b) Cameroon - Urban population



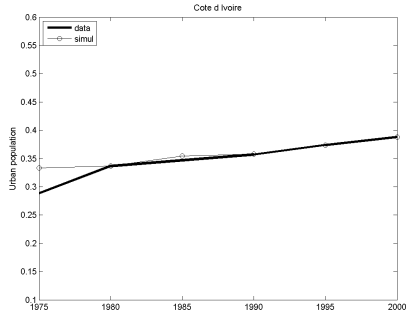
(c) Cameroon - GDP per capita



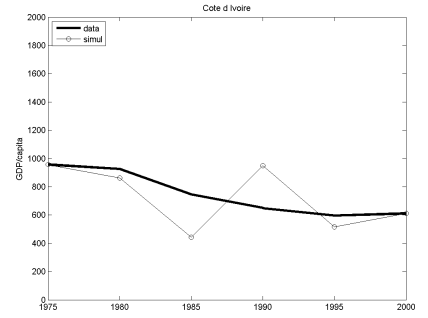
(d) Cote d'Ivoire - Human capital



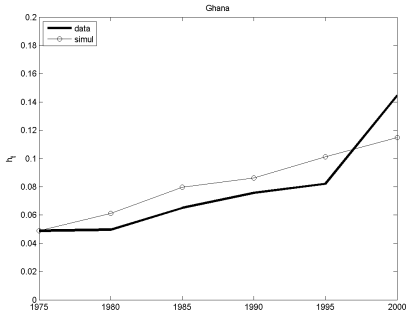
(e) Cote d'Ivoire - Urban population



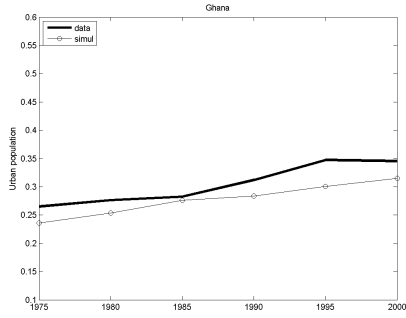
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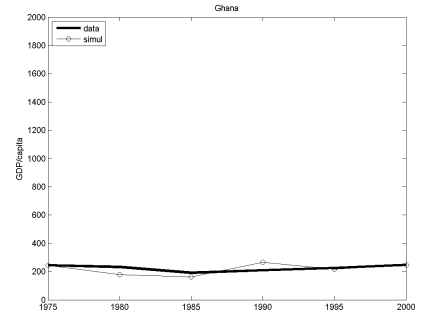
(g) Ghana - Human capital



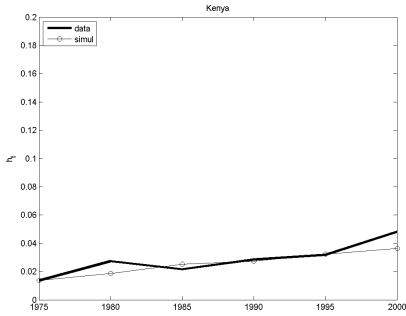
(h) Ghana - Urban population



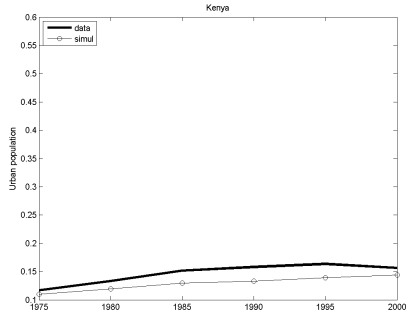
(i) Ghana - GDP per capita



(j) Kenya - Human capital



(k) Kenya - Urban population



(l) Kenya - GDP per capita

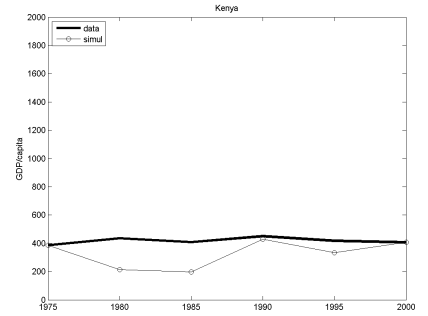
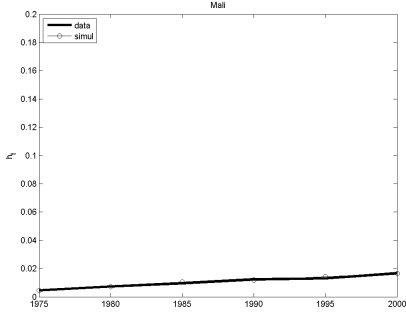
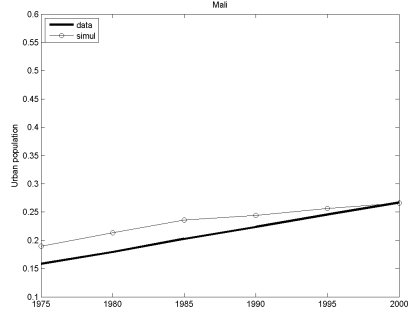


Figure A.5: Model validation on countries.

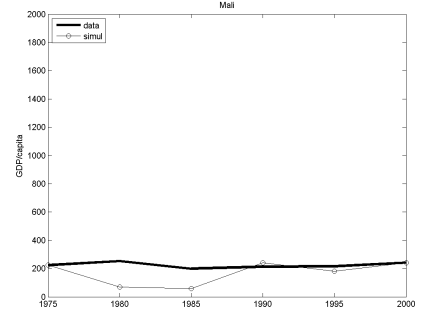
(a) Mali - Human capital



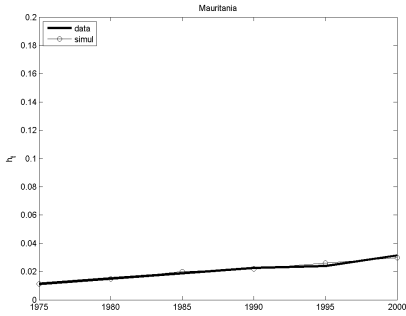
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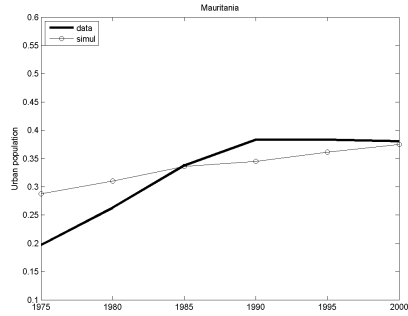
(c) Mali - GDP per capita



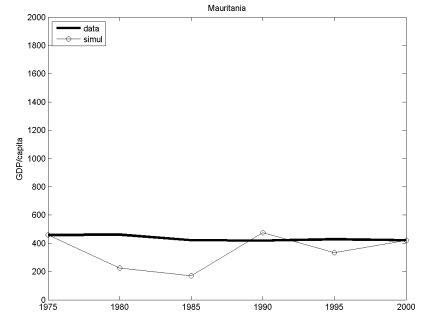
(d) Mauritania - Human capital



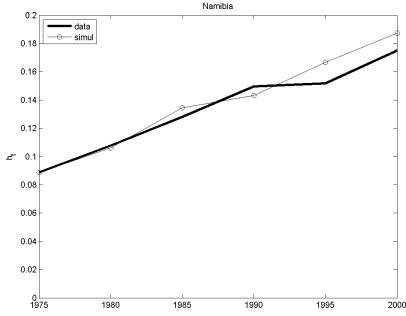
(e) Mauritania - Urban population



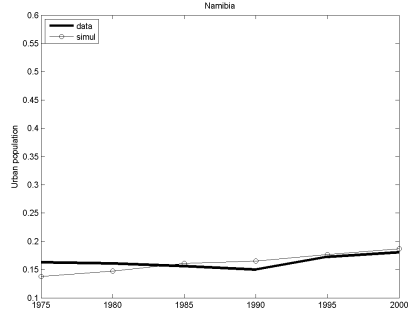
(f) Mauritania - GDP per capita



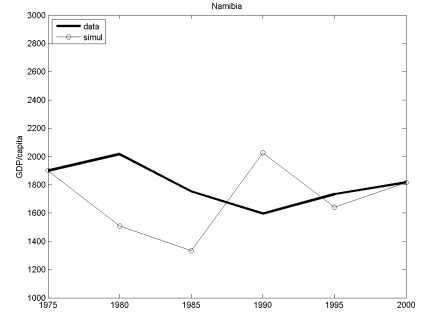
(g) Namibia - Human capital



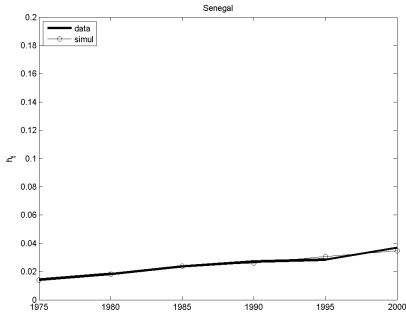
(h) Namibia - Urban population



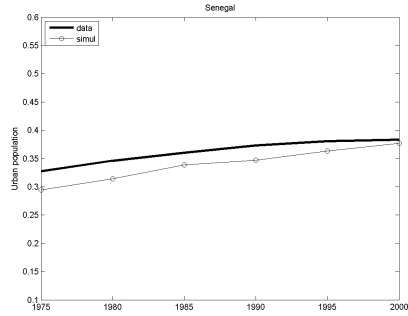
(i) Namibia - GDP per capita



(j) Senegal - Human capital



(k) Senegal - Urban population



(l) Senegal - GDP per capita

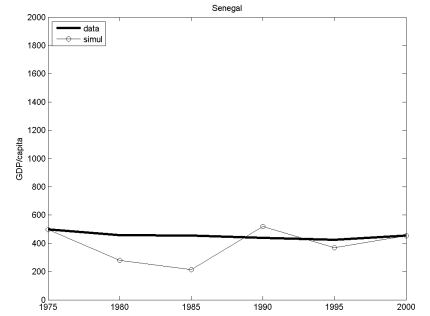
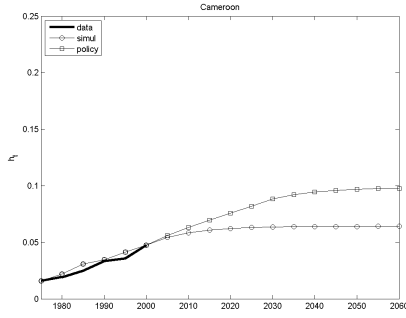
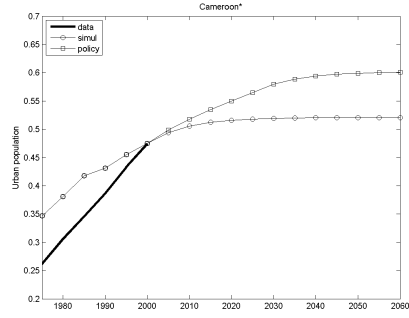


Figure A.6: Expansionary education policy.

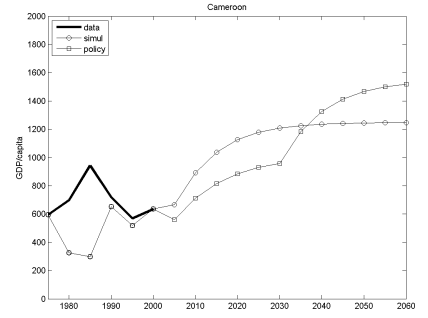
(a) Cameroon - Human capital



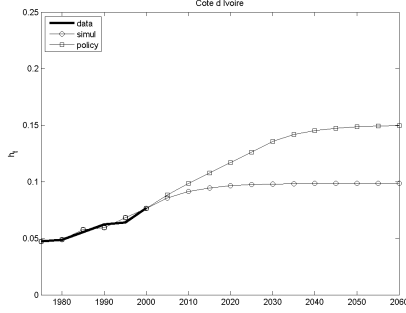
(b) Cameroon - Urban population



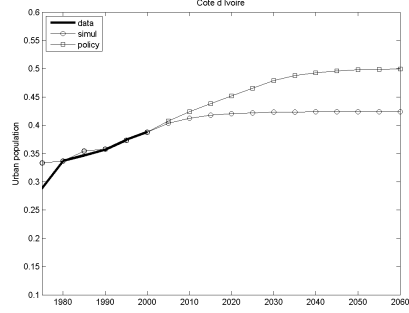
(c) Cameroon - GDP per capita



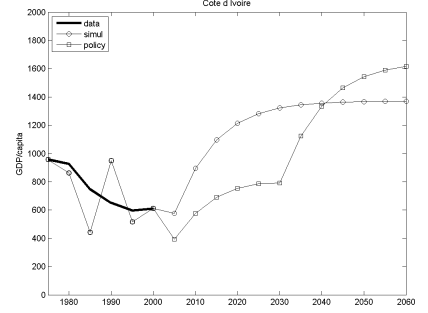
(d) Cote d'Ivoire - Human capital



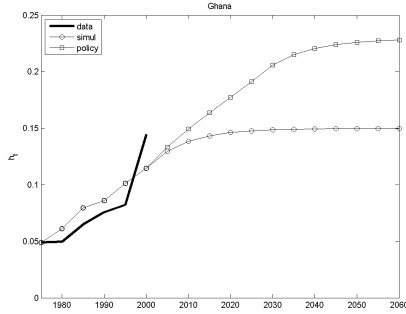
(e) Cote d'Ivoire - Urban population



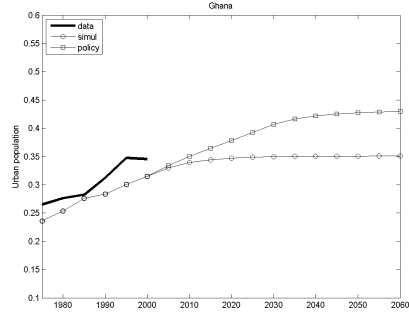
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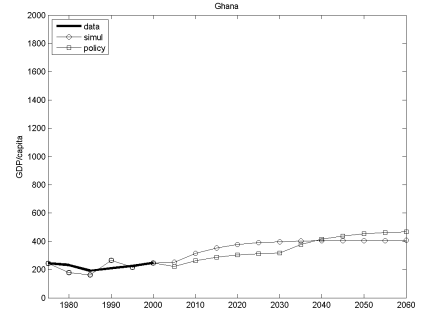
(g) Ghana - Human capital



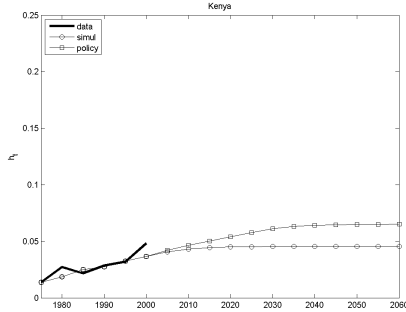
(h) Ghana - Urban population



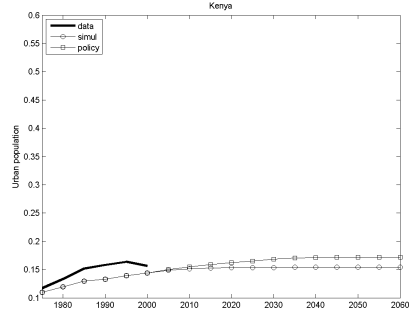
(i) Ghana - GDP per capita



(j) Kenya - Human capital



(k) Kenya - Urban population



(l) Kenya - GDP per capita

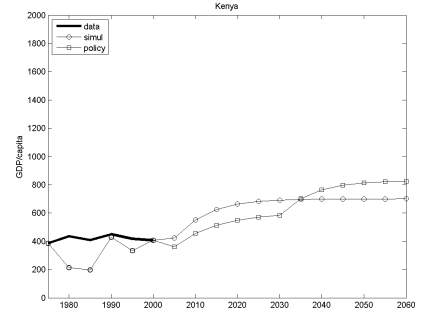
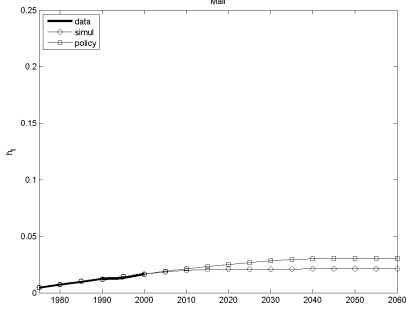
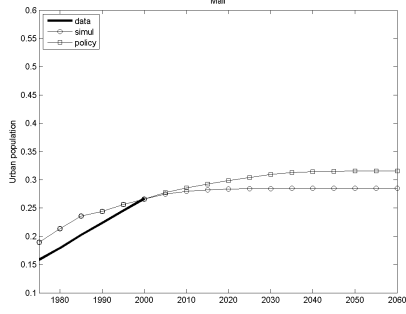


Figure A.7: Expansionary education policy.

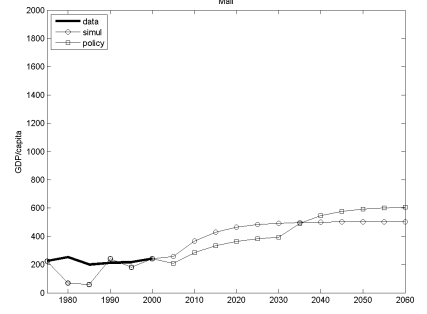
(a) Mali - Human capital



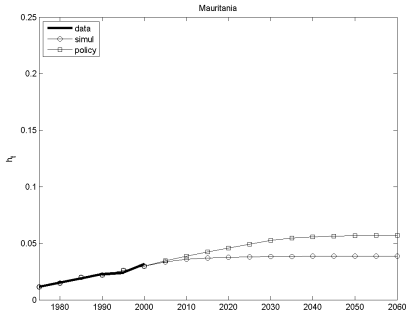
(b) Mali - Urban population



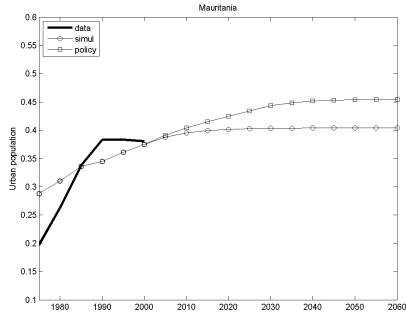
(c) Mali - GDP per capita



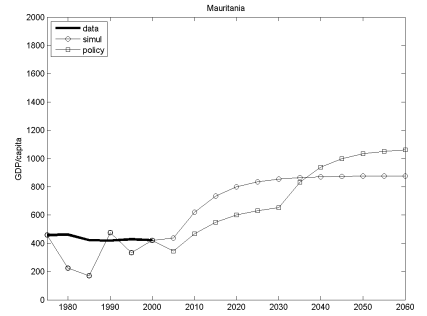
(d) Mauritania - Human capital



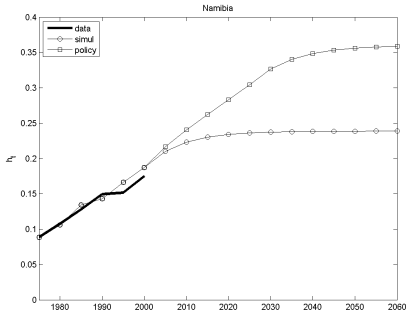
(e) Mauritania - Urban population



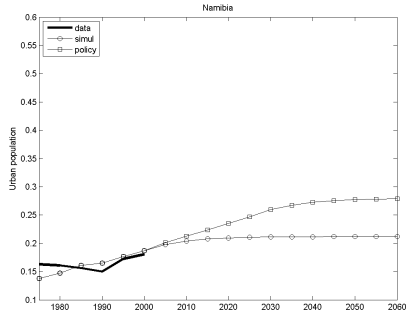
(f) Mauritania - GDP per capita



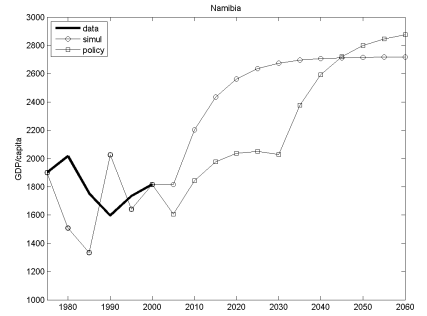
(g) Namibia - Human capital



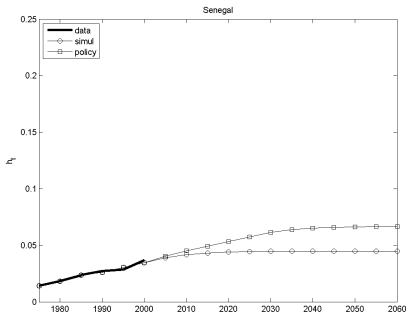
(h) Namibia - Urban population



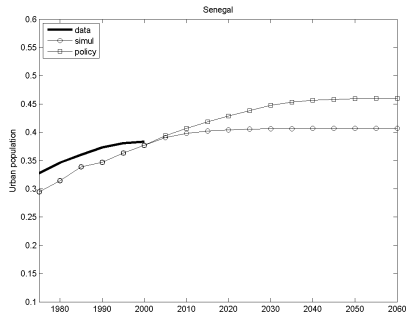
(i) Namibia - GDP per capita



(j) Senegal - Human capital



(k) Senegal - Urban population



(l) Senegal - GDP per capita

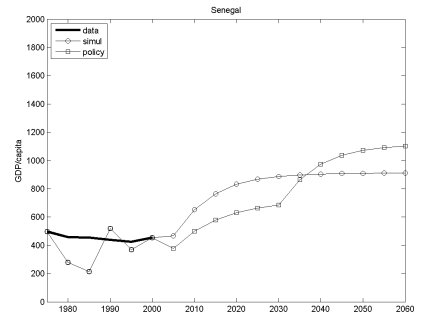
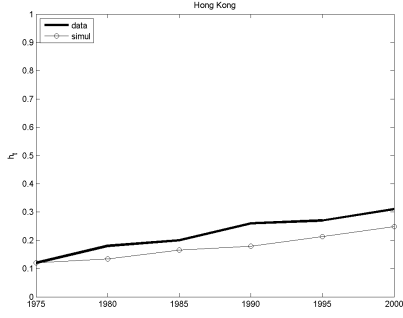
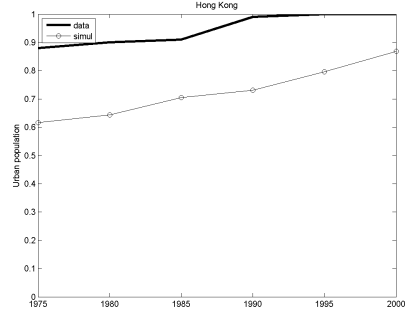


Figure A.8: Asian Tigers, Brazil and Chile.

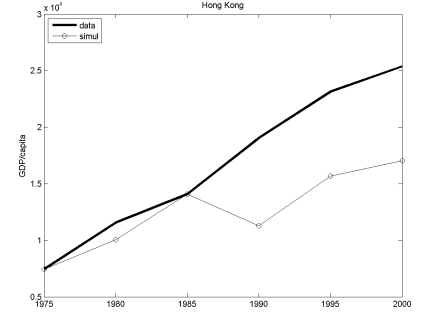
(a) Hong Kong - Human capital



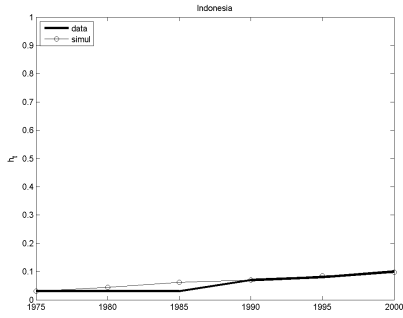
(b) Hong Kong - Urban population



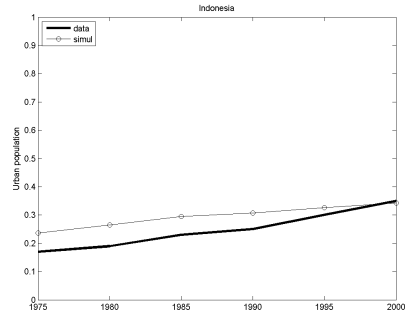
(c) Hong Kong - GDP per capita



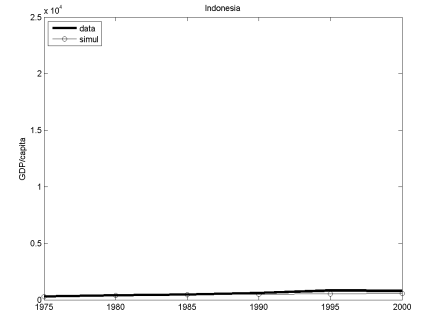
(d) Indonesia - Human capital



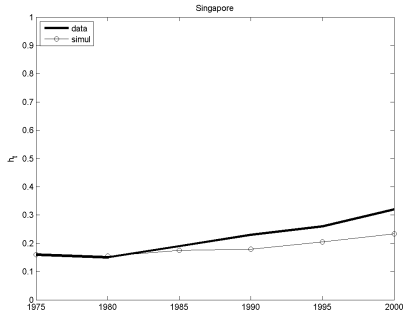
(e) Indonesia - Urban population



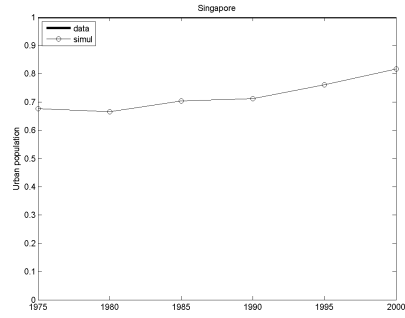
(f) Indonesia - GDP per capita



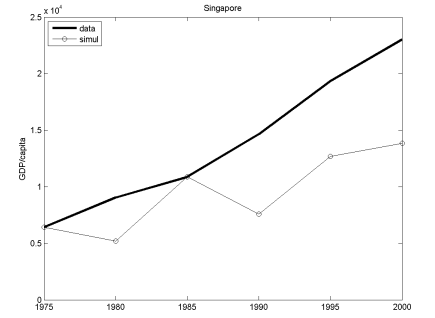
(g) Singapore - Human capital



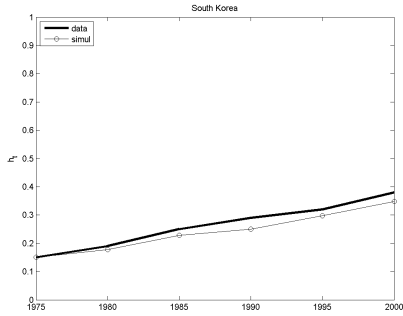
(h) Singapore - Urban population



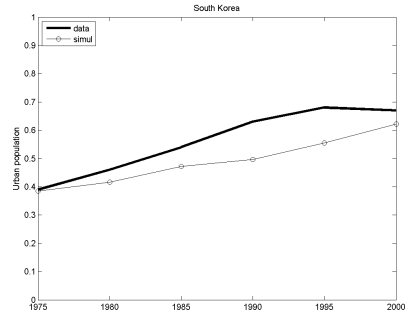
(i) Singapore - GDP per capita



(j) South Korea - Human capital



(k) South Korea - Urban population



(l) South Korea - GDP per capita

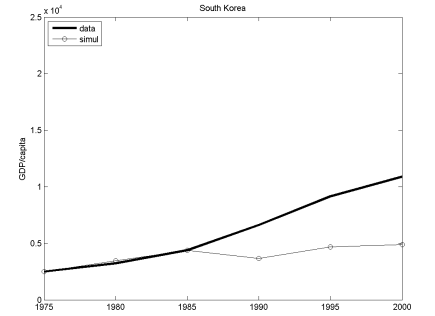
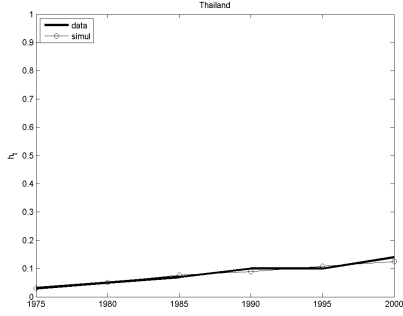
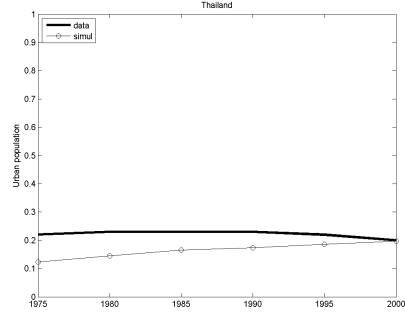


Figure A.9: Asian Tigers, Brazil and Chile.

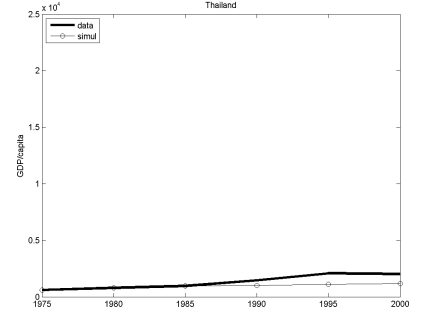
(a) Thailand - Human capital



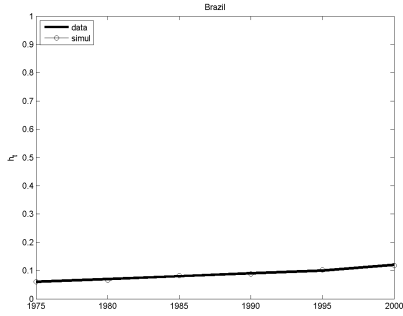
(b) Thailand - Urban population



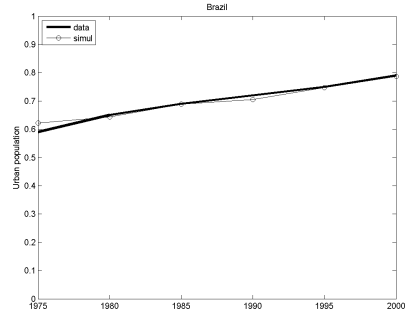
(c) Thailand - GDP per capita



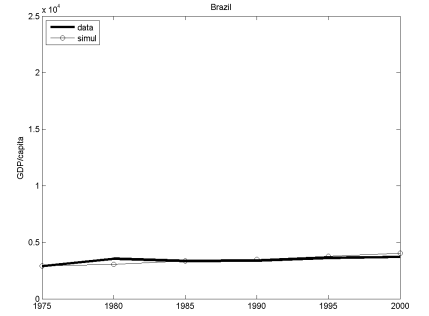
(d) Brazil - Human capital



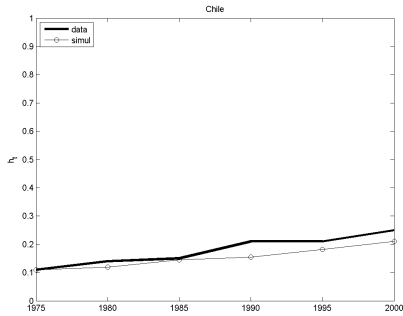
(e) Brazil - Urban population



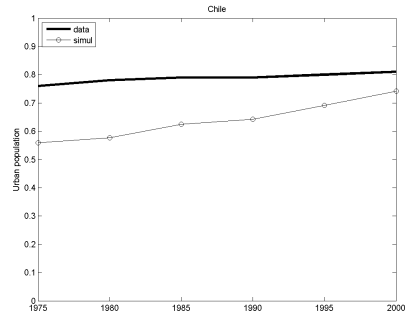
(f) Brazil - GDP per capita



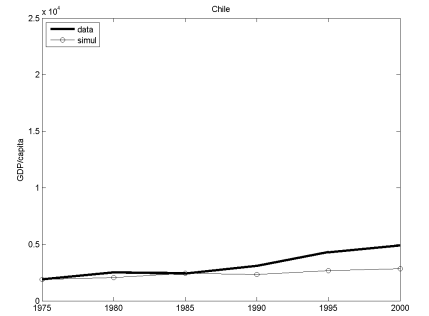
(g) Chile - Human capital



(h) Chile - Urban population



(i) Chile - GDP per capita



Chapter 2

Education Policies in a Context of Brain Drain^{8,9}

Abstract

High-skill emigration from developing to developed countries increased at a fast pace during the last decades. This paper theoretically and empirically investigates the implications of this growing brain drain for education policy in developing countries. We first generalize and expand the existing theoretical literature to derive a number of predictions regarding optimal education subsidies in a context of brain drain and emphasize the role of remittances (as a proxy for the strength of the ties between migrants and the home country) in determining such optimal response. We then test our predictions using cross-country data. The empirical results are in line with the theoretical predictions: we find that the brain drain has a negative effect on public education subsidies, except when the links between the diaspora and the home countries (as proxied by remittances) are strong. Given that the predictions are derived under the assumption of a benevolent government, we also expect our results to be stronger in a sub-sample of developing countries with relatively good institutional quality (that is, for which the assumption of a benevolent government is a reasonable one), which is indeed what we find.

JEL codes: F22; I28; J61; O15.

Keywords: Brain drain; international migration; education policy; development.

⁸Written jointly with Frédéric Docquier (FNRS, National Fund for Scientific Research and IRES, Université Catholique de Louvain) and Hillel Rapoport (Bar Ilan-University, EQUIPPE and CID, Harvard University).

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1 Introduction

The foreign-born population living in the OECD countries has rapidly grown over the last decades, tripling its share in the workforce of the receiving countries since 1960 and doubling it since 1985 (United Nations, 2005). A growing proportion of these foreign-born workers originates from developing countries (two thirds of them) and is increasingly of the high-skill type, that is, college educated (one third of them) (Beine, Docquier and Rapoport, 2007, Docquier, Lowell and Marfouk, 2009, Ozden et al., 2011). During the 1990s only, the number of highly skilled immigrants working in the OECD has more than doubled. This South-North brain drain is becoming a dominant pattern of international migration and a central aspect of globalization, driven in part by the growing competition among the most advanced economies to attract global talent and, on the supply side, by skill-biased technological progress and the tendency for talent to agglomerate where it is already abundant (Boeri et al., 2012).

Since the mid-90s, a growing literature has scrutinized the causes of the brain drain and its consequences for sending countries (see Docquier and Rapoport (2012) for a review of the literature). Surprisingly, the policy implications of the brain drain have been understudied, especially with regard to education policy. Given that the social return to education exceeds its private return, education subsidies can be in theory, and also in practice used to address human capital externalities. It is thus important to address how education subsidies should be adjusted in a context of brain drain. This issue has been addressed in a few recent theoretical studies. Justman and Thisse (1997) studied the effect of labor mobility on local public funding of education. In a multi-jurisdiction framework, they showed that mobility of highly-skilled workers reduces the incentives for public spending on education and leads

to global under-investment in human capital. Other studies examined the optimal education response to the brain drain in small, open economy frameworks. Stark and Wang (2002) explored how migration and education subsidies may substitute one another and be optimally combined as policy tools. They demonstrated that, by allowing a certain proportion of highly-skilled individuals to emigrate to a richer country, the government of the home country can stimulate the expected returns to schooling so as to obtain the socially desirable level of human capital without having to rely on education subsidies. More precisely, emigration prospects and education subsidies can be substituted as policy tools in order to boost education investment up to its optimal level. Docquier, Faye and Pestieau (2008) revisited this argument by assuming that the source-country government is concerned about the number of educated individuals remaining in the home country and accounting for fiscal distortions induced by the education policy

In the last two contributions, the social planner is assumed to choose the education policy that maximizes the welfare of remaining residents. In contrast, Bertoli and Brucker (2011) assumed that the planner maximizes the total welfare of natives, a weighted sum of residents' and emigrants' utility levels. They studied theoretically how changes in immigration policies in the destination countries affect human capital accumulation and welfare at origin, accounting for endogenous individual schooling choices and changes in education subsidies. Poutvaara (2008) developed a model where the possibility of brain drain distorts the provision of public education away from internationally transferable education (e.g., exact sciences, engineering, economics, medical professions) and towards country-specific skills (e.g., law), with the source country possibly ending up training too few engineers and too many lawyers; he then demonstrates that such a negative outcome could be avoided by introducing graduate taxes or income-contingent loans for students to be (re)paid also in case

of emigration. Finally, Djajic, Michael and Vinogradova (2012) determine education policies in a non-cooperative framework with homogenous agents where home-country governments set the level of public education subsidies and host-country governments set the level of restrictions to cross-border mobility.

This paper first generalizes and then extends the existing theoretical literature by investigating the role of the strength of the tie between emigrants and their home countries in the analysis of the model in different theoretical contexts and provides a comprehensive theoretical analysis of the optimal adjustment of education policies in a context of brain drain. Then, we present the empirical relationships between brain drain, education expenditures, education quality and enrollment rates. The different variants of the model (with exogenous v. endogenous emigration probabilities, first and second-best policy tools, a social welfare function including all "naturals" – to use Clemens and Pritchett's (2008) terminology – or residents only, etc.) allow us to derive a set of richer predictions with respect to the optimal education policy responses to the brain drain. We show that migration usually reduces the optimal provision of education if the government only cares about residents. This can be mitigated and even reversed when the government also cares about expatriates, the probability of migration is endogenous (in the sense that it depends on an individual's level of human capital), and the home-country is very poor. The empirical results are in line with the theoretical predictions, especially for a sub-sample of developing countries with good governance. It is found that the probability of migration causes an increase on the educational subsidy rates only in a very small number of countries and in most cases the fact that governments care about expatriates mitigates the subsidy rate but does not reverse it. In addition, we also investigate the relationship between high-skill migration and other education policy outcomes such as university quality and enrollment at different education levels. We confirm results from previous

studies that the brain drain appears to depress enrollment at the tertiary level once education subsidies and enrolment at the secondary level are taken into account, and fosters enrolment in secondary schooling, as do education subsidies. We discuss a few possible interpretations of these results.

The rest of the paper is organized as follows. The theoretical analysis is presented in Section 2 and the empirical analysis in Section 3. Section 4 contains the discussions and conclusions.

2 Theory

In this section we endogenize education policy in the context of a developing economy experiencing a brain drain. We model education policy as the choice of an education subsidy rate to be determined so as to maximize a social welfare function (which can include the welfare of emigrants) under a balanced budget constraint. In the literature, two types of model have been developed to study the link between brain drain and human capital accumulation. Models with homogenous agents endogenize the quantity of human capital accumulated by a representative native of the economy; models with heterogeneous agents endogenize the proportion of individuals reaching a certain level of educational attainment. The latter are preferable when the focus is on redistribution and inequality. The former are more tractable when the focus is on efficiency and on the comparison between the *laissez-faire* and first-best solutions. Our focus is here on efficiency. We will thus use a model with homogenous agents and formalize the impact of the brain drain on the education policy and the education decision of a representative individual.

We start with a the benchmark case of a model with homogenous agents and no migration in Section 2.1. We introduce migration in section 2.2 and investigate how this affects the choice of an optimal education subsidy. Extensions of the model to

the case where the probability of emigration is endogenous and raising taxes entails a deadweight cost are proposed in Sections 2.3 and 2.4, respectively. Section 2.5 summarizes the testable implications of the model.

2.1 Notations and benchmark equilibrium

We model a developing economy with N identical workers who produce a single good which also serves as numeraire. Labor is the only production factor in the economy. Each individual supplies h units of human capital on the labor market. As in Stark and Wang (2002), the wage in the home country, $y_o(h, H)$, is a linear function of the worker's individual human capital (h) and of the economy-wide average level of human capital (H). Similarly, the wage at destination, $y_d(h)$, depends on the private returns to schooling and on the average level of schooling. Assuming that immigration is too small to affect the average foreign level of human capital (H_d), we consider the value of externality abroad (denoted by Σ_d) as given. Wage equations are therefore given by:

$$y_o(h, H) = \alpha_o h + \eta_o H \quad (9)$$

$$y_d(h) = \alpha_d h + \Sigma_d \quad (10)$$

where α_o and η_o denote the private and social returns to human capital in the origin country (we assume $\alpha_o \geq \eta_o$), α_d is the private return to human capital abroad, Σ_d is a constant externality factor abroad ($\Sigma_d = \eta_d H_d$). It is worth to mention again that our focus in this paper is mainly on poor countries and for many of them we can reasonable assume that $\alpha_d \geq \alpha_o + \eta_o$. From a dynamic perspective, we could write the parameters (α_o, η_o) as increasing functions of the lagged stock of domestic human capital H_{-1} ; and (α_d, Σ_d) would be increasing in the lagged stock of human

capital abroad. What matters for our purpose, however, is that skill prices and externality levels differ across countries and are reasonably lower in the developing country. Note that since the parameters (α_o, η_o) affect human capital decisions in the origin country, the model is compatible with the existence of poverty traps in which low levels of development in the previous period induces low skill prices, low externalities, and low levels of human capital in the current period (see Azariadis and Drazen, 1990).

The level of human capital is endogenously determined and results from individuals' education choices driven by income maximization. Increasing one's human capital h gives access to higher wages in the origin country, $y_o(h, H)$ and in the destination country, $y_d(h)$ but also induces a cost $c(h)$. Natives from the developing country are homogenous, implying that $h = H$. However, individuals are atomistic and have no significant impact on the average level H . The education cost function is given by:

$$c(h) = \frac{h^2}{2} \quad (11)$$

We first study the benchmark case of an economy without migration. Individuals maximize $y_o(h, H) = \alpha_o h + \eta_o H - \frac{h^2}{2}$. This yields

$$h_0^\circ = \alpha_o$$

where superscript $^\circ$ is used to denote individual decisions.

On the other hand, a central planner would internalize the human capital externality and maximize income $Y(h) = \alpha_o h + \eta_o h - \frac{h^2}{2}$. The first best solution with no migration is therefore characterized by

$$h_0^{**} = \alpha_o + \eta_o \quad (12)$$

where the superscript $**$ denotes a first-best solution (a second-best solution will be introduced in Section 2.4 and denoted using superscript $*$).

The determination of the optimal education policy can be presented as a problem of decentralization of the first best solution. If a fraction s of education expenditures can be subsidized and the government can levy a lump-sum tax τ on workers, the public budget constraint can be written as $\tau = \frac{sh^2}{2}$. And individuals now maximize $\alpha_o h + \eta_o H - (1 - s)\frac{h^2}{2} - \tau$, implying that

$$h_0^\circ = \frac{\alpha_o}{1 - s} \quad (13)$$

Decentralizing the first best solution can be done by choosing the education subsidy rate so as to equalize h_0° and h_0^{**} . This gives

$$s_0^{**} = \frac{\eta_o}{\alpha_o + \eta_o} \quad (14)$$

together with $\tau_0^{**} = \frac{\eta_o(\alpha_o + \eta_o)}{2}$. Clearly, in a model with homogenous agents, a government intervention is only needed if the value of the externality η_o is positive.

We now investigate how migration affects individual education decisions and the process of decentralization of the first best solution. Some recent contributions have analyzed the effect of high-skilled migration on the optimal provision of education. In a model with homogenous agents, there is no distinction between the number of educated agents and the quality of education. The human capital level h reflects both the quantity and quality of schooling.

The effect of migration on the optimal education policy is very intuitive. Individual education decisions can be affected by education subsidies and by emigration prospects. We can write $h^\circ(s, p)$ where s is the subsidy rate and p is the rate of emigration. The first-best level of education can also be affected by emigra-

tion. We write $h^{**}(p)$. The decentralization of the first-best solution requires solving $h^{\circ}(s^{**}, p) = h^{**}(p)$ for s . Using the implicit function theorem, we have

$$\frac{\partial s^{**}}{\partial p} = \frac{\frac{\partial h^{**}}{\partial p} - \frac{\partial h^{\circ}}{\partial p}}{\frac{\partial h^{\circ}}{\partial s}} \quad (15)$$

As is now well recognized (see Docquier and Rapoport, 2012), emigration prospects to rich countries increase the expected return to education. Building on Stark and Wang (2002), we consider a probabilistic migration model in which a fraction p of the home-country population can emigrate conditional on being educated. Assuming that individuals are risk neutral and perfectly anticipate emigration prospects when making their education decisions, they maximize

$$E[y(h, H)] = (1 - p)y_o(h, H) + py_d(h) - c(h)$$

where $y_o(h, H)$, $y_d(h)$ and $c(h)$ are defined in (9), (10) and (11), respectively.

Maximizing $E(y)$ with respect to h gives

$$h_p^{\circ} = (1 - p)\alpha_o + p\alpha_d = \alpha_o + p(\alpha_d - \alpha_o)$$

which is larger than α_o provided that $\alpha_d \geq \alpha_o$.

In a model with homogenous agents and probabilistic migration to a richer country, emigration prospects increase the expected return to schooling and stimulate the laissez-faire amount of education (again, see Docquier and Rapoport (2012) for a review of the micro and macro literature). This will play a central role in determining the social optimum.

2.2 First-best solution with exogenous migration

Assume that a central planner maximizes the aggregate income of all native-born individuals and weighting migrants' income by $\phi \in [0, 1]$. The social objective function becomes

$$E[y(h, h)] = (1 - p)y_o(h, H) + \phi py_d(h)$$

If $\phi = 0$, it implies that the planner does not care about expatriates and maximizes only the income per capita of residents. On the other hand, if $\phi = 1$, the planner maximizes consumption per "natural" without considering their residence. Note that the latter case also depicts a situation in which the planner only cares about residents, but expatriates transfer income to residents so as to equalize consumption levels. The planner then cares about the average income of all "naturals" (Clemens and Pritchett, 2008).

In practice, the weight ϕ is likely to be positively correlated with the beneficial feedback effects of emigration for the origin country. In particular, ϕ can be higher if emigrants send large amounts of remittances, the prospects for return migration are high, and migration induces strong diaspora externalities on trade, foreign direct investments or technology transfers. ϕ is also large if emigrants keep their voting rights or can lobby from abroad (as in the exit-and-voice model of Hirshman), or if the government encouraged emigration of workers (e.g. Filipino nurses, Egyptian teachers). We consider ϕ as a parameter and study its effect on the optimal education policy. In our theoretical developments, we will only distinguish the extreme cases with $\phi = 0$ and $\phi = 1$.

Let us first disregard for a moment any possible fiscal costs of emigration (i.e., the fact that emigrants do not contribute to the government budget) and assume that

education decisions are taken before migration and that tax payments also occur before migration takes place. Without fiscal costs distortions, we are in a first-best context and the planner's objective function becomes:

$$Y(h) = (1 - p) \left[\alpha_o h + \eta_o h - \frac{h^2}{2} \right] + \phi p \left[\alpha_d h + \Sigma_d - \frac{h^2}{2} \right]$$

The first best solution is given by

$$h_p^{**} = \frac{(1 - p)(\alpha_o + \eta_o) + \phi p \alpha_d}{1 - p + \phi p} \quad (16)$$

with particular values $h_p^{**} = \alpha_o + \eta_o = h_0^{**}$ if $\phi = 0$ (this is the model studied in Stark and Wang, 2002) and $h_p^{**} = (1 - p)(\alpha_o + \eta_o) + p \alpha_d$ if $\phi = 1$.

In the general case with $\phi \in [0, 1]$, we have:

$$\frac{\partial h_p^{**}}{\partial p} = \frac{\phi(\alpha_d - \alpha_o - \eta_o)}{(1 - p + \phi p)^2}$$

If the government is only concerned about the income per capita of the resident population ($\phi = 0$), the optimal level of education is independent of the probability to emigrate. However, if the government also cares about the income of the expatriates, the probability of emigration will affect the optimal level of schooling. In the case of very poor countries, one may reasonably assume that the private return to skills abroad exceeds the social domestic return ($\alpha_d > \alpha_o + \eta_o$); in such a case, the optimal level of education increases with the migration probability. However, in the case of countries at intermediate income levels (that is, for which we can reasonably assume that $\alpha_d < \alpha_o + \eta_o$), the optimal level of education decreases with the emigration probability.

Decentralizing the first-best optimum is only possible if emigrants pay taxes before

they leave (i.e., there is no fiscal cost of emigration). Assuming that individuals take migration prospects into account when making their education decisions, we have:

$$\begin{aligned} E[y(h, H)] &= (1-p) \left[\alpha_o h + \eta_o H - \frac{(1-s)h^2}{2} - \tau \right] \\ &\quad + p \left[\alpha_d h + \Sigma_d - \frac{(1-s)h^2}{2} - \tau \right] \end{aligned}$$

From the first order condition with respect to H we find the incentive constraint:

$$h_p^\circ = \frac{(1-p)\alpha_o + p\alpha_d}{1-s} \quad (17)$$

Thus, equalizing h_p^{**} in (16) and h_p° yields:

$$s_p^{**} = \frac{\eta_o(1-p) - (\alpha_d - \alpha_o)(1-p)p(1-\phi)}{(1-p)(\alpha_o + \eta_o) + p\phi\alpha_d} \quad (18)$$

When $\phi = 0$, the optimal subsidy rate equals $s_p^{**} = \frac{\eta_o - p(\alpha_d - \alpha_o)}{\alpha_o + \eta_o}$. Compared with (14), it is obvious that s_p^{**} decreases with the migration probability. The intuition is straightforward. When the government only cares about residents, the optimal level of human capital is constant, while individuals are incentivized to invest more due to the higher expected returns to education in a context of migration. Hence, the level of subsidy required to reach the optimum level of education decreases. This is the model studied in Stark and Wang (2002).

When $\phi = 1$, however, no such general rule can be obtained because the optimal level of education can increase or decrease with migration when the government cares about all natives equally. However, even if it increases, it does so less than the laissez-faire education level. Moreover, we have $s_p^{**} = \frac{\eta_o(1-p)}{(1-p)(\alpha_o + \eta_o) + p\alpha_d}$, which is also decreasing in p since $\frac{\partial s_p^{**}}{\partial p} = -\eta_o\alpha_d[(1-p)(\alpha_o + \eta_o) + p\alpha_d]^2$ is negative. Hence, the

optimal subsidy rate also decreases with migration.

2.3 First-best solution with endogenous migration

The previous section analyzed the effect of exogenous migration shocks on education policy. Let us now suppose that education policy affects the propensity to emigrate: the higher the level of human capital, the higher the probability to be accepted abroad. How does this affect the optimal subsidy rate? To investigate this issue, we assume that the probability of migration, p , increases linearly with the quantity of human capital. We write $p = \pi h$ where π depends on a vector of exogenous country characteristics affecting the equilibrium migration rate (country size, geographic distance to rich countries, language, etc.). A more general formulation of the migration probability has been used in Bertoli and Brucker (2011) which is equal to $p = p_0 + p_i h$ where p_0 captures the generosity and p_i captures selection of migration.

Solving the individual optimization problem in which individuals internalize that their probability to emigrate is endogenous and introducing education subsidies and lump sum taxes, the expected income becomes:

$$\begin{aligned} E[y(h, H)] &= (1 - \pi h) \left[\alpha_o h + \eta_o H - \frac{(1 - s)h^2}{2} - \tau \right] \\ &\quad + \pi h \left[\alpha_d h + \Sigma_d - \frac{(1 - s)h^2}{2} - \tau \right] \end{aligned}$$

The maximization of $E[y_o(h, H)]$ with respect to h yields

$$h_\pi^\circ = \frac{\alpha_o + \pi \Sigma_d}{1 - s - \pi [2(\alpha_d - \alpha_o) - \eta_o]} \quad (19)$$

which is an increasing function of π (except for very large values for η_o)

The central planner maximizes the same function as before, $Y(h)$, with $p = \pi h$. Contrary to the case of exogenous migration, education policy now affects the size of the remaining population in the origin country. To generate comparable results with the previous sub-sections, we eliminate the size effect and consider two cases.

In the first case, the planner only cares about the welfare of those left behind. This case can be compared to the solution with $\phi = 0$ in the previous sub-sections. The planner maximizes $Y(h) = \left[\alpha_o h + \eta_o h - \frac{h^2}{2} \right]$. This gives $h_\pi^{**} = \alpha_o + \eta_o$ as in the economy without migration. This optimal education level does not depend on migration. Since migration has a positive impact on individual education decisions, the optimal subsidy rate decreases with π .

In the second case, the planner cares about expatriates. This case can be compared to the solutions with $\phi = 1$ in the previous sub-sections. The planner maximizes the average income level of the native population:

$$Y(h) = (1 - \pi h) \left[\alpha_o h + \eta_o h - \frac{h^2}{2} \right] + \pi h \left[\alpha_d h + \Sigma_d - \frac{h^2}{2} \right]$$

The first-best solution is given by:

$$h_\pi^{**} = \frac{\alpha_o + \eta_o + \pi \Sigma_d}{1 - 2\pi (\alpha_d - \alpha_o - \eta_o)}. \quad (20)$$

This optimal level of education is an ambiguous function of the migration scale parameter π . The planner now takes into account the development level of the destination country, reflected by Σ_d at the numerator, and the difference $(\alpha_d - \alpha_o - \eta_o)$ at the denominator. h_π^{**} is increasing with π if $\Sigma_d + 2(\alpha_o + \eta_o)(\alpha_d - \alpha_o - \eta_o)$ is positive. As noted above, this case is always obtained in very poor countries, for which we realistically assume that the private return to skills abroad exceeds the social domestic return ($\alpha_d > \alpha_o + \eta_o$). In countries with intermediate income levels ($\alpha_d < \alpha_o + \eta_o$),

the effect of π on h_π^{**} is ambiguous.

The decentralization of this solution requires equalizing h_π^{**} and h_π° . Solving this equation for s gives:

$$s_\pi^{**} = \frac{\eta_o [1 - \pi (2\alpha_d + \pi \Sigma_d - \alpha_o - \eta_o)]}{\alpha_o + \eta_o + \pi \Sigma_d}$$

The denominator increases with π . And the numerator is likely to decrease with π , at least if $2\alpha_d + \pi \Sigma_d > \alpha_o + \eta_o$. The optimal subsidy rate, therefore, is an ambiguous function of π . When the government in the origin country cares about the welfare of its emigrants and emigration increases with human capital, the optimal level of education can increase more rapidly than the laissez-faire level ($\frac{\partial h^{**}}{\partial \pi} > \frac{\partial h^\circ}{\partial \pi}$). It might be optimal for the government to increase education subsidies when emigration prospects become larger.

2.4 Second-best solutions

The previous analysis assumes that education subsidies and controlled emigration policies can be substituted one for another. As in Docquier, Faye and Pestieau (2008), we now introduce two types of fiscal costs. First, expatriates do not pay taxes. Second, we assume that subsidizing education induces a deadweight cost, σ . Therefore, the government budget constraint becomes: $(1 - p)\tau = \frac{sh^2(1+\sigma)}{2}$. In this second best context, we study the effect of exogenous migration on education policy.

The individual optimization problem becomes:

$$\begin{aligned} E[y(h, H)] &= (1 - p) \left[\alpha_o h + \eta_o H - \frac{(1 - s)h^2}{2} - \tau \right] \\ &\quad + p \left[\alpha_d h + \Sigma_d - \frac{(1 - s)h^2}{2} \right] \end{aligned}$$

and the first-order condition is equivalent to that obtained in the case of a probabilistic migration:

$$h_{\sigma}^{\circ} = \frac{(1-p)\alpha_o + p\alpha_d}{1-s} \quad (21)$$

To determine the second-best optimal level of human capital, H^* , we use a Lagrangian which accounts for the planner's objective function $Y(h)$, the budget constraint with fiscal costs, and the decentralization constraint:

$$\begin{aligned} L = & (1-p) \left[\alpha_o h + \eta_o h - \frac{(1-s)h^2}{2} - \tau \right] + \phi p \left[\alpha_d h + \Sigma_d - \frac{(1-s)h^2}{2} \right] \\ & + \rho \left[(1-p)\tau - \frac{sh^2(1+\sigma)}{2} \right] + \lambda [(1-p)\alpha_o + p\alpha_d - (1-s)h] \end{aligned}$$

where ρ is the Lagrangian multiplier associated with the budget constraint and λ is the multiplier associated with the decentralization constraint.

Together with these two constraints, the set of first-order conditions ($\frac{\partial L}{\partial h} = \frac{\partial L}{\partial \tau} = \frac{\partial L}{\partial s} = 0$) determines the interior second best solution. The first-order conditions write as

$$\begin{cases} 0 = (1-p)(\alpha_o + \eta_o) + \phi p\alpha_d - (1-p + \phi p)(1-s)h - \rho sh(1+\sigma) - \lambda(1-s) \\ 0 = -(1-p) + \rho(1-p) \\ 0 = \frac{h^2}{2} [1-p + \phi p - \rho(1+\sigma)] + \lambda h \end{cases}$$

From $\frac{\partial L}{\partial \tau}$, we obtain $\rho = 1$. Substituting this condition into $\frac{\partial L}{\partial s}$, we have $\lambda = \frac{h}{2} [p(1-\phi) + \sigma]$. And finally, plugging these two conditions and the decentralization constraint (21) into $\frac{\partial L}{\partial h}$ determines the second best level of human capital:

$$h_{\sigma}^* = \frac{(1-p)(\alpha_o + \eta_o) + \phi p\alpha_d + \frac{(1-p)\alpha_o + p\alpha_d}{2} [p(1-\phi) + \sigma]}{1+\sigma} \quad (22)$$

Let us consider three particular cases:

- In the economy without migration ($p = 0$), the second-best level of human capital is equal to $h_0^* = \frac{\alpha_o + \eta_o + \sigma \alpha_o / 2}{1 + \sigma}$. It can easily be shown that this amount is lower than the first-best level h_0^{**} in (12) and that the decrease is fully due to the deadweight costs associated with education subsidies.
- In an economy with migration and a planner caring about residents only ($\phi = 0$), the second-best level of human capital h_σ^* increases with p if

$$\sigma > \frac{\alpha_o + 2\eta_o - 2p(\alpha_d - \alpha_o)}{\alpha_d - \alpha_o},$$

that is, when fiscal distortions are large. The second-best subsidy rate is then equal to:

$$s_\sigma^* = \frac{(1-p)(\alpha_o + \eta_o) - [(1-p)\alpha_o + p\alpha_d](1 - \frac{p}{2} + \frac{\sigma}{2})}{(1-p)(\alpha_o + \eta_o) + [(1-p)\alpha_o + p\alpha_d]\frac{p+\sigma}{2}}$$

- In an economy with migration and a planner caring about all naturals equally ($\phi = 1$), the second-best level of human capital h_σ^* increases with p if

$$\sigma > \frac{-2(\alpha_d - \alpha_o - \eta_o)}{\alpha_d - \alpha_o};$$

this condition is less restrictive than with $\phi = 0$. It is always satisfied in the case of very poor countries. The second-best subsidy rate in this case equals to:

$$s_\sigma^* = \frac{(1-p)(\alpha_o + \eta_o) + p\alpha_d - [(1-p)\alpha_o + p\alpha_d](1 + \frac{\sigma}{2})}{(1-p)(\alpha_o + \eta_o) + p\alpha_d + [(1-p)\alpha_o + p\alpha_d]\frac{\sigma}{2}}$$

Figure 1 provides a numerical simulation of the effect of emigration on the second-

best subsidy rate, measured on the vertical axis. The continuous line represents the case of a government caring only about residents ($\phi = 0$), while the dashed line represents the case of a government also caring about migrants ($\phi = 1$). In both cases, the optimal subsidy s_p^* decreases with the emigration rate p (measured on the horizontal axis). The negative correlation between s_p^* and p is stronger when the government cares about residents only. A corner solution with $s_\sigma^* = 0$ obtains when p reaches a certain threshold. The parameter set used for the simulation is $\alpha_o = 1$, $\eta_o = 1.5$, $\alpha_d = 2$, $\Sigma_d = 2$, and $\sigma = 0.2$. Higher values for σ shift the curves inwards.

[INSERT FIGURE 1]

2.5 Summary of predictions

Table 1 summarizes our theoretical predictions. The different columns describe the framework within which the migration-education relationship is examined. The columns display the different cases for exogenous or endogenous migration (i.e., when education increases the chances of migration) and the case where education policy is associated to the existence of deadweight costs. The rows show the effect of migration prospects first on the private incentives to educate and then on the socially optimal level of education for social welfare functions where the government either cares only about the country's remaining residents ($\phi = 0$) or cares equally about all natives ($\phi = 1$). In the benchmark first-best model (Column 1) with exogenous migration, emigration reduces the optimal provision of education, whatever the social objective of the government. In the other models, education subsidies usually decrease with migration when the government only cares about residents. When the government cares about all natives equally, we find an ambiguous effect of migration on the optimal provision of education: a positive effect is more likely to be obtained when

the origin country is very poor and when the emigration probability endogenously increases with human capital.

[INSERT TABLE 1]

As discussed above, the links between brain drain migration and education policy variables such as education subsidies depend on the objective function of governments and the income level of countries. If the government cares more about residents, we are more likely to observe a "disinvestment" in education, with a possible exception in very poor countries. If the government also cares about expatriates (i.e., cares about natives' average incomes), a positive relationship between education expenditures and brain drain migration becomes theoretically possible. Finally, to evaluate the role of fiscal costs, we will compare policy responses to the brain drain in the full sample of developing countries to the responses obtained in a sub-sample of developing countries with better institutions, using an index of government effectiveness to capture the government's ability/willingness to allocate resources in an efficient manner.

In the next section, we will test the predictions of our model using actual data for 107¹⁰ developing countries. Although our model formalizes the quantity of human capital acquired by a representative agent, available data document the proportions of individuals who reach a certain level of education. Basically, the aggregate quantity of human capital accumulated in the economy (the source of externality) increases with the proportion of educated and with the quality of education. In our empirical analysis, we will endogenize subsidy and enrollment rates at the three main educational levels (primary, secondary and tertiary) as well as the quality of the tertiary education system.

¹⁰The number of observations changes in different empirical specifications depending on the data availability for the included covariates.

3 Empirical analysis

In this section we use cross-country regressions to investigate the relationship between high-skill emigration and education policy outcomes. The analysis is cross-sectional and tries to capture public education expenditures at different margins using a range of indicators of educational investments in both quantity and quality: education expenditures per student (normalized as a percentage of GDP per capita) at different education levels, quality of higher-education institutions (as proxied by world rankings), and enrolment rates. Analysis of the latter outcome also aims at establishing whether more education expenditures translate into a higher enrolment rate (which is indeed the case, showing that education subsidies are effective) and at establishing whether or not there is indeed an incentive effect of high-skill emigration prospects on private incentives to educate. In fact, there are two types of brain drain models: those with homogenous agents (such as Stark and Wang (2002), Docquier, Faye and Pestieau (2008)), and models with heterogeneous agents. Theoretical section in this paper uses the former type model; disregards inequality issue but instead focuses on efficiency and the role of human capital accumulation in a world with homogenous agents. However, in real world we have low- and high-skilled people. Empirically, human capital flight is better proxied with the emigration rate of the educated since the low-skilled emigration rate is usually negligible and therefore empirical section uses the emigration rate of the high-skilled. As we proceed with the analysis of our first outcome of interest, namely, education expenditure per student, we briefly discuss a number of methodological and data issues that are relevant for other outcomes as well.

3.1 Education expenditures

We use the same specification as in Docquier, Faye and Pestieau (2008), henceforth

referred to as DFP. We regress the log of public expenditure per student as percentage of GDP per capita around the year 2000 (an average of 1996-2002) on the log of the brain drain in 1990, the physical capital stock level in 1990, a 'Rule of Law' governance quality index in 1996, workers' remittances per capita in 1990, dummies for low and middle-income status, and regional dummies. We expand this benchmark specification by adding an interaction term between brain drain and remittances. As explained, this is assumed to capture the strength of the connection between the home-country and the diaspora, which can be reflected in the government's social welfare function through higher weights put on emigrants' welfare (due either to a genuine concern for their fate or to the anticipation of remittances, which affect the disposable income and welfare of the residents).¹¹

3.1.1 Data and methodology

We estimate the following equation¹²:

$$\begin{aligned} \ln(s_{00}^j) = & a_0 + a_1 \cdot \ln(p_{90}) + a_2 \cdot (\ln(p_{90}) \cdot \phi_{90}) + a_3 \cdot \phi_{90} + a_4 \cdot K_{90} \\ & + a_5 \cdot RLAW_{96} + a_6 \cdot LINC + a_7 \cdot MINC + \sum_{i=8}^{12} a_i \cdot REGD_i + \varepsilon_s, \end{aligned} \quad (23)$$

where $j = (p, s, t)$ denotes the primary, secondary and tertiary levels of education,

¹¹To proxy for migrants' ties with their origin country, we also used two other alternatives: whether expatriates keep their voting rights once abroad (data taken from International IDEA Handbook (2007) on 'Voting from Abroad', showing that 55 out of 105 countries provide voting rights to their emigrants), and existence of dual citizenship rights (data taken from the Appendix tables of Blatter, Erdmann and Schwanke (2009), showing that only 19 out of 92 countries accept dual citizenship rights for their emigrants). The results for the specifications using these alternatives proxies are not shown (but are available upon request) as these variables and their interaction with the brain drain are insignificant in a majority of specifications which is probably due to the small number of observations.

¹²We estimated our empirical models using the regression technique suggested by Eisenhauer (2003).

and the definitions and data sources for the different variables are as follows:

- s_{00}^j : average annual public subsidies per student as percentage of GDP per capita in the years 1996-2002, taken from the UNESCO Institute for Statistics (see <http://stats.uis.unesco.org/>).
- $\ln(p_{90})$: the log of the high-skill emigration rate, taken from Docquier, Lowell and Marfouk (2009) who computed emigration rates of college graduates to OECD destinations for all countries of the world. Emigration rates are obtained by dividing the stock of expatriate college graduates in 1990 by the stock of college graduates born in the country.
- ϕ_{90} : remittances per migrant in current US dollars in 1990. Data on remittances in 1990 (in thousands) is taken from IMF Balance of Payments Statistics Yearbook.¹³ Two specifications are actually considered: one in levels, as explained, and one where we define a binary variable I_{90} equal to one if ϕ_{90} is positive and zero otherwise. Due to technical coding strategy of the remittances data, a zero reported value for the dummy I_{90} does not mean that the amount of remittances is exactly equal to zero but that it is lower than a certain threshold.¹⁴
- K_{90} : the level of physical capital stock in 1990, computed as the sum of investment of the previous decade with a depreciation rate of 5 percent per year and

¹³Workers' remittances are current transfers by migrants who are employed or intend to remain employed for more than a year in another economy in which they are considered residents. Some developing countries classify workers' remittances as a factor income receipt (and thus as a component of GNI). The World Bank adheres to international guidelines in defining GNI, and its classification of workers' remittances may therefore differ from national practices. This item shows receipts by the reporting country.

¹⁴Note that due to technical and administrative issues (e.g., individual remittances appear in official statistics only if they are formal, and above a certain threshold), having positive remittances implies that some aggregate threshold level of transfer is attained. In the balance of payment, remittances can also be recorded as compensation of employees. Aggregating workers' remittances and compensations of employees in our database (what is referred to as total remittances in most empirical studies), we obtain an average of USD 827 million per year in countries with $I_{90} = 0$, and USD 2,988 million in countries with $I_{90} = 1$.

assuming a stationary level of physical capital in 1980 (given by the amount of investment divided by the depreciation rate). Data on investment are taken from the World Development Indicators.

- $RLAW_{96}$: a standard governance measure from the Kauffman, Kray and Mastruzzi (2005) dataset in 1996, the first wave in the database. This variable captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. It takes a value ranging from -2.5 (worst) to 2.5 (best).
- $LINC$ and $MINC$: dummies for low and middle-income status, using the World Bank classification;
- $REGD_i$: dummies for regions which are constructed using the World Bank regional classifications of countries. There are six regional dummies: South Asia, Sub-Saharan Africa, Latin America, Middle East and North Africa, East Asia and Pacific, Eastern Europe and Central Asia. The first region is used as the reference region in the empirical analysis.

In addition, we also divide our sample into two sub-samples characterized by high/low institutional quality, using the Kauffman, Kray and Mastruzzi (2005) index of governance efficiency. This variable ranges from -2.5 (lowest efficiency) to +2.5 (highest efficiency) and we set the cut-off at .5. This generates a sub-sample of 58 developing countries out of 92 with relatively high institutional quality. This sub-sample is selected to have around the half of the observations and not below because otherwise we will be losing the reliability of the estimates due to a very low number of observation. The justification for the split-sample analysis is that our theoretical

framework assumes a welfare-maximizing government. This is clearly a disputable assumption in any country, rich or poor, however we expect government policy to be more in line with the predictions of our model in the case of countries with better government effectiveness. Table A1 in the Appendix provides information about the definitions, sources and descriptive statistics of the variables that are used in all of the models in the empirical section.

The fact that we use stock data (rather than flows) makes our regressions less likely to suffer from a reverse causality problem (e.g., education expenditures in 1990 affecting the stock of expatriates accumulated over the previous years). However, inertia in education policy and emigration, together with unobserved heterogeneity problems can be a source of endogeneity bias. Therefore, the brain drain indicator is instrumented using a set of geographical variables. More precisely, the instruments used in the IV (instrumental variable) models are: dummies for landlocked countries, the log of population sizes, the log of distance from the nearest OECD country, and interactions of these variables with remittances per migrant as well as other interactions, depending on the model specification. Using such interactions as additional instruments is suggested in Wooldridge (2009).¹⁵

¹⁵We are aware of the fact that geographic variables can also affect education policies via the quality of institutions. Several diagnostic tests are therefore conducted to test the consistency of the estimates provided by the IV method. First, the validity and the relevance of the instruments are tested. Validity and relevancy tests are very important since the estimations will become more biased if the instruments are not valid or, in other words, if they have little explanatory power (Hahn and Hausman, 2002). For the relevancy of the excluded instruments, first-stage F-statistics of the joint significance test are checked. First-stage regressions should provide F-statistic above 10 as a rule of thumb. Moreover, Anderson-Rubin Wald test statistic and Kleibergen-Paap Wald test statistic are checked again for the relevance of the excluded instruments. Hansen J-Statistic is used for the overidentification test and null hypothesis of the orthogonality assumption is checked for the validity of the instruments. A C-test is also performed to see whether endogenous regressors should be entered to the model as exogenous regressors. All the test statistics are robust to heteroskedasticity.

3.1.2 Results

We present the results for the effect of the brain drain on education expenditures separately for the tertiary, secondary and primary education levels. We are interested in answering the following questions: does the brain drain negatively affect public education expenditures, as our theory predicts, and more so at higher education levels, as one could expect? Is this relationship mitigated or even reversed when migrants keep strong ties (i.e., send a lot of remittances) to their home countries, and does the answer to this second question depend on the level of education?

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[INSERT TABLES 2.a TO 2.c]

Tertiary education level. Table 2a reports the regression results for public expenditures (per student, normalized as percent of GDP per capita) at the tertiary level. The first two columns (model (a)) show the OLS and IV specifications in DFP (2008). We then introduce workers remittances and their interaction with the brain drain: in columns 3 and 4 (model (b)), remittances enter as a dummy which equals to 1 if remittances per migrant are positive while in columns 5 and 6 (model (c)) they enter as the level of remittances per migrant. Finally, columns 7 and 8 (model (d)) uses the same specification as model (b) but for the sub-sample of countries with better government efficiency.

The results show that for all model specifications there is a negative impact of the brain drain on the log of education expenditures, with a downward bias in the OLS regressions, as in DFP (2008). Interestingly, this negative impact is stronger when we extend the baseline model of DFP (2008) by controlling for migrants' ties with their origin countries through remittances. Indeed and in line with our theoretical model, the empirical analysis shows that stronger connections between migrants and home countries (as captured by remittances) mitigate the negative effect of the brain drain on government education expenditures (hence a more negative direct effect when we control for, and interact the brain drain with remittances). This mitigating impact could be due to many different reasons depending on the type of link between governments and expatriates. If remittances per migrant are high or if expatriates are a good source for an increase in FDI and/or private expenditures, then government could be willing to invest more on education to enable this additional source of income continuously. In fact, there are many empirical studies which have found evidence on the positive impact of migration in fostering private investment in the countries of origin which can be seen as an important contribution for the domestic economy in general. (such as Lucas (1987), Dustmann and Kirchkamp (2001), Konseiga (2007)) If the tie between the government and the expatriates is not that strong then there would not be such an incentive. In fact, governments would be decreasing subsidy rates in order to prevent brain drain and, thus, loss of potential income. The coefficients on the other variables are as expected: "rule of law" has a positive and significant sign, confirming that countries with good institutions invest more in tertiary education, and dummies for low-income and middle-income status also have a positive sign, suggesting that there is relatively more public subsidies to higher education where liquidity constraints on private investment are more severe. First-stage F-statistics are well above 10 for all IV specifications except IV4, which is most likely due to

the lower number of observations in that model. The Anderson-Rubin Wald test result for IVs do not reject the relevance of the instruments and the Kleibergen-Paap statistics do not accept the underidentification. Furthermore, Hansen J-test results tell us that underidentification is not accepted for all IV specifications and C-test results confirm the endogeneity of the brain drain variable.

Additionally, we want to check whether the coefficient for the brain drain variable is significantly different from the coefficient of its interaction with remittances in absolute value. F-test results show that the coefficients are not equal to each other in absolute value. Therefore, we can argue from the results of the IV2 and IV3 specifications that brain drain may lead to an increase in education subsidies at the tertiary level when emigrants keep strong ties with their origin countries. Using the point estimates from IV3 specification, one can compute the level of remittances per migrant above which the total effect of brain drain migration on public education expenditures at the tertiary level becomes positive. For example, using the coefficients from the IV3 specification in Table 2a, we find that this threshold level is about 45,000 dollars (i.e., $0.180/0.004 \times 1,000$). In fact, the level of remittances per migrant is above the threshold for only 3 countries out of 101.

Regarding countries with better government effectiveness (specifications OLS4 and IV4), the same qualitative outcomes are observed but with different magnitudes. These countries might be closer to the first best solution and take greater advantage of the migration-induced incentive effect to reduce their subsidies in a context of brain drain. When remittances are important, they increase the subsidy rate less than in other developing countries. This is in line with equation (20) which shows that the positive effect of the brain drain on the optimal level of human capital is less important in richer countries.

Secondary and primary education levels. For the secondary level subsidy rates, we present the estimation results in Table 2b using the same model specifications as in Table 2a. In general the results are in line with those for tertiary education (negative effect of the brain drain on public education expenditure, stronger in IV regressions; same signs and significance levels for the control variables), but with some interesting exceptions. We focus the comparison across education levels on specification IV3 because the various test results lead us to select it as preferred specification. Using the IV3 specification results, it can be shown that the partial effects of brain drain on the subsidy rates at the mean remittances per migrant (holding all other variables fixed) are 15.32%, 31.45% and 27.99% for tertiary, secondary and primary levels of education, respectively.

The main difference with the analysis at the tertiary level is that the mitigating effect of remittances is no longer present (as the average level of remittances received is not, or very weakly significant), suggesting that the strength of the ties with the home-country as captured by remittances cannot reverse the negative relationship between brain drain migration and public education expenditures even at high levels of remittances. We conjecture, in line with our theoretical predictions, that this could be due to inclusion in the sample of countries with bad governance and low government effectiveness. And indeed, once we restrict our sample to developing countries with relatively good institutional quality (see specification IV4 in Table 2b), the mitigating effect of remittances appears again.

Finally, Table 2c presents the estimate results at the primary education level, using again the same model specifications as for tertiary education. The same qualitative results also hold, suggesting that brain drain affects not just the structure of the education budget but also its total size (i.e., leads not just to a reallocation from tertiary to primary education levels but to budget cuts across the board). As for the

results at the secondary level, remittances do not have a mitigating effect in the full sample and do exert a mitigating effect in the sub-sample of countries with better institutions.

3.2 Enrolment rates and quality of universities

We can interpret the public education expenditure variable as an aggregate education policy outcome resulting from the combination of quantitative and qualitative objectives. In this sub-section we try to separate the analysis for quantity and quality by looking at enrolment rates on the one hand, and at the quality of higher-education institutions, on the other hand.

3.2.1 Quality of universities

We present the results for the quality of universities, as revealed by their position in world rankings. The chosen model specification corresponds to model b in the education subsidy equation:

$$\begin{aligned} \ln(Q) = & c_0 + c_1 \cdot \ln(p_{90}) + c_2 \cdot (\ln(p_{90}) \cdot \phi_{90}) + c_3 \cdot \phi_{90} + c_4 \cdot K_{90} \\ & + c_5 \cdot RLAW + c_6 \cdot LINC + c_7 \cdot MINC + \sum_{i=8}^{12} c_i \cdot REGD_i + \varepsilon_q \end{aligned} \quad (24)$$

where the quality of education, Q , is measured by the percentage of the country's universities ranked in the top 4000 (according to the world classification of universities)¹⁶ per 1,000 students in the tertiary education aged population. Test results for IV estimation lead us to focus on OLS estimates. As can be seen from Column 2 in Table 3, brain drain migration has a negative but insignificant impact on university quality

¹⁶The data on the total number of universities in origin countries and the number of universities in the top 4,000 ranking is obtained from <http://www.webometrics.info> in February 2009.

(note however the low number of observations), but remittances and their interaction with the brain drain variable are positive and highly significant, suggesting that the existence of stronger ties between the migrants and their home country contributes to increase the quality of higher education. This could be due to a number of causes, including a demand push to receive diploma accreditation for those universities (Lien, 2008). The other coefficients are conform to intuition, with a positive sign for "rule of law", suggesting that better governed countries invest more in the quality of higher education, and negative signs for the dummies on low- and middle-income status, suggesting that these tend to lean towards quantity when facing a quantity-quality tradeoff in the allocation of educational resources.

[INSERT TABLE 3]

3.2.2 Enrolment rates

To investigate the effect of brain drain migration on enrolment we use Beine, Docquier and Rapoport (2010) as our baseline specification. In addition to the variables that are used in this baseline model, we also control for the same regional and income dummies as for our previous regressions on education expenditures and university quality. We therefore estimate the following equation:

$$\begin{aligned} \ln(ENR_{95}^j) = & b_0 + b_1 \cdot \ln(p_{90}) + b_2 \cdot \ln(ENR_{90}^{j-1}) + b_3 \cdot s_{90}^j \\ & + b_4 \cdot LINC + b_5 \cdot MINC + \sum_{i=6}^{10} b_i \cdot REGD_i + \varepsilon_e, \end{aligned} \quad (25)$$

where j =secondary or tertiary, depending on the specification. The definitions and the data sources are the same as above, with ENR_{95}^j being the 1995 net rate of school

enrolment at education level j and ENR_{90}^{j-1} the 1990 net rate of school enrolment at education level below j . The data for enrolment rates are taken from the UNESCO Institute for Statistics.

The results for the enrolment rates at the secondary and tertiary levels are presented in Table 4. In the IV specifications, we instrument the relevant emigration rate and public education expenditures to account for reverse causality between these variables and enrolment rates. The instruments for the first-stages are log of population size in 1990, dummy for landlocked and rule of law measurement which ranges from -2.5 to +2.5. Instrumentation is not very good for the subsidy variable since it is difficult to find a variable that would affect education subsidies without affecting enrollment rate. IV test results are good for the IV1 specification except for one of the first-stage F-statistics.

The results show that there is a positive relationship between migration prospects and enrolment rates, mostly at the secondary level (once the latter is controlled for, the effect of the brain drain on enrolment rates at the tertiary level are negative in OLS regressions but insignificant in the IV regressions). Table 4 therefore confirms that schooling enrolment rates at the secondary level are stimulated by emigration prospects and also confirms that public education expenditures per student matter for secondary level enrolment rates. The absence of similar results at the tertiary level would seem to be counter-intuitive, however it was already noted and discussed in previous literature, notably Faini (2003) who suggested that there could be a potentially depressing effect of skilled emigration on both tertiary and secondary levels if people emigrate to study abroad. However, by using a logarithmic specification as we employ in this paper, Beine, Docquier and Rappoport (2010) found no impact of brain drain migration on tertiary level subsidies and a positive impact on secondary level enrolment, which is in line with our findings. Their explanation for brain drain

having no effect on enrolment at the tertiary level followed Faini's (i.e., migration prospects may lead students to invest more in their education at secondary level at home and then migrate to pursue their tertiary level education). Another reason for the insignificant result at the tertiary level, however, could simply be due to the low number of observations.

[INSERT TABLE 4]

4 Conclusion

High-skill emigration from developing to developed countries increased at a fast pace during the last decades. This paper theoretically and empirically investigates the implications of this growing brain drain for education policy in developing countries. We first present a general theoretical model which extends the existing literature on the optimal provision of education in a context of brain drain along a number of dimensions. Notably, we allow for governments to factor the welfare of emigrants in, for heterogeneous effects at different levels of income and degrees of homogeneity/heterogeneity in migration opportunities across education groups, and for deadweight costs relating to the fiscal costs of taxation and to the ineffectiveness of certain government in the design and implementation of public policies. This allow us to derive a rich set of predictions with respect to the optimal education policy responses to the brain drain. We show that migration is expected to reduce the optimal provision of education if the government only cares about residents. This can be mitigated and even reversed when the government also cares about expatriates, the probability of migration is endogenous (in the sense that it depends on an individual's level of human capital), and the home-country is very poor. We then test our predictions using cross-country data. The empirical results are in line with the

theoretical predictions: we find that the brain drain has a negative effect on public education subsidies, except when the links between the diaspora and the home countries (as proxied by remittances) are strong. Given that the predictions are derived under the assumption of a benevolent government, we also expect our results to be stronger in a sub-sample of developing countries with relatively good institutional quality (that is, for which the assumption of a benevolent government is a reasonable one), which is indeed what we find. In addition, we also investigate the relationship between high-skill migration and other education policy outcomes such as university quality and enrolment at different education levels. We confirm results from previous studies in that the brain drain appears to depress enrolment at the tertiary level once education subsidies and enrolment at the secondary level are taken into account, and fosters enrolment in secondary schooling, as do education subsidies. We discuss a few possible interpretations of these results.

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Tables and Figures

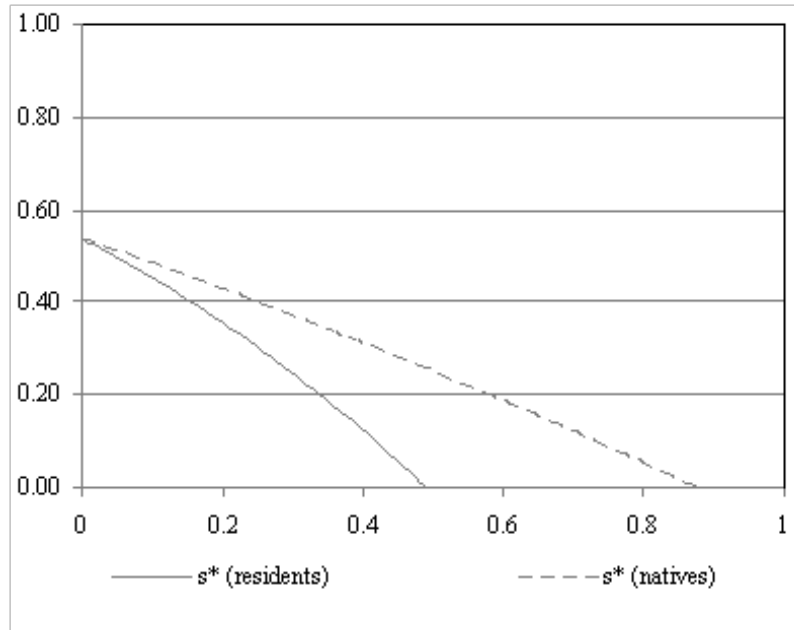


Figure 1. Brain drain and optimal subsidy rates with fiscal distortions

Table 1. The effect of high-skill emigration on the generosity of education policy

		Exogenous migration	Endogenous migr.	Fiscal costs
Individual decisions	h	$\succ 0$	$\succ 0$	$\succ 0$
Optimum ($\phi = 0$)	h	$= 0$	$= 0$	$\succ 0$ if σ high
	s	$\prec 0$	$\prec 0$	$\prec 0$
Optimum ($\phi = 1$)	h	≥ 0	$\succ 0$ if <i>poor</i> ≤ 0 if <i>medium</i>	$\succ 0$ if σ high
	s	$\prec 0$	≥ 0	$\prec 0$

Table 2. Dependent = Education expenditure per student
(as percentage of GDP per capita)
2.a. Tertiary level, $\ln(s_{00}^t)$

	OLS1	IV1	OLS2	IV2	OLS3	IV3	OLS4	IV4
$\ln(p_{90})$	-.051* (.032)	-.183*** (.057)	-.148*** (.057)	-.388*** (.088)	-.063 (.041)	-.180*** (.061)	-.223*** (.065)	-.435*** (.076)
$\ln(p_{90}) \cdot I_{90}$			.237*** (.073)	.585*** (.145)			0.303*** (.075)	.573*** (.099)
$\ln(p_{90}) \cdot \phi_{90}$					.003*** (.001)	.004*** (.001)		
I_{90}			.504*** (.191)	.305*** (.348)				1.293*** (.286)
ϕ_{90}					.010*** (.002)	.013*** (.003)		
K_{90}	.028** (.013)	.026** (.011)	.019 (.013)	.002 (.002)	.028** (.013)	.027** (.012)	0.008 (.000)	.001 (.000)
$RLAW_{96}$	.420*** (.109)	.370*** (.124)	.466*** (.116)	.380*** (.137)	.535*** (.117)	.501*** (.124)	0.528*** (.158)	.371** (.167)
$LINC$	.542*** (.153)	.343** (.154)	.635*** (.177)	.304 (.250)	.659*** (.151)	.401** (.198)	.291 (.258)	-.103 (.301)
$MINC$	.512*** (.130)	.406*** (.123)	.365** (.149)	.055 (.218)	.474*** (.134)	.362** (.145)	.275* (.155)	.017 (.194)
Region dummies	YES	YES	YES	YES	YES	YES	YES	YES
Uncentered R2	.88	.86	.89	.86	.88	.87	.91	.90
Nb of obs	107	107	92	92	92	92	58	58
Hansen J-test		.437		.439		.045		.721
1st stage F (1)		19.28		19.00		13.34		7.68
1st stage F (2)				19.23		53.91		12.69
ARW		.000		.001		.000		.199
Kleibergen-Paap		.000		.007		.000		.025
C-test		.002		.001		.021		.006

Heteroskedastic-robust Standard errors are reported between brackets. IV excluded instruments: log of population size, dummy for landlocked, log of distance to nearest OECD country. Interaction of these three dummies with remittances per migrant and with the dummy for positive remittances per migrant are used as excluded instruments depending on the model specification. Hansen J-statistic for overidentification test, First-stage regression F-statistics for instrument relevance, ARW stands for Anderson-Rubin-Wald Test statistics for instrument relevance, Kleibergen-Paap Statistics for underidentification test, C-test statistic for the exogeneity of assumed endogenous variables. *p<0.1, **p<0.05, ***p<0.01.

Table 2. Dependent = Education expenditure per student
(as percentage of GDP per capita)
2b. Secondary level, $\ln(s_{00}^s)$

	OLS1	IV1	OLS2	IV2	OLS3	IV3	OLS4	IV4
$\ln(p_{90})$	-.081* (.044)	-.318*** (.070)	-0.196*** (.068)	-.763*** (.229)	-.114** (.046)	-.388*** (.108)	-.143* (.086)	-.682*** (.262)
$\ln(p_{90}) \cdot I_{90}$	-	-	0.191 (.120)	.898*** (.366)	-		.173 (.117)	.736** (.325)
$\ln(p_{90}) \cdot \phi_{90}$	-	-	-	-	.013 (.009)	.011* (.006)		
I_{90}	-	-	0.725** (.321)	2.345*** (.829)			.531* (.321)	1.793** (.735)
ϕ_{90}	-	-	-	-	.066	.047 (.035)		
K_{90}	.058*** (.013)	.059*** (.012)	0.042*** (.013)	.011 (.019)	.052*** (.013)	.059*** (.012)	.035** (.000)	.033** (.000)
$RLAW_{96}$	.525*** (.178)	.430** (.210)	0.400** (.164)	.144 (.224)	.486*** (.171)	.470** (.217)	.656*** (.209)	.222 (.295)
$LINC$	1.684*** (.265)	1.354*** (.263)	1.319*** (.205)	.465 (.355)	1.398*** (.239)	.937*** (.281)	1.159*** (.374)	.128 (.534)
$MINC$	.786*** (.202)	.650*** (.207)	.440** (.198)	-.202 (.355)	.587*** (.202)	.536** (.251)	.479** (.198)	.139 (.295)
Region dummies	YES	YES	YES	YES	YES	YES	YES	YES
Uncentered R2	.95	.94	.96	.94	.96	.95	.97	.95
Nb of obs	86	86	73	73	73	73	46	46
Hansen J-test		.594		.664		.711		.174
1st stage F (1)		23.95		15.48		9.80		6.54
1st stage F (2)		-		14.17		15.39		7.34
ARW		.000		.002		.000		.000
Kleibergen-Paap		.000		.015		.000		.182
C-test		.000		.000		.001		.016

Heteroskedastic-robust Standard errors are reported between brackets. IV excluded instruments: log of population size, dummy for landlocked, log of distance to nearest OECD country. Interaction of these three dummies with remittances per migrant and with the dummy for positive remittances per migrant are used as excluded instruments depending on the model specification. Hansen J-statistic for overidentification test, First-stage regression F-statistics for instrument relevance, ARW stands for Anderson-Rubin-Wald Test statistics for instrument relevance, Kleibergen-Paap Statistics for underidentification test, C-test statistic for the exogeneity of assumed endogenous variables. *p<0.1, **p<0.05, ***p<0.01.

Table 2. Dependent = Education expenditure per student
(as percentage of GDP per capita)
2c. Primary level, $\ln(s_{00}^p)$

	OLS1	IV1	OLS2	IV2	OLS3	IV3	OLS4	IV4
$\ln(p_{90})$	-.017	-.235*** (.075)	-.323*** (.094)	-.830*** (.217)	-.133** (.058)	-.300** (.132)	-.250*** (.115)	-.752* (.441)
$\ln(p_{90}) \cdot I_{90}$	-	-	.397*** (.143)	.957*** (.301)			.313** (.152)	.788* (.474)
$\ln(p_{90}) \cdot \phi_{90}$	-	-	-	-	.009 (.007)	.003 (.016)		
I_{90}	-	-	1.028*** (.328)	2.155*** (.623)			.635* (.357)	1.550* (.964)
ϕ_{90}	-	-	-	-	.046 (.039)	.006 (.088)		
K_{90}	.038***	.042*** (.009)	.021*** (.008)	.002	.040*** (.010)	.049*** (.016)	.019** (.009)	.018 (.013)
$RLAW_{96}$	.730***	.738*** (.193)	.683*** (.133)	.637*** (.015)	.783*** (.154)	.882*** (.211)	.523*** (.202)	.273 (.285)
$LINC$		1.542*** (.273)	1.285*** (.277)	.879** (.426)	1.346*** (.282)	1.311*** (.374)	.349 (.340)	-.112 (.541)
$MINC$		.978*** (.196)	.518** (.234)	.030 (.337)	.816*** (.239)	.863*** (.325)	.425 (.268)	.096 (.413)
Region dummies	YES	YES	YES	YES	YES	YES	YES	YES
Uncentered R2	.95	.93	.96	.94	.96	.95	.97	.96
Nb of obs	72	72	60	60	60	60	37	37
Hansen J-test		.135		.125		.049		.214
1st stage F (1)		10.29		10.88		9.83		5.02
1st stage F (2)				14.11		10.66		7.03
ARW		.000		.000		.000		.000
Kleibergen-Paap		.005		.063		.009		.140
C-test		.020		.124		.483		.887

Heteroskedastic-robust Standard errors are reported between brackets. IV excluded instruments: log of population size, dummy for landlocked, log of distance to nearest OECD country. Interaction of these three dummies with remittances per migrant and with the dummy for positive remittances per migrant are used as excluded instruments depending on the model specification. Hansen J-statistic for overidentification test, First-stage regression F-statistics for instrument relevance, ARW stands for Anderson-Rubin-Wald Test statistics for instrument relevance, Kleibergen-Paap Statistics for underidentification test, C-test statistic for the exogeneity of assumed endogenous variables. *p<0.1, **p<0.05, ***p<0.01.

Table 3. Dependent = Relative number of high-quality of universities in 1990

	OLS	IV
	# of universities per student in top 4,000	
$\ln(p_{90})$	-.076 (.117)	-.312 (.464)
$\ln(p_{90}).I_{90}$	.445*** (.180)	.708* (.429)
I_{90}	1.146*** (.455)	1.824 (1.184)
K_{90}	.032 (.043)	.042 (.046)
$RLAW$	.586* (.305)	.501* (.266)
$LINC$	-11.476*** (.446)	-12.214*** (1.564)
$MINC$	-11.100*** (.467)	-11.835*** (1.367)
Region dummies	YES	YES
Uncentered R2	.99	.99
Nb of obs	62	62
Hansen J-test		.128
1st stage F (1)		2.93
1st stage F (2)		12.23
ARW		.043
Kleibergen-Paap		.678
C-test		.578

Heteroskedastic-robust Standard errors are reported between brackets. IV excluded instruments: log of population size, dummy for landlocked, log of distance to nearest OECD country. Interactions of these three dummies with the dummy for positive remittances per migrant are used as excluded instruments depending on the model specification.. Hansen J-statistic for overidentification test, First-stage regression F-statistics for instrument relevance, ARW stands for Anderson-Rubin-Wald Test statistics for instrument relevance, Kleibergen-Paap Statistics for underidentification test, C-test statistic for the exogeneity of assumed endogenous variables. *p<0.1, **p<0.05, ***p<0.01.

Table 4. Dependent = Enrolment rates in 1995, $\ln(ENR_{95}^j)$

	OLS1	IV1	OLS2	IV2
	Secondary (j=s)		Tertiary (j=t)	
$\ln(p_{90})$	.034 (.028)	.187* (.101)	-.110** (.046)	-.351 (.247)
$\ln(ENR_{90}^{j-1})$	.960*** (.047)	.839*** (.119)	.893*** (.087)	1.082*** (.308)
$\ln(s_{90}^j)$	.024 (.085)	.605** (.305)	-.368*** (.076)	-.802 (.601)
<i>LINC</i>	-.602*** (.115)	-.861*** (.200)	-.141 (.192)	.304 (.776)
<i>MINC</i>	-.284*** (.086)	-.263* (.139)	-.134 (.141)	.025 (.318)
Region dummies	YES	YES	YES	YES
Uncentered R2	.99	.97	.95	.90
Nb of obs	85	85	58	58
Hansen J-test		.331		.233
1st stage F (1)		10.93		12.42
1st stage F (2)		3.09		5.54
ARW		.004		.409
Kleibergen-Paap		.131		.629
C-test		.017		.295

Heteroskedastic-robust Standard errors are reported between brackets. IV excluded instruments: log of population size, dummy for landlocked and rule of law measurement. Hansen J-statistic for overidentification test, First-stage regression F-statistics for instrument relevance, ARW stands for Anderson-Rubin-Wald Test statistics for instrument relevance, Kleibergen-Paap Statistics for underidentification test, C-test statistic for the exogeneity of assumed endogenous variables. *p<0.1, **p<0.05, ***p<0.01.

Appendix

Table A1: Variable Definitions and Data Sources

Variable	Definition	Source
s_{00}^p	Public subsidies per student as percentage of GDP per capita Primary level - Average 1996-2002	UNESCO, Institute for Statistics
s_{00}^s	Public subsidies per student as percentage of GDP per capita Secondary level - Average 1996-2002	UNESCO, Institute for Statistics
s_{00}^t	Public subsidies per student as percentage of GDP per capita Tertiary level - Average 1996-2002	UNESCO, Institute for Statistics
ENR_{95}^s	Net rate of school enrolment, secondary level in 1995	UNESCO, Institute for Statistics
ENR_{95}^t	Net rate of school enrolment, tertiary level in 1995	UNESCO, Institute for Statistics
ENR_{90}^p	Net rate of school enrolment, primary level in 1990	UNESCO, Institute for Statistics
ENR_{90}^s	Net rate of school enrolment, secondary level in 1990	UNESCO, Institute for Statistics
p_{90}	Emigration rate of college graduates	Docquier, Lowell and Marfouk (2009)
ϕ_{90}	Remittances per migrant in current USD in 1990 (in thousands)	IMF Balance of Payments Statistics
I_{90}	Dummy equal to 1 for the positive values of ϕ_{90}	Own calculations
Q	Percentage of universities in the top 4000 (x1000) (per 1,000 students in the tertiary education aged population)	http://www.webometrics.info
K_{90}	The level of capital stock in 1990	World Development Indicators (2008)
$RLAW_{96}$	Governance measure	Kauffman, Kray and Mastruzzi (2003)
$LINC$	Dummy for low-income status	World Bank classification
$MINC$	Dummy for middle-income status	World Bank classification
$REGD_i$	Regional Dummies	World Bank classification

Table A2: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
$\ln(s_{00}^p)$	79	2.302	.664	.264	3.436
$\ln(s_{00}^s)$	97	2.908	.824	.858	5.982
$\ln(s_{00}^t)$	121	1.367	.526	-.378	3.513
$\ln(ENR_{95}^s)$	129	3.786	.717	1.726	4.735
$\ln(ENR_{95}^t)$	123	1.962	1.281	-1.609	3.777
$\ln(ENR_{90}^p)$	128	4.505	.310	3.299	5.061
$\ln(ENR_{90}^s)$	129	3.686	.751	1.639	4.669
$\ln(p_{90})$	119	-2.208	1.442	-6.838	-.033
ϕ_{90}	101	6.680	29.625	0	259.051
$\ln(Q)$	93	-11.292	1.204	-14.239	-8.576
K_{90}	130	2.950	6.715	0	46.802
$RLAW_{96}$	132	-.322	.614	-1.450	1.253

Note: Number of variables changes for different regression model due to the availability of the data. Therefore, mean values of each variable are provided for their overall sample.

Chapter 3

Is National Citizenship Withering Away? : Social Affiliations and Labor Market Integration of Turkish Origin Immigrants in Germany and France^{17,18}

Abstract

There are around 3 million Turkish origin migrants in Germany and 400 thousand in France who have already raised their third generations. Nowadays they are even being named with their hyphenated identities, such as German-Turks and French-Turks. In the meantime, they encounter various obstacles in everyday life due to the stigmatization and securitization of migration and Islam. This is why their integration into the receiving societies is of great importance, as better social cohesion helps nurture the economic, political and social contribution of migrants to their countries of settlement. Using the data derived from a recent micro-level survey on Turkish-origin immigrants residing in Germany and France, the determinants of their social affiliations and employment probability as well as the impact of citizenship acquisition on their socio-economic integration is analyzed in this article.

Keywords: Turkish migrants, Citizenship, Affiliation, Economic Integration.

JEL codes: F22, O15, Z13.

¹⁷Written jointly with Ayhan Kaya (Istanbul Bilgi University).

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1. Introduction

The contemporary world is being shaped by tremendous flows of both capital and labor more than ever before. These flows brought about the need for efficient restructuring in the institutional frameworks of both destination and home countries, and still call for further changes in the structure of existing institutions. International migration of laborers after World War II had an important impact, especially on the institution of citizenship, which was and still is one of the highly debated issues. It is common to start discussing the institution of citizenship before and after the Second World War, which had an enormous impact on its transformation. (Marshall, 1950). In the aftermath of World War II, the right to citizenship was extended to women and children after men (Marshall, 1950). T. H. Marshall sociologically defined the institution of citizenship as an ideological tool employed by the modern capitalist state in order to contain social groups' claims in the civil, political and social domains. In other words, the Marshallian conception of citizenship could also be perceived as a form of *governmentality* in the Foucauldian sense¹⁹. The focus was on the ingredients of the skeleton of a nation, and therefore citizenship was granted to those who share common ethnic, religious, linguistic and cultural identities. Citizenship as a prescribed contract signed between a rights-holder and a certain nation-state was actually an exclusionary one, in the sense that migrants from other nations did not have any chance of having it. This discourse was dominant in the nation-states until the beginning of the 20th century, and especially started to lose its importance after the enormous migration flows emerging in the aftermath of WWII (Marshall, 1950; Brubaker, 1992; Turner, 1990; Bottomore, 1992; Heater, 1999).

2. Changing forms of Affiliation: Inclusive policies make sense!

Citizenship is not only about the enjoyment of rights as a full member of a political community (Marshall, 1950) and the performance of duties; it also confers an identity and a feeling of solidarity with other citizens. Thus, it can be argued that being a citizen is far from the aspiration of having more rights in today's post-modern world. It has also become a tool in the quest for recognition of one's differences, be they

¹⁹Governmentality refers to the practices which characterise the form of supervision a state exercises over its subjects, their wealth, misfortunes, customs, bodies, souls and habits. It is the art of governing (Foucault, 1979).

religious, ethnic, linguistic or other (İşın, 2008). Citizenship defines who belongs to the political community and who is excluded, who is welcome as a fellow citizen, and who remains an outsider. Besides, new social movements have also brought about the development of different layers of rights apart from civil, political and social rights, such as cultural and ecological rights (Turner, 1990 and 1993).

Soysal (1994) argues that national citizenship has lost its importance in the post-modern era since some of the basic rights, namely social and civil rights linked to the institution of citizenship, are now given automatically by post-modern membership to those who are not even the citizens of a specific nation-state. This is what Hammar (1990) calls ‘denizenship’, which is granting migrants civil, social and cultural rights, but not political ones. Apart from political rights, all other rights are secured by international institutions and, therefore, it is argued that the nation-state has recently lost its power-stick of loyalty for its members. Moreover, Soysal (1994) points out the fact that increasing restrictiveness is a common feature of European immigration laws, especially for non-EU migrants. However, the complicated process of citizenship acquisition is still questionable under these conditions.

We believe that an empirical analysis which investigates the impact of citizenship on the socio-economic integration and affiliation of migrants is promising and timely. Besides, it is plausible to deal with migrants with the same country of origin in terms of overcoming the measurement problems raised by comparison of different migrant groups, although general conclusions cannot be drawn without caution from this study with regard to the situation of other migrant groups.

In the light of the literature review, this paper argues that the institution of national citizenship did not actually lose its importance but has even required further substance for the emergence of a more cohesive and egalitarian society. By providing a link between the two streams of the literature, this paper aims to analyze the impact of citizenship on employment probabilities and different affiliations of Turkish-origin immigrant populations settled in Germany and France together with revealing the link between employment and citizenship status from an empirical perspective. Although it is argued that post-national membership already provides many social, civil, cultural and ecological rights to migrant populations, which causes devaluation in the importance of holding national citizenship for those migrants, we claim that

the institution of citizenship still has power over the social, political and economic integration and assimilation of migrants if the subjective evaluations of migrants towards their own affiliations are taken into consideration. Therefore, citizenship continues to be an important instrument for governments to provide incentives for the migrant population to make them more attached to their countries of residence and more active in the economic setting of the host country. Hence, empirical analysis which investigates the impact of citizenship on socio-economic integration is essential.

Since the paper focuses on the impact of citizenship on both social and economic integration of migrants of Turkish origin residing in Germany and France, the following sections will review the relevant literature and the historical developments in the institution of citizenship in both countries. Subsequently, we will describe the data and econometric methodology used in our analysis. Consequently, the results of our analysis will be presented in the last section.

Increasing flows of international migration from the third-world countries to some European countries in the aftermath of WWII gave rise to the formation of a new type of membership in the European nation-states. These flows caused local people to face new ethno-cultural and religious identities in a way that brought about a need for immigrants to be respected through their differences by the receiving majority societies. The increasing intervention of international institutions in securing the social and civil rights of immigrants brings up various doubts about the importance of the national citizenship institution for immigrants themselves. Soysal (1994: 119) claims that "the scope and the inventory of non-citizens' rights do not differ significantly from those of citizens, and the rights of non-citizens are increasingly standardized across host policies." Thus, according to this analysis, it seems that migrant origin workers do not need national citizenship in their destination countries in order to have membership rights and privileges. However, we argue that it should be the aim of destination countries to establish optimal migration policies, which should include easing citizenship acquisition to those immigrants who already have rights and privileges of citizenship via their mode of residence, since this will provide them with greater incentive to be more closely connected to the native society.

Hypothesis 1: More inclusionary policies lead migrants and their descendants to be more affiliated with receiving countries.

3. Segregationist and Integrationist Models at Work: Germany and France

A question often heard when any revision of citizenship is suggested is: "What about our national identity?" In fact, citizenship and nation are two imbricate institutions. National identity, like all other identities, is dynamic, fluid and syncretic, and should not be prescribed. Our identity, be it national, individual, political, communal or ethnic, is shaped by the acts of recognition, unrecognition or misrecognition of "others" (Taylor 1994: 25). The human mind develops in a dialogical way, but not in a monological way. We can construct our identities only if we are able to experience others' reactions to our attitudes and behavior. Thus, it is impossible to build an identity without a dialogue with the "other." If a nation prescribes a holistic notion of culture²⁰, then it would be remarkably difficult for new-comer groups to incorporate themselves into the existing social and political system without major resistance from the majority society. Prescribing, thus essentializing, the nation may inevitably lead its members not to recognize newcomers whom they consider to be ethno-culturally and religiously different. Unrecognition of newcomers may result in the construction of radical and centrifugal identities, and thus in conflict. In other words, as Kymlicka and Norman have remarked, "immigrant groups that feel alienated from the larger national identity are likely to be alienated from the political arena as well" (2000: 39). Traditional citizenship rhetoric is inclined to advance the interests of the dominant national group at the expense of immigrant origin populations as well as native ethno-cultural and religious minorities.

The idea of the nation-state, originating from the holistic notion of culture, is essentially rooted in a "name," a common ancestry, a set of common historical memories and myths, a national anthem, a common territory for which the "forefathers" have died, a national economy, and a set of common legal rights and duties (Smith, 1995). Accordingly, foreigners such as 'guest workers,' asylum seekers or refugees,

²⁰Anthropologically speaking, there are two principal notions of culture. The first one is the holistic notion of culture, and the second is the syncretic notion of culture. The former considers culture a highly integrated and grasped static 'whole'. This is the dominant paradigm of the classical modernity, of which territoriality and totality were the main characteristics. The latter notion is the one which is most obviously affected by increasing interconnectedness in space. This syncretic notion of culture has been proposed by contemporary scholars to demonstrate the fact that cultures emerge in mixing beyond the political and geographical territories. For further information on this discussion, see Kaya (2001).

who migrated to the West in large numbers during the post-war era, have been somehow excluded from civil, social, political and cultural rights. It should be kept in mind that traditional citizenship rhetoric is inclined to advance the interests of the dominant national group at the expense of immigrant origin populations as well as native ethno-cultural and religious minorities. The model of national citizenship, which is linked to territorialized notions of cultural belonging and primordial loyalty, has been dominant during the period of massive migration since the turn of the twentieth century. However, the recent experience of transnational migrant workers reflects "a time when national citizenship is losing ground to a more universal model of membership, anchored in deterritorialized notions of persons' rights" (Soysal 1994: 3).

Although permanent residents, denizens, have certain privileges of having civil, social, ecological and cultural rights, which may lead one to argue that granting them citizenship will not improve their rights and, therefore, there is no need to privilege them with citizenship, our empirical analysis shows that acquiring citizenship has a positive impact on the social assimilation of immigrants towards their country of settlement.

In Germany, non-EU immigrants and even their offsprings were not easily able to obtain citizenship until the year 2000, and this exclusionary discourse of citizenship caused Turkish origin immigrants to strengthen their ethnic capital both in Germany and across the national borders (Kaya, 2009; Joppke, 2005). The new law has partially changed the principle of descent (*jus sanguinis*) that has so far been the country's traditional basis for granting citizenship. Now, it is also possible to acquire German citizenship as a result of being born in Germany (*jus soli*). According to the new law, children who are born in Germany to foreign nationals will receive German citizenship when one of the respective child's parents has resided lawfully in Germany for at least eight years and holds entitlement to residence, or has an unlimited residence permit for at least three years. Under the new law, such children acquire German citizenship at birth. The new law also created a transitional arrangement for children up to the age of 10 who were born in Germany before the 'Act to Amend the Nationality Law' was enacted, according to which those children were entitled to automatic naturalization. In most cases, they also acquire their parents' citizenship under the principle of descent. Such children now have to decide within five years of turning 18 - before

their 23rd birthday - whether they want to retain their German citizenship or not. They must opt for one of their two nationalities.²¹

It is apparent that the number of ‘foreigners’ applying for naturalization in Germany has greatly increased since the introduction of the new citizenship laws. For instance, while the number of Turkish origin immigrants who were naturalized before 2000 was around 300 thousand, now this number has almost tripled and become more than 900 thousand in ten years. The new citizenship laws permit the descendants of Turkish migrants to acquire dual citizenship for at least a certain period of time. The present legal reforms enable German-born ‘foreigners’ to go beyond their previously defined ‘denizen’ status (Joppke, 2005). They can thus enjoy political as well as civic, social, cultural and environmental rights. Hence, the present German citizenship laws have created a possibility for the introduction of a kind of limited "hyphenated" citizenship for non-European ‘foreigners’ as well as for those of Turkish origin. The partial introduction of the principle of *jus soli* clearly indicates that the definition of Germanness is no longer limited to ethnic descent. It also suggests that ethnically non-German and non-European members of the Federal Republic can be incorporated into the political sphere through civic channels.

One could argue that citizenship reforms in Germany have become more restrictive since 2000 due to concerns about terrorism, Muslim origin immigrants and adherence to Western values. The introduction of the ‘attitude test’ (*Gesinnungstest*) by the state of Baden-Württemberg in 2006 was the first step towards a more restrictive regime of citizenship towards Muslim-origin migrants and their descendants, who are asked for their views on issues like domestic violence, arranged marriages, religious freedom and terrorism.²² The citizenship test became a national exercise in August 2007 as the amended Nationality Act came into effect. It was stated by the Federal Ministry of the Interior that knowledge of German civic values will now be required for naturalization. The definition of civic values includes having basic knowledge of the legal and social order and the way of life in Germany as well as competency in the national language (Federal Ministry of the Interior, 2007). The 2007 amendments mark a setback from the 2000 Citizenship Law in the sense that this new

²¹For a detailed account of the contemporary German Nationality Law, see the German Interior Ministry, http://www.bmi.bund.de/Internet/Content/Common/Anlagen/Gesetze/Staatsangehoerigkeitsgesetz__englisch accessed on April 2, 2011.

²²See <http://www.integration-in-deutschland.de/> accessed on May 3, 2011.

civic-based citizenship has now turned the pre-2000 blood-based restriction on citizenship into a restriction based on ‘values’. The so-called civic integration seems to be discriminatory to Muslims, who are negatively targeted as an ethnic group in Europe under the guise of liberalism (Joppke, 2007). Stigmatization of migrants of Turkish origin still remains the same. In his critique of Thilo Sarrazin’s highly polemical book *Germany Does Away With Itself* (*Deutschland schafft sich ab*, 2010), Habermas (2010) states that German *Leitkultur* (leading culture) is recently being defined not by “German culture” but by religion: “With an arrogant appropriation of Judaism — and an incredible disregard for the fate the Jews suffered in Germany — the apologists of the *Leitkultur* now appeal to the ‘Judeo-Christian tradition,’ which distinguishes ‘us’ from foreigners.” Referring to genetic arguments, Sarrazin claims in his book that the future of Germany is threatened by the wrong kind of immigrants, especially from Muslim countries. Although his arguments are based on conventional racist rhetoric, he was highly credited by German society for securitizing citizenship (Habermas, 2010). His racist arguments were later followed by German Chancellor Angela Merkel’s discourse on “the end of multiculturalism” in contemporary Germany, and Bavarian Prime Minister Horst Seehofer’s hate speech against migrants coming from Turkey and Arab countries (Habermas, 2010).

Unlike Germany, France has historically defined citizenship in political rather than ethno-cultural terms since the French Revolution, and invited all foreigners, “Friends of Liberty”, to join the French State. The decree of 26 August 1792 granted French citizenship to foreigners who by their writings or acts had defended liberty and the principles of the revolution. Alongside the principle of *jus sanguinis* attributing automatically citizenship to those born in France to French parents, the revolutionaries attributed to the principle of *jus soli* specific conditions which guaranteed attachment and loyalty to France. The dominance of the principle of *jus soli* has remained the same since the revolution. While the 1851 citizenship law gave French citizenship to third-generation immigrants, the 1889 citizenship legislation automatically attributed French citizenship to second-generation immigrants (Brubaker, 1992: 85-86). The 1889 law, with small modifications, still exists today. French citizenship law contains two provisions embodying the principle of *jus soli*: Article 23, attributing citizenship at birth to third-generation immigrants, and Article 44, attributing citizenship at age 18 to second-generation immigrants born in France and resident there since aged 13, provided they have not opted out of French citizenship during the

preceding year and they have not been convicted of certain crimes. French citizenship law also permits double citizenship.

Despite its embracing integrationist policies vis-à-vis immigrants and their descendants, French citizenship law has lately been criticized by nationalists for turning foreigners into French citizens on paper without making sure that they were "French at heart" (*Français de Coeur*). Nationalist critiques of the *jus soli* principle have become even stronger since the early 1990s, when so-called Islamic fundamentalism has been escalating in the West (Kaya, 2009).

For a century, France has defined second generation immigrants as citizens. This practice was uncontested until recently. In the mid-1980s, however, *jus soli* came under sharp attack from the far right. "*Etre Français, cela se mérite*" (To be French, you have to deserve it), proclaimed Jean-Marie Le Pen's National Front. Under pressure from the National Front, the center-right parties took up the theme during the 1986 legislative campaign, proposing in their joint platform to denounce 'automatic' acquisitions of French citizenship. Second generation immigrants would no longer become French *jus soli*, they would have to express a demand for French nationality, which would have to be accepted by the state. In the late 1980s, the government of Jacques Chirac proposed to limit the *jus soli* principle as far as immigrants were concerned. Yet the proposal provoked strong opposition and was eventually withdrawn from the legislative agenda. A commission of enquiry was set up, which put forward the idea of extending rather than further restricting access to French citizenship (Brubaker, 1992: 138). The Commission's report formed the basis for Law No 93.933, in force since July 22nd, 1993. The most important reform introduced the notion of consent by stating that "persons born in France of foreign parents can acquire French citizenship between the ages of 16 and 21 by declaration if the five years residence requirement and the non-convictions required are satisfied." Persons who have expressly declined French citizenship during the year preceding their majority and persons who have been convicted of certain crimes are excluded from this provision.

In France, naturalization is secondary to the acquisition of citizenship. In contrast to the declaration, the naturalization procedure is discretionary, i.e., subject to the control and approval of the administration. The naturalization procedure in

France requires five years of permanent residence, majority, linguistic competence, assimilation into the French community, and good morals and customs, meaning no prison sentences of more than six months or offences or crimes against national security. Unlike many other countries, France does not require candidates for naturalization to renounce their original citizenship. The requirements for naturalization are founded on a presumption of assimilation, attachment and loyalty of foreigners settled in France. Thus, the administration usually rejects demands of naturalization by foreigners whose family members live abroad.

Hypothesis 2: Long-lasting exclusionary migration and integration policies of Germany on migrants and their descendants make German-Turks less affiliated with Germany; however, inclusionary policies of France make French-Turks more affiliated with France.

4. Economic Integration: Employment and Citizenship

The literature in political science mainly focused on the importance of the citizenship institution and the concept of citizenship itself for a long time (*cf.*, *inter alia*, Marshall, 1950; Turner, 1990; Brubaker, 1992; Taylor, 1994; and Soysal, 1994). On the other hand, the literature on the economics of citizenship has recently emerged, and mainly explores the impact of political and social integration of immigrants on their economic outcomes without necessarily questioning the determinants of social and political integration (*inter alia*, Bratsberg et al., 2002; Scott, 2006; Zimmermann, 2007). The literature on the economics of citizenship can be divided into two main parts. On the one hand, there is a literature which focuses on the earnings catch-up of immigrants that we could describe as “economic assimilation research.” On the other hand, there is another stream of literature which focuses on the economic impact of citizenship on earnings and employment.

Chiswick (1978) analyzes the economic integration of immigrants in the sense that he looks at the convergence between earnings of native and immigrant workers, and finds out that the positive impact of naturalization on earnings fades away when it is controlled by the years of residence. Besides, Bratsberg et al. (2002) have revealed a positive impact of citizenship acquisition on the earnings of the immigrant male population. All these implications lead to policy suggestions towards easing the citizenship acquisition of migrants. DeVoretz and Pivenko (2006) also analyze the

impact of naturalization on wages in the Canadian case and find a positive relation between citizenship and wages of immigrants. However, they do not control the endogeneity problem. Furthermore, Steinhardt (2008) finds that naturalization plays a crucial role by increasing the labor market opportunities of immigrants in Germany, and he employs both cross-sectional and panel-data settings. Bratsberg et al. (2002) and Scott (2006) also find a positive effect of naturalization on earnings of immigrants in the USA and Sweden, respectively.

Although there is a considerable amount of knowledge about the economic assimilation of migrants and the impact of naturalization on the economic integration of immigrants, there is a lack of information on this issue with regard to the immigrants in European countries. Steinhardt (2008) looks at this impact for Germany and concludes that citizenship matters. In our study, we focus on Turkish immigrants both in Germany and France. Our results for Germany confirm the results of Steinhardt (2008). Last but not least, Euwals, Dagevos, Gijsberts and Roodenburg (2010) try to investigate the impact of citizenship on the labor markets using survey data on Turkish immigrants in Germany and the Netherlands. However, they do not deal with the reverse causality problem in their empirical analysis. To our knowledge, there are no other empirical studies focusing on the impact of naturalization in France. Moreover, as Dustmann (1996) also points out, there is little information about the socio-cultural assimilation of immigrants, although it breaks down the barriers to full economic participation. By exploring the migrants' subjective feelings of integration, he provides an empirical analysis of the determinants of their integration using data on Germany. DeVoretz (2008) focuses on the developments of the research in the economics of immigrants' citizenship acquisition and on the importance of interdisciplinary research on this topic. He also analyzes whether naturalized German citizens earn higher incomes and concludes that there are significant economic gains from citizenship ascension. Since the related literature underlines the importance of the social integration of immigrants, it is necessary to analyze the determinants of affiliations of migrants, which will have a direct or indirect effect on their economic integration together with the achievement of a more cohesive society in the destination countries.

Although there are different aspects of a comprehensive answer to the question, "Why does integration of immigrants matter?" it can be argued that the main reason is to have a more cohesive society, which brings out some positive outcomes like

economic and fiscal contributions of migrant origin individuals. Knowledge about the determinants of different affiliations of immigrants is also important to explain and foresee migrants' return behavior, to shape political, social and migration policy debates. Moreover, the pervasive belief of migrants being problematic for many European countries can only be confirmed with the research on the subject.

Zimmermann (2007), for example, analyzes the economic impact of integration, and concludes that integrated migrants have more global opportunities and better employment and income potentials. Moreover, participation in the labor market can be seen as an indicator of economic success in the destination countries, which also has many positive spillover effects in terms of the integration of migrants to the society, such as improving welfare, becoming familiar with the culture of the receiving society, and so on. Furthermore, Bauböck (2005) argues that political integration of immigrants was the main motivation factor in non-citizen franchise for Scandinavia and the Netherlands. Besides, Walters, Phythian and Anisef (2007) try to identify the link between ethnic identity, economic success and other determinants of ethnic identity using cross-sectional data. They found out that citizenship status has high relevance in adopting the identity of their host country.

Hypothesis 3: Since citizenship ownership sends a signal to employers about the lower probability of return behavior of migrants and their descendants together with the satisfaction of the other eligibility criteria, especially for the first generation immigrants, it increases the probability of being employed.

5. Data and Methodology

Data used in the empirical analysis is obtained from the results of structured interviews²³ conducted with 1,065 interlocutors in Germany (2004) and 600 in France (2004). However, the total number of observations is a reduced size of this whole dataset, because we had to exclude from the data people who had already applied but were still waiting for citizenship, so as not to cause any bias in our results. Pooled data is used in the empirical analysis in order to increase the number of observations for the analysis. It is also crucial to note that the questionnaires and the data collection method were the same in both countries, which enables the comparability of the survey data between France and Germany. A detailed description of the data and the manner in which it was collected is provided in the Appendix. Besides, Table 1 below provides the descriptive statistics about the main variables that are used in the analysis.

The aim of the empirical section is to explore the link between citizenship acquisition and socio-economic integration of immigrants in their destination countries after controlling for a range of individual characteristics and country fixed-effects. In the first subsection of the empirical part, we would like to analyze the impact of having citizenship of the destination countries on the engagement of different affiliation²⁴ types of the immigrant population after controlling other potential determinants of a migrant's affiliation. Therefore, our dependent variables will be the four affiliation types which are actually derived from subjective answers to the question, "Do you feel yourself affiliated closer with the destination country or with Turkey?" If the interlocutor who is interviewed answered that s/he feels closer to Turkey, then her/his affiliation is classified as *segregated*. If the answer favors the receiving country instead of the home country, then s/he is classified as *assimilated*. If the interviewee says that s/he feels equally close to both destination country and Turkey then s/he is classified as *integrated*. Lastly, s/he is classified as *marginalized* if s/he feels equally distant

²³Structured interviews enable reliable comparative research since they ensure that each respondent is faced with the same questions in the same order.

²⁴The term affiliation is used here to mean psychological contiguity, attachment or sympathy towards a country in comparison to the other. In that respect it reflects the feeling of identity of migrants with the receiving country relative to their origin countries. Affiliation categories that are described and used in this paper (separation, assimilation, integration and marginalization) are referred to acculturation states or the acculturation process that are commonly used in cross-cultural psychology literature. See Berry (1997) for details.

from both countries. As we mentioned earlier, this classification is in accordance with the acculturation model of Berry (1997). Although we know that socio-cultural integration is a more complex phenomenon than what this model suggests, we used it in order to be in line with the literature.

TABLE 1: DESCRIPTIVE STATISTICS*

	Full Sample	Germany (citizens only)	Germany (citizens only)	France (citizens only)
# Observations	1544	991	279	553
Age**	36.15	36.52	32.48	35.51
Gender (=1 if male)	54.08	54.79	47.31	52.80
Language Proficiency				
Reading and writing (good)	53.89	55.60	78.06	50.59
Speaking and understanding (good)	57.06	57.98	79.57	55.37
Network (=1 if exists)	79.73	82.44	93.55	74.86
Education Level***				
Primary	23.19	20.68	7.53	27.67
Lower Secondary	26.68	32.90	37.63	15.55
Upper Secondary	35.43	33.70	44.80	38.52
Tertiary	9.84	8.48	8.60	12.30
Social Activities (=1 if participated)	35.30	38.55	40.86	29.48
Citizenship				
Nationality of the host country	31.99	28.15	100	38.88
Employment (=1 if employed)	44.55	38.83	46.95	54.79
Affiliation Types				
Segregated	45.14	50.35	29.03	35.80
Assimilated	22.47	21.19	36.20	24.77
Integrated	29.47	25.63	30.82	48.14
Marginalized	2.91	2.82	3.94	3.07
First Generation	66.39	64.89	44.44	69.08
Second Generation	33.61	35.11	55.56	30.92

*Values represent percentages out of total population in each sample.

** Mean age for each group.

***Educational level categories are exclusionary but the total may not give 100 percent since there could be some missing in the data or people without a diploma.

In the second part of the empirical analysis, we estimate the impact of citizenship on the employment probabilities of immigrants in their destination countries. Employment variable is a dummy variable which is equal to 1 if the respondent reported to be working. Students, housewives and retired people are excluded from this sample even if they may have part-time employment. As it can be realized already, there is a potential problem of endogeneity in estimating both cases. For the impact of citizenship on affiliation types, one can argue that, although a person's status of membership affects her/his attitude towards the society s/he lives in, the opposite may also be true. For example, people who are assimilated in the destination country could be eager to obtain citizenship of the country of residence. Moreover, one can argue that employed people would like to apply for citizenship since it would be easier for them to be naturalized. Due to this potential reverse causality problem, we decided to use second-stage procedure for our multinomial-probit and probit models, which led us to choose a reliable and valid instrument for the citizenship variable. In other words, instruments should have a high correlation with the potentially endogenous variable but should not have a correlation with the error term.

We used a dummy for immigrants who immigrated due to family reunification as an instrument for citizenship variable in both analyses. For both of the countries concerned, family reunification is a facilitating source of naturalization. However, it is not easy to talk about a direct impact of it, either on affiliation types or employment probability. One may argue that immigrants who came to the host country by means of family reunification would have a better environment in which to be integrated or assimilated, because the people who had immigrated before them can be a good example in showing how to socialize and integrate in the receiving country. However, this mechanism could work in other ways as well, and one may argue that early immigrants could result in segregation of the later-comers if they were not successful in their integration process. We also used other instruments for the robustness analysis, such as the year of eligibility for citizenship considering the minimum years of residence for naturalization in both countries. A similar instrument is also used by Bevelander and Pendakur (2009) in their analysis of the impact of citizenship on the employment probabilities of the migrant population in Sweden. We also used instruments such as dummy variables for the return decisions of migrants and some indicators for the economic well-being of migrants. However, the instrument that we chose to use provides the best statistics in terms of first-stage results and, moreover,

it has the advantage in comparison to the other instruments in terms of its economic validity, since the above mentioned instruments have a direct link with the social and economic integration of immigrants. All in all, we can say that lack of availability of a more relevant and valid instrument makes it difficult to talk about a causal link, but rather we can interpret more on the correlation outcomes.

Since we have four separate affiliation groups, the multinomial probit model is employed in analyzing the impact of citizenship on these affiliation types. However, in the analysis of the effect of citizenship on employment probability, we employ the probit model since our dependent variable is a binomial one. Moreover, Mallar (1977)'s procedure is employed in both estimations to find efficient and consistent results from the regression analysis, because the endogenous dummy variable (citizenship status) is a discrete variable. Following Mallar's procedure we first run first-stage probit regressions using the instruments and all the other explanatory variables;

$$\begin{aligned} P(CITIZENSHIP|\mathbf{x}, \mathbf{z}) &= P(CITIZENSHIP = 1|x_1, x_2, \dots, x_k, \mathbf{z}) \\ &= \Phi\{\alpha_0 + FE_c + \mathbf{x}\boldsymbol{\beta} + \mathbf{z}\boldsymbol{\delta}\} \end{aligned} \quad (26)$$

,where $\mathbf{x}$ represents the vector of exogenous explanatory variables, $\mathbf{z}$ is the vector of the instruments, and FE_c stands for the country fixed effects. Φ is the standard normal cumulative distribution function (cdf), which is strictly between zero and one for all values of the parameters. An index of linear prediction of the endogenous variable is constructed from the first-stage results. It is important to note that index is a linear function of all exogenous explanatory variables but not the predicted probability of a 1-outcome of the first-stage dependent variable. In other words, the index is the estimation of $CITIZENSHIP^*$ from the first-stage probit but not the estimate of $CITIZENSHIP = 1[CITIZENSHIP^* > 0]$. After obtaining the linear index from the first-stage, we substitute this index for the endogenous variable in the second-stage estimation, and then maximize the marginal likelihood function with respect to the structural parameters.

$$\begin{aligned}
P(y|\mathbf{x}, CITIZENSHIP^*) &= P(y = 1|x_1, x_2, \dots, x_k, CITIZENSHIP^*) \\
&= \Phi\{\boldsymbol{\alpha}_0 + FE_c + \mathbf{x}\boldsymbol{\beta} + \boldsymbol{\delta}CITIZENSHIP^*\} \quad (27)
\end{aligned}$$

This method provides consistent estimates with large samples. However, we need to take care with the reliability of standard errors and t-statistics since performing the second-stage procedure manually is likely to give unreliable standard errors. Re-sampling the whole procedure takes place by means of bootstrap. Thus, valid standard errors are obtained by estimating the same equation using different samples drawn from the original data, which is assumed to be a population; bootstrap standard errors are the sample standard deviations of the parameter obtained from the repeated re-sampling and estimation as the number of bootstrap replications (Wooldridge, 2009). In estimations, we employed 300 bootstrap replications. The number of replications is arbitrarily chosen, however the idea is that the higher the number of replications, the better would be the estimate of standard errors.

6. Results

In this section, we will present the results of the empirical analysis. Firstly, the impact of citizenship on different affiliations will be summarized. Subsequently, the link between employment probability of migrants and their citizenship status will be revealed.

6.1 Impact of Citizenship on Different Affiliations

In our multinomial probit models, we aim to find the determinants of response probabilities, or in other words, if a person defines himself/herself as segregated, assimilated, integrated or marginalized:

$$\begin{aligned}
P(y_t|\mathbf{x}, CITIZENSHIP^*) &= \Phi\{\boldsymbol{\alpha}_0 + \boldsymbol{\alpha}_c + \boldsymbol{\alpha}_1CITIZENSHIP^* + \boldsymbol{\alpha}_2network \\
&\quad + \boldsymbol{\alpha}_3gender + \boldsymbol{\alpha}_4age + \boldsymbol{\alpha}_5agesq + \boldsymbol{\alpha}_6foreignlang_{rw} \\
&\quad + \boldsymbol{\alpha}_7foreignlang_{us} + \sum_{j=8}^{10} \boldsymbol{\alpha}_jeducationlevel \\
&\quad + \boldsymbol{\alpha}_{11}socialactivity\} \quad (28)
\end{aligned}$$

, where t denotes the type of the individual which can take four different values (a, i, s and m) and a, i, s and m stand for four different affiliation types, respectively for assimilation, integration, segregation and marginalization. $\mathbf{x}$ is the full set of explanatory variables. α_0 and α_c are constant and country fixed effects, respectively. As in the previous section, $CITIZENSHIP^*$ is the linear prediction of citizenship variable from the first-stage regression. The variable *network* indicates whether immigrants had a member of the family or friend before migrating to the host country. *gender* is a dummy variable, which is equal to 1 if the migrant is male. *age* is a continuous variable for the age of the respondent and *agesq* is the squared transformation of the variable age, which is added to include the concavity of the age value into estimation. Moreover, *foreignlang_{rw}* and *foreignlang_{us}* are, respectively, the dummy variable for the reading and writing ability of the respondent in the language of destination country, and a dummy variable for the understanding and speaking ability of the language used in the receiving country. Furthermore, $\sum_{j=8}^{10} \alpha_j educationlevel$ stands for the dummy variables stating the latest education diploma for the immigrant (lower secondary, upper secondary and tertiary education). The excluded category for the education level is primary level and, therefore, estimation results for the different categories should be compared to the excluded category. Lastly, *socialactivity* the socialactivity variable indicates whether or not the respondent is participating in social activities in the host country.

Assuming that response probability will be nonlinear in the set of explanatory variables, and further assuming that this non-linear function will have standard normal cumulative distribution function, we decided to use the multinomial probit model. It is also important to note that our interest in the regressions is not coefficients from the regressions above. Rather, we presented average partial effects for each explanatory. Moreover, it could also be argued that there is a probability for movements among these different classifications of affiliations over time. However, this intermingling will not be considered due to the cross-sectional structure of our data. Being aware of this obstacle, we believe that cross-sectional analysis will provide hints for further research on the same topic. Tables 2a and 2b present the marginal effects from each regression equation.

In Table 2a, we present marginal effects from multinomial probit estimations and in Table 2b, we give marginal effects from two-stage multinomial probit results where

we control the endogeneity problem. As can be seen from Table 2a, for those who have citizenship of the country they live in, marginal effect on their segregation is -.129. Thus, citizenship has negative and significant causal impact on segregation of immigrants and their descendants from the destination country. The impact of citizenship on the probability of being assimilated is also found to be significantly positive. The same impact is positive but not statistically significant for the integration of migrants. Lastly, according to IV- multinomial probit results, it is revealed that citizenship possession has a negative impact on the probability of being marginalized after controlling the reverse causality. Thus, it can be said that citizenship status has undeniable impact on the different affiliation categories of migrants and their descendants, thus our Hypothesis 1 is satisfied.

TABLE 2a: AVERAGE MARGINAL EFFECTS FROM MULTINOMIAL PROBIT REGRESSIONS

	SEGREGATION	ASSIMILATION	INTEGRATION	MARGINALIZATION
Age	-.003	.005	-.002	-.000
Age squared	.000	-.000	.000	-.000
Gender (=1 if male)	.074**	-.007	-.066**	-.0003
Language Proficiency				
Reading and writing (good)	-.059**	.0001	.057**	.001
Speaking and understanding (good)	-.069**	.051**	.021	-.002
Network (=1 if exists)	-.027	.042	-.025	.010
Education Level				
Lower Secondary	-.013	-.010	.013	.010
Upper Secondary	.050	-.086**	.026	.009
Tertiary	.106**	-.133**	.039	-.012
Social Activities (=1 if participated)	-.023	-.011	.032	.001
Citizenship				
Nationality of the host country	-.129***	.103***	.026	-.001
Country Dummy (=1 if participated)	-.140	.030	107***	.002
# Observations	1485	1485	1485	1485

Moreover, for those migrants who already have a family member preceding their migration, it is discovered that there is a negative average marginal effect on migrants' segregation, although it is not statistically significant. The same effect is found to be positive and statistically significant for the marginalization probability of migrants when we control the endogeneity in Table 2b. This is an important finding, since it can lead to an argument that ethnic capital may be harmful for the integration process of migrants and, therefore, destination countries could try to find some ways to cope with this issue. In this regard, the exclusionary ghettoization politics of many destination countries is open to revision.

When we look at the impact of gender in multinomial probit regression, it is discovered that men on average have .074 percentage points more probability of being segregated and .066 percentage points less probability of being less integrated into the society in comparison to women. This could be due to the fact that they are more incorporated into ethnic labor markets in destination countries instead of working in mainstream jobs, and thus have less interaction with the receiving society as a whole. Furthermore, the impact of higher level of education (both upper secondary and tertiary levels) in comparison to the primary school educated migrants is positively correlated with segregation, and is found to be negatively correlated with the assimilation of migrants according to the IV-multinomial estimation results.

TABLE 2b: AVERAGE MARGINAL EFFECTS FROM IV-MULTINOMIAL PROBIT REGRESSIONS

	SEGREGATION	ASSIMILATION	INTEGRATION	MARGINALIZATION
Age	-.009	.012**	-.002	-.001
Age squared	.0001*	-.0002**	.000	.000
Gender (=1 if male)	.041	.040	-.066**	-.016
Language Proficiency				
Reading and writing (good)	-.068**	.008	.058**	.001
Speaking and understanding (good)	-.074**	.051**	.024	-.001
Network (=1 if exists)	.033	-.039	-.028	.034*
Education Level				
Lower Secondary	.104	-.160**	.004	.052*
Upper Secondary	.202**	-.285***	.015	.068*
Tertiary	.273**	-.346***	.024	.047
Social Activities (=1 if participated)	-.011	-.027	.032	.005
Citizenship				
Nationality of the host country	-.180**	.228**	.014	-.061*
Country Dummy (=1 if participated)	-.086*	-.048	.106**	.027*
# Observations	1485	1485	1485	1485
Bootstrap Replications	300	300	300	255

Moreover, language proficiency in speaking and understanding is found to have a positive effect on the assimilation probability of migrants. On the other hand, reading and writing abilities have significantly positive impact on the integration probability of migrants. And lastly, all kinds of language abilities were found to be negatively and significantly important for the segregation probability of migrants, which is understandable since it enables immigrants to communicate better with their surroundings. Furthermore, country dummy reveals that, everything else controlled, immigrants in France have less probability of being segregated in comparison to their counterparts in Germany according to the IV-multinomial probit model. Interestingly, it is also revealed that immigrants in France have a higher probability of being integrated in comparison to migrants in Germany. These findings are also in line with our hypothesis 1.

6.2 Impact of Citizenship on Employment Probability

In this part, we implement again Mallar (1977)'s procedure of two-stage using probit regressions in the second-stage of the estimation. Dependent variable is the dummy variable for employment and regressors are as in the section above. The definitions of the independent variables are same as in the previous section.

In Table 3, we present the marginal effects from the three estimation models. In column 1, probit estimation results are presented, and in column 2, IV-probit results are given. Lastly, in column 3 we repeated the IV-probit estimation by excluding the education dummies as control variables, because there could be strong incentive to acquire human capital if they are planning to apply for citizenship. It can be observed from the comparison of column 2 and column 3 that there is no significant impact of excluding education categories from the regression.

TABLE 3: MARGINAL EFFECTS FOR EMPLOYMENT PROBABILITY

	PROBIT	IV-PROBIT 1	IV-PROBIT 2
Age	.054***	.051***	.051***
Age squared	-.001***	-.001***	-.001***
Gender (=1 if male)	.283***	.372***	.340***
Language Proficiency			
Reading and writing (good)	-.016	-.098*	-.069**
Speaking and understanding (good)	.069**	-.008	.023
Network (=1 if exists)	.001	-.089	.046
Education Level			
Lower Secondary	.072*	-.042	—
Upper Secondary	.084**	-.086	—
Tertiary	.034	-.111	—
Social Activities (=1 if participated)	.021	.009	.060
Citizenship			
Nationality of the host country	.037	.347*	.211**
Country Dummy (=1 if participated)	.149***	.001	.062*
# Observations	1483	1483	1483
Bootstrap Replications	—	300	300

As can be seen from Table 3, citizenship ownership has a positive and significant impact on the probability of employment for immigrants in IV specifications. For the age structure, it is seen that increase in the average age (see Table 1) has a positive impact on the probability of being employed up to a threshold level, and then affects negatively due to a significant and negative coefficient of age squared. Moreover, men are found to have greater likelihood to be employed. This could be due to the educational difference between men and women, or because of the patriarchal family structure of the Turkish origin immigrants, which is more likely to imprison women at home to deal with housework. Furthermore, education level is found to have a positive impact on the employment probability in probit estimations. For the IV estimations, we could not find significant results for the employment probabilities of migrants. In addition, country dummy indicates that it is easier for migrants to be employed in France than in Germany. This could be due to inclusionary policies of France towards immigrants. To sum up, naturalization has a positive impact on the labor market position of immigrants after controlling for other personal characteristics, and this confirms our Hypothesis 3 above.

7. Conclusion

As we have discussed earlier, citizenship defines who belongs to the political community and who is excluded, who is welcome as a fellow citizen and who remains an outsider. Therefore, the institution of national citizenship could provide migrants with an incentive to be both socially and politically more attached to the country of residence. As it is well-documented by the migration studies literature, social integration of migrants in terms of having better knowledge of the language of the country they live in, and being more acquainted with the social norms in the society can have positive impacts on their integration to the labor markets in their destination countries. In that sense, it would be interesting to see if citizenship has a positive spillover impact on economic integration by strengthening social integration and/or assimilation. However, this does not necessarily mean that linguistic and cultural integration automatically results in economic integration of immigrant origin populations. One should remember that the unemployment rate in France in the late 1990s among university graduates of French ethnic origin is 5%, and 27% among the North African origin university graduates (Noiriel, 1998; Kaya, 2009)²⁵. This ratio is

²⁵In order to cope with institutional racism in the labor market as well as in other spheres of

much higher than it is in Germany (4% and 12%), Belgium (5% and 15%), and the Netherlands (3% and 12%)²⁶.

In the empirical analysis, we have found a statistically significant impact of citizenship on both affiliations and economic integration of immigrant origin populations. These findings render citizenship policies crucial for the incorporation policies of Germany and France vis-a-vis immigrants and their descendants. Citizenship procedures should be eased in both countries, at least for those immigrants and their descendants who have strong affiliation with their country of residence. It was also revealed that loyalty and attachment to the country of residence by means of citizenship attainment is likely to have a great impact on the social and economic integration of migrants and their descendants.

life, migrant origin people tend to give traditional French first names to newborn children. Gérard Noiriel indicates that this practice is rather an old practice among migrants: in a Polish community in northern France, 44% in 1935, 73% in 1945, 82% in 1955, and 98% in 1960 (Noiriel, 1998: 233).

²⁶Insight into the process of migrant youth integration can be gleaned from a study comparing second-generation migrant populations in Austria, Belgium, France, Germany, the Netherlands and Sweden (Crul and Vermeulen, 2003). The study, for instance, found that Muslim-background youth in Germany suffered far less unemployment than Muslim-background youth in France, Belgium and, to a lesser extent, the Netherlands. This is because of the apprentice system linked to vocational school education in Germany. In Belgium, France and the Netherlands, a significant number of Muslim-background youth held professional or white-collar jobs, but many highly qualified and unqualified second-generation Turkish members of the labor force were unemployed owing to the difficult transition from school to employment.

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Chapter 4

Socio-economic Impact of Conflict: State of Emergency Ruling in Turkey

Abstract

Uprising tensions during 2010 in Eastern and South Eastern regions of Turkey provoked arguments about the necessity for a State of Emergency (SOE; '*Olağanüstü Hal*' in Turkish) declaration in those regions, with a belief of enduring political stability. The discussion is inflamed by a speech of the Nationalist Movement Party's leader about the suggestion to announce a State of Emergency ruling after the death of 24 Turkish soldiers in Hakkari (a city in the South East of Turkey) in an attack of the PKK (Kurdistan Workers' Party) on the 19 October 2011. Although a new announcement of SOE did not take place, the discussion itself induced the idea behind this paper which is to provide a quantitative analysis of the SOE in Turkey. In fact, the State of Emergency ruling is not a new concept for Turkey and it has been implemented in 13 cities in the Eastern and Southeastern regions from 1987 to 2002. Although there have been many discussions about the costs of these fifteen years of the SOE ruling in terms of military expenditure and, thus, on the national budget, there is a lack of quantitative analytical examination of the economic and social costs of it. Difference-in-differences (DID) analysis reveals negative spill-over impacts of the SOE, especially on the forced migration, unemployment and educational investments. The results also show that SOE ruling is an important factor for the underdevelopment of the Eastern and South Eastern regions in Turkey and, thus, a new SOE will bring enormous inequalities, both economically and socially, and an intensification of the ethnic tensions in Turkey.

Key words: Kurdish conflict, State of Emergency Rule, Difference-in-differences (DID) method, conflict analysis, Turkey.

JEL codes: D74, P16, R23.

1. Introduction

Turkish government's rhetoric for the Kurdish conflict has changed from period to period. East and South East regions of Turkey had been neglected until the *coup d'état* in 1980 by bringing forward the unfavourable regional conditions as an excuse and this has been exploited by various governments as a discourse in publicising the issue to medium voters. Yegen (1999) argues, for example, that the main discourse of the government for the Kurdish conflict during 1960s was centered on the socio-economic disparity of the region- which is named as "backward region"- where majority of Kurdish population lives. Ongoing ethnic conflict in the region moved to an important phase after the establishment of the PKK (Kurdistan Workers' Party) in 1974, and its first military attack in Eruh and Semdinli in 1984. In fact, ethnic conflict in the Eastern and South-eastern regions is escalated after the announcement of State of Emergency²⁷ (*Olağanüstü Hal* in Turkish; SOE afterwards) rule in 1987 to take control of the region through a special governance scheme with the aim of preventing "terrorism" acts.

During 15 years of the SOE ruling in the region, there were a crucial military expenditure transfer to the region each year. McDowall (1992) argues that eastern and south-eastern Anatolia were militarised with over 150,000 troops by 1990. Besides, the Human Rights Report in 1996 argues that the military costs of the counter-insurgency operations were representing approximately 20 percent of the state budget. Thousands of people have died both because of military operations and PKK attacks. Moreover, there were almost no economic or social investment during the SOE years (15 years) which created an enormous barrier in the development and welfare of the SOE cities. Private investors also hesitated to initiate their projects in the region due to the chaotic environment, which contributed to an important increase in unemployment rates in the region. Unemployment also intensified due to forced migration from villages after the 1990s and; thus, a downward pressure on wages became inevitable. Therefore, one can argue that SOE ruling and its negative spillover impacts were one of the main causes of economic instability in the East and

²⁷Implementation of SOE first started in Bingöl, Diyarbakir, Elazig, Hakkari, Mardin, Siirt, Tunceli ve Van. Three other cities included in SOE in the status of "neighbouring cities". After 1990, Batman and Sirnak, which were initially part of Siirt, declared as new cities. Therefore, total number of cities under SOE became thirteen.

South East regions of Turkey which, without a doubt, had an impact on the overall economic stability in the country.

There were also crucial changes in the population structure of the region especially after the forced migrations from villages to urban areas both in SOE cities (particularly to Diyarbakir and Van), and in some other hub points for emigration, such as Adana, Ankara, Istanbul, Izmir and Mersin. This forced migration created other problems for the region's economic development because the agriculture sector and animal husbandry were the mainstays of the economy in the SOE cities and a huge amount of income was lost, due to migrating villagers. Kirisci and Winrow (1997) reports that 307,000 people have been displaced as a result of village evacuations.²⁸ In addition to the economic costs of forced migration, there is also enormous social costs. For example, the IHD survey in 1995 reported that "338 (over 99 per cent) of the heads of 341 families in Istanbul, Mersin and bursa, firmly wished to return to the land from which they had been displaced" due to various reasons such as acute insecurity of abode and employment, improper living conditions, nostalgia about their way of lives (stock-rearing and crop-growing) and depression.

Another important impact of the SOE years was on the level of educational investments in the region. Inadequate levels of educational investment, together with the attacks of PKK against teachers and schools in the region, caused the regional population not only to be behind other regions in terms of educated populations, but also to have higher unemployment rates and other social problems. Yildirim and Ocal (2013) conclude that increase in education levels and employment rates are among the main factors to hinder terrorism. In that sense, enormous increases in military expenditure with the expectation of reducing terrorism and attaining stability in the region resulted in the decrease in educational investment which, in fact, contributed to the conflict in the region.

²⁸This official figure is argued to be underestimated. In fact, the population increases even in the city centers of SOE region supports this underestimation. For example, the Turkish Daily News reported that the population of Adana had grown from 900,000 to 1,5 million, and that of Mersin from 550,000 to about a million in 1994 just after 2 years of village evacuations. (Sinan Yilmaz, 'Adana and Mersin turn into ticking time bombs,' Turkish Daily News, 23 August 1994) Besides, according to TUIK (Turkish Institute of Statistics), the share of city population in Diyarbakir increased from 48.1% in 1980 to 60% in 2000. In Bitlis, the share rose from 36.4% in 1980 to 56.5% in 2000. For Adana, one of the important magnets for immigrants, city population share ascended from 56.7% in 1980 to 75.6% in 2000.

Although one can list many other impacts of the SOE in the region, this paper aims to uncover the assumed and widely discussed side effects of the SOE that are discussed above with a quantitative analysis. The plan of the paper is as follows. In Section 2, a brief summary of the literature about the SOE and its possible impacts is provided. Data and methodology will be discussed in Section 3 which is followed by the presentation of the findings in Section 4. Section 5 shows results of the placebo and sensitivity tests. Conclusion and policy remarks are contained in Section 6.

2. State of Emergency Ruling in Turkey and Its Potential Impacts

After three years of the creation of cordon sanitaire along the Iraqi border whence the first PKK attacks were believed to have come in 1984 (McDowell (1996)), SOE ruling is announced and was in force in 13 cities in Eastern and South Eastern Turkey until The Justice and Development Party (*AK Party* in Turkish) came to the power in 2002. The State of Emergency as a term lies on the conflux of law and political science, which makes it harder to be defined in a simple way (Agamben, 2010). It is usually defined as a rule of law in which there is no room for the implementation of norms, even though they still exist in theory and there is an enormous power of illegitimate regulations over the Law. Gemalmaz (1990) defines the SOE²⁹ ruling as "a type of exceptional regime which is the result of a crisis in the existing politico-juridical system that leads to the adoption of emergency measures to tackle this crisis."

Under the SOE ruling, security forces work contingently with the civilian government which can be seen as the ground for potential 'unlawful' regulations. In fact, there were serious human rights issues with the implementation of this special system of governance in the Eastern and South Eastern regions of Turkey which resulted in fatal practices such as devastation of villages and extrajudicial punishments (Üskül, 2003). Under the SOE ruling, Yörük (2012) argues that "Turkish military forces evacuated and burned more than three thousand villages in the Kurdish regions and initiated a policy of internal displacement to block the growing Kurdish popular support for the PKK." Besides, a State of Emergency Report (1991) prepared by human

²⁹State of Emergency Law is provided in the Appendix. The English translation of the published version in the Official Gazette is taken from Gemalmaz (1990).

rights associations and their representative offices in Turkey, presents many striking examples about the human rights violations in the region during SOE years. Barkey and Fuller (1998) also argued that “as a policy issue, the Kurdish question was reduced to eliminating the PKK, body counts, and cross-border raids, leading to a significant increase in human rights violations”. Thus, the main distinction between normal rule of law and state of emergency lies on the issue of rights and freedoms which are in fact subject to special limitations under the SOE ruling.

Furthermore, there are also a few empirical studies which suggest that terrorism is more affected by the political factors such as political rights, the level of democracy and the extent of civil liberties than the economic growth in a country. [Abadie (2004); Blomberg and Hess (2008a), Li (2005), Blomberg and Rosendorff (2006)] In that aspect, the role of SOE ruling in the eastern and south-eastern provinces of Turkey can be argued to cause the peace conditions deteriorate in the region since its implementation caused extensive limitations on the level of democracy and citizenship rights in the region which in turn can be argued to create a vicious cycle since this deterioration in the level of democracy is another cause of terrorism activities as the studies cited above suggest.

Aside from being an important cause of human rights violations³⁰, the SOE ruling was also a calamity for social and economic development through its direct and indirect effects. A TESEV (Turkish Economic and Social Studies Foundation) report in 2008 on the Kurdish Question argues similar issues and urges that “a reliable economic project is needed for all provinces of the region that were governed for years under the State of Emergency rule, and it should be implemented unconditionally with simultaneous political policies”. Moreover, it can also be argued that SOE ruling did not mitigate the ethnic conflict and in fact it helped garner sympathy towards the PKK from the Kurdish population which was against the aim of the

³⁰ Apart from the Articles about the emergency rule, the Article 15 of 1982 Constitution regulates the suspension of fundamental rights and freedoms practice in Turkey. Gemalmaz (1991) argues that “suspension opens the door, by deleting constitutional guarantees recognized for individual, to the insecure regime; derogation completes this process by introducing an opportunity to authorities to intervene an individual.” In analyzing the Article 15, Gemalmaz (1991) also underlines the fact that “derogation clause” in Article 15 contains the concept of “suspension” in comparison with other supranational human rights instruments such as European Convention on Human rights (ECHR) (Article 15/1), the International Covenant on Civil and Political Rights (ICCPR) (Article 4/1) and the American Convention on Human Rights (ACHR) (Article 27/1).

SOE implementation. So, in fact, it contributed to economic underdevelopment in two-fold. First, SOE ruling resulted in a diversion of spending from public investment to military expenditures in addition to the causing a tremendous increase in terrorism acts in the region. Second, the increase in ethnic conflict and terrorist incidences have a detrimental effect on economic growth by increasing transaction costs lowering savings and increasing current consumption, decreasing tourism revenues, decreasing FDI and causing a fall in net foreign investment positions. [Blomberg et al. (2004); Abadie and Gardeazabal (2008); Fielding (2004); Hall and O’Sullivan (1996); Neumayer (2004)] Kirisci and Winrow (1997) also discuss the fact that private investment in Eastern and South-eastern regions was not adequate and low levels of savings and credits were among the main characters of the region.

Although there is a lack of research on the economic costs of conflict in Turkey, there are some important works on the same concept for some other cases. Abadie and Gardeazabal (2003), for example, investigate the economic impact of political instability in the Basque Country. Using synthetic control methods, they find that terrorist conflict had a negative impact on the economic prospects of the Basque Country. There are also some papers on this subject which employs cross-sectional data.³¹ In the Turkish case, however, there are studies which focus on the impact of the SOE on military spending and human rights violations, but the issue is rarely analyzed quantitatively, with regards to economic prospects in the region. This paper aims to fill in this gap with the following analysis.

3. Data and Methodology

The data by province level are obtained from the Turkish Institute of Statistics (TUIK). The variables before 1987 are used as the pre-treatment variables, which are unemployment rates in 1980 and 1985, city population rates in 1980 and 1985, the share of workers in the industrial sector in 1985, net migration rates between years 1980-1985, rate of population increase in 1980, labor force participation rate in 1980 and the number of primary school students per teacher in 1980-1981 academic year.

The variables after 2002, which is the end year for the SOE ruling in Turkey, are used as post-treatment variables which are unemployment rates in 2008, the net

³¹See for example Venieris and Gupta (1986), Alesina and Perotti (1996).

migration rates between 2008 and 2011, labor force participation rate in 2008, the number of primary school students per teacher in 2005-2006 academic year and the total number of prison convictions in 1981. The data again is by province.³²

³²There are some newly created cities in different regions of Turkey especially after 1990s. Those cities are excluded from the data not to cause any bias on the estimations since the newly announced cities are sometimes formed by different regions from their neighbor cities. Therefore, their characteristics after the SOE years can be misleading.

Table 1: Pre- and Post-SOE Characteristics for Control Groups (1) and (2) and Treatment Group

	Control Group1 ^a (1)	Control Group2 ^b (2)	SOE Region (3)
Unemployment rate(%) in 1980	2.877	3.014	3.927
Unemployment rate(%) in 1985	3.834	4.443	5.091
Unemployment rate(%) in 2008	9.189	8.53	16.185
Labour Force Participation Rate (%) in 1980	67.460	67.714	71.336
Labour Force Participation Rate (%) in 1985	66.041	66.7	70.954
Labour Force Participation Rate (%) in 2008	49.657	48.48	35.346
Share of Industrial Employees in Total Employed Population in 1985	8.341	5.014	2.427
City Population Rate (%) in 1985	40.885	43.214	36.191
Net Migration Growth Rate (%) between 1975 and 1980	-15.758	-57.650	-47.756
Net Migration Growth Rate (%) between 1980 and 1985	-14.089	-41.381	-40.382
Net Migration Growth Rate between 2008 and 2011	-3.505	-10.783	-10.458
Literacy Rate (%) in 1985	76.911	66.262	56.031
Number of Primary School Students per Teacher in 1980-1981 academic year	24.426	28.286	26.909
Number of Primary School Students per Teacher in 2003-2004 academic year	23.154	28.3	32.077
New convicts received into prison (average) in 1981	537.830	479.714	211.727
New convicts received into prison (average) in 2003	1036.754	654.1	434.077
Ratio of Asphalt Road in Villages (%) in 1985	11.613	.814	1.4
Ratio of Villages with Sufficient Fresh Water in 1985	60.509	54.206	56.903

Sources: Turkish Statistics Institute (TUIK), Ankara, Turkey. Statistics are autor's own calculations.

a Control group consists of all non-SOE cities except Istanbul, Izmir and Ankara. Sample consists of 67 cities.

b Control group consists of all non-SOE eastern cities. Sample consists of 23 cities.

Table 2: Pre- and Post-SOE Characteristics for Control Group (3) and Treatment Group

	Control Group 3 ^a (1)	SOE Region (2)
Unemployment rate(%) in 1980	3.071	3.927
Unemployment rate(%) in 1985	4.028	5.091
Unemployment rate(%) in 2008	9.571	16.185
Labour Force Participation Rate (%) in 1980	70.733	71.336
Labour Force Participation Rate (%) in 1985	69.8	70.954
Labour Force Participation Rate (%) in 2008	53.111	35.346
Net Migration Growth Rate (%) between 1975 and 1980	-30.678	-47.756
Net Migration Growth Rate (%) between 1980 and 1985	-25.193	-40.382
Net Migration Growth Rate between 2008 and 2011	-7.006	-10.458
Number of Primary School Students per Teacher in 1980-1981 academic year	26.857	26.909
Number of Primary School Students per Teacher in 2003-2004 academic year	25.428	32.077
New convicts received into prison (average) in 1981	402	211.727
New convicts received into prison (average) in 2003	762	434.077

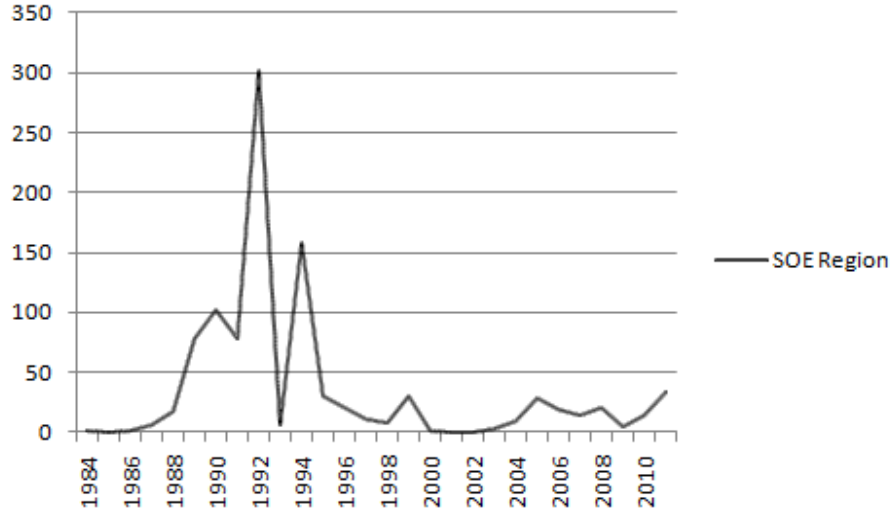
Source: Turkish Statistics Institute (TUIK), Ankara, Turkey. Statistics are author's own calculations.
a Control group 3 consists of cities who are similar to SOE cities prior to treatment intake.

In Table 1 above, the characteristics for treatment and control groups (1) and (2) are presented for pre- and post-SOE years. Due to a lack of data, it was not possible to construct a sensible control group with a synthetic control method. Therefore, three different control groups are used in order to compare the impact of the SOE on the region and to check whether the results are robust or not. Firstly, the cities without the implementation of the SOE (excluding Istanbul, Ankara and Izmir) between 1987 and 2002 are used as one of the control groups which consists of all 67 cities. The second control group consists of neighbor cities in the eastern and south eastern regions as a control group, being aware of the fact that the negative externality impact of the SOE on those cities could cast a shadow upon the average treatment effect on the treated. Thus, the results with control group (2) should be analyzed with that caution in mind. Control group (2), includes only “eastern” non-SOE cities which are 23 in total. Thirdly, Mahalanobis distance matching procedure is used for each post-treatment outcome to produce the third control group which only includes cities that have similar characteristics with the treatment cities prior to treatment intake (before the introduction of SOE in 1987). Thus, this prior matching provides a check of robustness for our methodology. Table 2 presents the characteristics for this third control group (namely, control group (3)). Moreover, the number of observations in each control group changes for each post-treatment outcome since the matching is performed separately for each category that we are looking for.³³

All of these three control groups are used in the difference-in-differences (DID) method to find the impact of the SOE on the treated. Besides, the reduced form regressions are performed to check whether other control variables have an impact on the average treatment effect on the treated (ATET).

³³Number of observations for the control groups for unemployment rate is 7 and the matched cities are Aydın, Ağrı, Kahramanmaraş, Kırşehir, Malatya, Çankırı and Gümüşhane. For labour force participation rate, there are 9 matched cities prior to the treatment which are Amasya, Antalya, Ağrı, Malatya, Samsun, Tokat, Yozgat, Çorum and Gümüşhane. Mahalanobis matching for the net migration growth rates prior to the treatment gives 10 matched cities which are Amasya, Aydın, Burdur, Erzurum, Kahramanmaraş, Malatya, Tokat, Çorum, Şanlıurfa and Ordu. Similarly, matching in terms of educational investments provides 7 matched cities that are namely Kars, Malatya, Manisa, Zonguldak, Çankırı, Çorum and Şanlıurfa. Lastly, matching with regards to total number of new convicts into prisons shows that there were 4 matched cities prior to the SOE ruling which are Ağrı, Kahramanmaraş, Malatya and Şanlıurfa. Table 2 presents the average outcomes of these different matched city groups concerning their outcome group. Thus, for example, unemployment rate in 1980 is presented only for the control cities that are matched using Mahalanobis distance matching for the unemployment rates.

Figure 1: The Number of PKK Attacks in Turkey



Before moving to the analysis of the data, it is important to discuss some issues regarding the difference-in-differences method and the strength of inferences from the analysis. Firstly, it can be argued that the analysis in the paper quantifies the combined effect of SOE and ethnic tensions in the region. Thus, if the role of SOE in stimulating the conflict can be supported by the secondary evidence then this information can be used to support the role of SOE in the analysis of this paper. With this aim, the data on PKK attacks are obtained from the Global Terrorism Database (GTD) of University of Maryland.³⁴ The data provide information on each PKK attacks from 1970 to 2011.³⁵ The Figure 1 presents the total number of PKK attacks from 1970 to 2012. As it can be seen above, the incidents tremendously increased after the announcement of the SOE. ³⁶ Besides, the detailed information about the number of PKK attacks is provided in the Table 3 below. As it can be observed from the Table 3, the PKK incidents usually occurred in the SOE region and also after the announcement of the SOE ruling. Almost 73% of total attacks are observed

³⁴The data are obtained from <http://www.start.umd.edu/gtd/> on the September 14th, 2013.

³⁵The place, timing and number of fatalities and injuries of each PKK attack are recorded. The data on the place of attacks are recorded usually on village level. This information is transformed to city level in order use in the analysis.

³⁶There is a sharp decline in the number of incidents in 1993. This can be attributed to the ceasefire that is announced by PKK on that year which is abolished after the death of President Turgut Özal.

in the SOE region. Yildirim and Ocal (2012) also argue that "the average terrorist incidents and particularly average fatalities are mainly concentrated in the Eastern, South-Eastern Turkey and the major cities". Therefore, the analysis in this paper can be argued to present the impact of the SOE ruling which had also a stimulating role in increasing the ethnic conflict as the secondary data shows. Moreover, it can be also argued that the endogeneity of the SOE implementation and ethnic conflict in the region gets stronger after 1987 even if the SOE can be regarded as a catalyst for the increase in PKK attacks.

Another important issue about the difference-in-differences method is the common trends assumption as the validity of the DID estimator is based on it. This parallel trends assumption is not testable, although it is possible to get some idea of its plausibility depending on the availability of the data for the pre-treatment period. Figure 2 below shows the distribution of unemployment for treatment and control regions between 1980 and 2010 with the five data points noted in the graph. The distribution of the unemployment rate before the SOE (between 1980 and 1985) can be taken as evidence for the parallel trends assumption for the unemployment rate. Similar analysis is performed for other variables and the same conclusion is reached about the validity of the common trends assumption.

Table 3: Total Number of PKK Attacks

Region ^c	Number of Incidents	Total number of fatalities and injured	Period of attack
Adiyaman	8	64	1992-1995
Batman	36	178	1990-2012
Bingol	57	270	1988-2012
Bitlis	28	148	1990-2012
Diyarbakir	99	580	1989-2012
Elazig	24	127	1989-2012
Hakkari	87	618	1984-2012 ^a
Mardin	101	414	1986-2012 ^b
Mus	15	101	1991-2009
Siirt	60	245	1987-2012
Sirnak	133	615	1987-2012
Tunceli	39	216	1988-2012
Van	34	168	1989-2012
SOE Region	721	3714	1984-2012
Rest of Turkey	271	1171	1987-2012
TOTAL	992	4885	

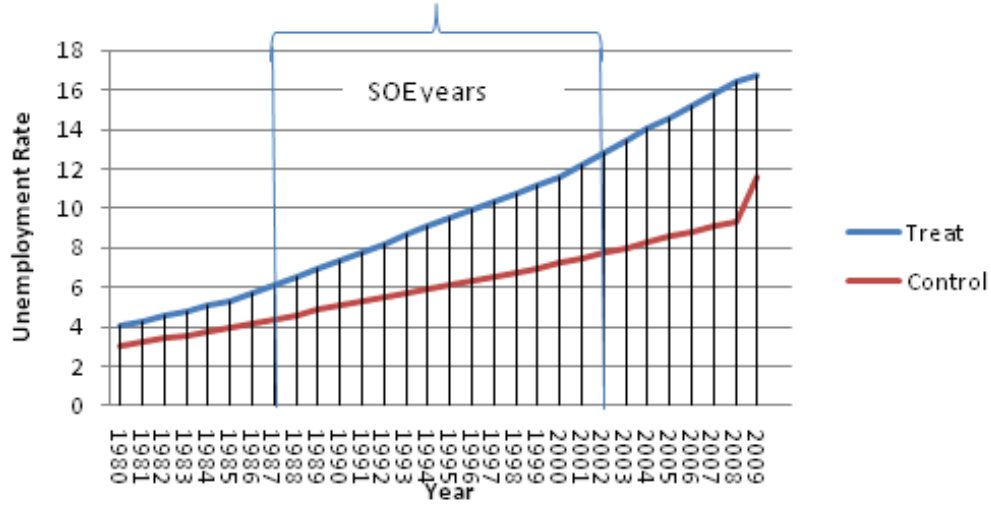
Sources: Global Terrorism Database, University of Maryland. Statistics are autor's own calculations.

^a There was only 1 attack in 1984 and the next attack occurred in 1988 which is after the announcement of the SOE.

^b There was only 1 attack in 1986 and the next attack occurred in 1987 which is the year of announcement of the SOE.

^c Seome regions are defined as "unknown" or "south east Turkey". I have eliminated those regions from the calculations which are 55 in total.

Figure 2: Distribution of the Unemployment Rate in Treated vs. Control Region



4. Findings

4.1. Unemployment and Labor Force Participation

The impact of the SOE on unemployment and labor force participation is crucial to identify, not only due to their role as an economic indicator, but also as a sign of “social hardship and a determinant of wage pressure”³⁷. Very low levels of investment in the region between 1987 and 2002, and forced migration from villages to urban areas contributed to the increase in unemployment. *Figure 3* below shows the distribution of unemployment rates before and after the SOE. It can be clearly seen that the SOE years resulted in an obviously polarized distribution of unemployment after 2002, in which treated cities are positioned on the right hand side with a comparatively high level of unemployment. Thus, the levels and changes in average unemployment rates are interesting to analyze in detail.

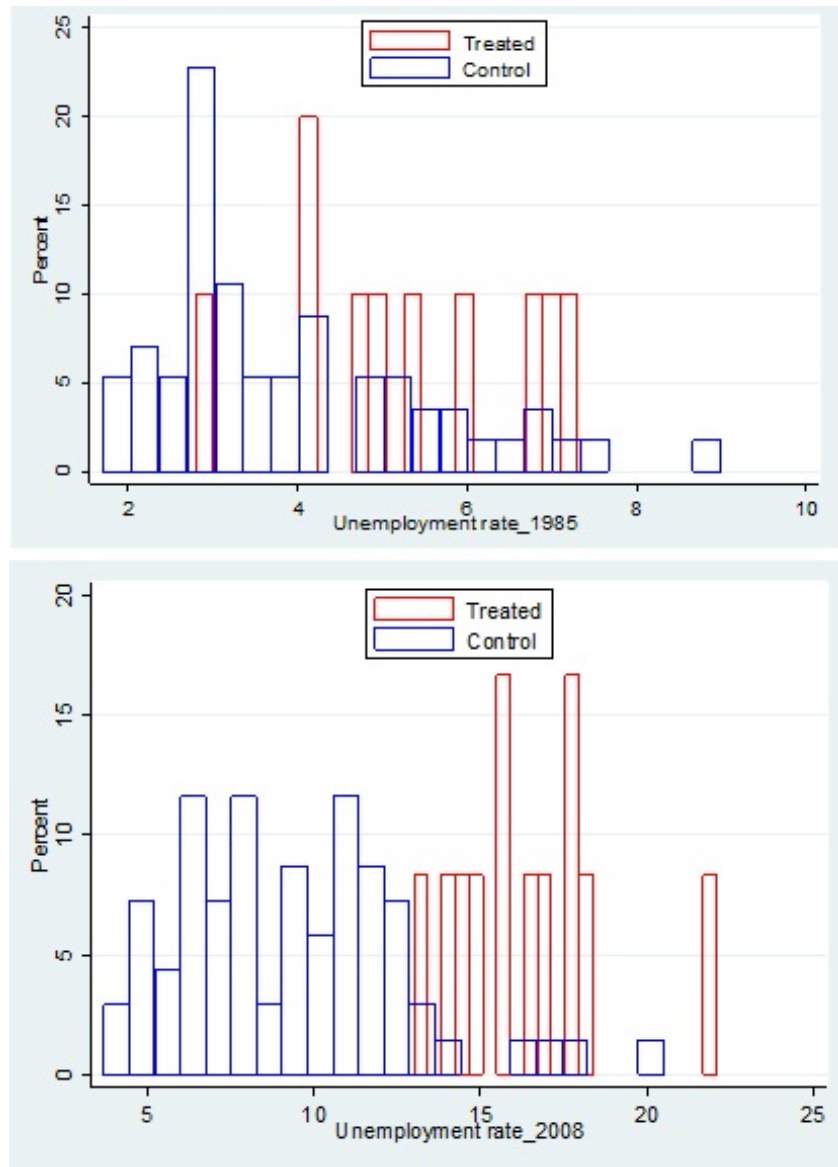
Table 4 summarizes unemployment problem before and after the SOE in two different samples of the control groups. Columns (i) and (ii) provide the levels and changes in average unemployment in treated and control cities where all non-SOE

³⁷For a detailed discussion about unemployment and labour force participation, see Elmeskow and Pichelmann, 1993.

cities excluding Istanbul, Izmir and Ankara are used as the control group. Column (iii) presents the differences in average unemployment rates between treated and control group 1 before and after the SOE. Moreover, row (3) reveals the changes in average unemployment rates between 1985 and 2008. Besides, *control group 2* repeats a similar analysis for a different control group which includes only eastern non-SOE cities. Lastly, *control group 3* only includes the cities that are matched with Mahalanobis distance procedure using characteristics prior to the SOE ruling. As noted in *Table 3*, average unemployment rates increased sharply in the treated group compared to all three control groups.

Moreover, the difference is larger for control group 2 and lower for *control group 3*. It can be seen from the results that the increase in unemployment from pre- to post-treatment years has almost tripled in the SOE governed cities and the relative increases in unemployment compare to the increase in control groups are 5.29%, 6.03% and 5.18% with a p-value $< .01$ respectively for *control group 1*, *control group 2* and *control group 3*.

Figure 3: Distribution of Unemployment Rate before and after SOE



Furthermore, t-test results for the first row show that pre-treatment unemployment was higher than the control group's average unemployment rate and the differences are significant at the 5% level. The same difference is smaller (.65) for the second control group specification. Thus, it can be argued that unemployment rates before the SOE are most similar for the treated and control groups when the *control group 2* classification is used. On the other hand, the difference is remarkably larger for the mean comparison of the unemployment rates after the SOE years and were found to be 6.99%, 7.65% and 6.24% respectively for the three different control groups and strongly significant at the .01 level. Thus, under the parallel trends assumption, we can conclude that the implementation of the SOE for the cities in the East and South-East of Turkey led an important increase in unemployment rates in the treated region which is on average 5.5% considering all of the control groups.

Table 4: Average Unemployment Rate Before and After the SOE

Variable	Control Group 1 ^a			Control Group 1 ^b			Control Group 3 ^c		
	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)
(1) Unemployment before the SOE	3.83 (.21)	5.09 (.45)	1.26 (.50)	4.44 (.60)	5.09 (.46)	.65 (.75)	4.03 (.49)	5.09 (.46)	1.06 (.68)
(2) Unemployment after the SOE	9.19 (.42)	16.18 (.69)	6.99 (.81)	8.53 (1.34)	16.18 (.69)	7.65 (1.51)	9.57 (1.18)	15.81 ^d (.56)	6.24 (1.30)
(3) Change in mean unemployment	5.43 (.37)	10.73 (.73)	5.29 (.82)	4.7 (1.16)	10.73 (.73)	6.03 (1.38)	5.54 (1.03)	10.72 (.73)	5.18 (1.26)

Notes: Standard errors are given in parentheses.

^aControl group consists of all non-SOE cities except Istanbul, Izmir and Ankara. Sample size for this control group is 53 and 65 respectively for the years before the SOE and after the SOE.

^bControl group consists of all eastern non-SOE cities. Sample size for this control group is 7 and 10 respectively for the years before the SOE and after the SOE.

^cControl group consists of cities that are matched prior to the treatment with Mahalanobis distance procedure. Sample size for this control group is 7.

^dThe number of observations for the treated cities decreased in this specification if the data is not available for the variables that are used matching with Mahalanobis distance method.

Although DID (difference in differences) estimates in *Table 4* roughly reveal the differences in the average unemployment in both regions, it does not take into account other characteristics of the cities in both groups, and thus, does not control for the other sources of variation. Regression-adjusted models are used to incorporate these other control variables and the results of different model specifications are given in *Table 5*. The model specification that is used to find the results in *Table 5* is:

$$\Delta U_i = \text{constant} + X_i\beta + \text{treat}_i + \varepsilon_i \quad (29)$$

; where ΔU_i is the change in unemployment from 1985 to 2008 at city i , X_i is the vector of covariates that are used to control for the variance in the difference and treat_i is the dummy variable which equals 1 if the city i is in the treated region.

Table 5: Reduced-Form Models for Change in Unemployment Rate

	Model ^c						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SOE city dummy	5.29*** (.87)	5.37*** (.91)	5.18*** (1.22)	6.32*** (1.37)	4.072*** (.95)	4.839*** (1.671)	5.464*** (.972)
Controls variables ^a	no	yes	no	yes	yes	yes	yes
Std. error of regression	2.676	2.465	2.536	2.177	2.490	2.118	1.746
Adj R-sq.	.35	.45	.50	.63	.34	.34	.69
Joint F-test p-values ^b	—	.00	—	.07	.03	.00	.00
Number of observations	64	64	18	18	64	18	18

Notes: Standard errors are given in parentheses. Mean and standard deviation of the dependent variable are 6.28 and 3.27 respectively. All models include an unrestricted constant.

^aCity population rate at 1985, share of workers in industrial sector in 1985 and net migration rate between years 1975 and 1980 are used as control variables for pre-treatment city characteristics.

^bProbability value of joint F-test for the exclusion of control variables.

^cControl group 1 is used in the estimations of Model (1) and (2). Control group 3 is used in the estimations of Model (3) and (4). Besides, Control group 1, 2 and 3 are used in the estimations of Model (5), (6) and (7), respectively; in which observations are weighed by the size of cities.

In all model specifications, we estimate a positive and statistically significant treatment effect. The estimate is almost identical and still significant after controlling for some other pre-treatment variables for the *control group 1* specification. If

we use *control group 3* in our regressions, then Model (4) shows that the ATET is higher compared to all other specifications, even if we control the pre-treatment city characteristics. Thus, under parallel trend assumption, it can be concluded that there is a positive and significant impact of the SOE on unemployment rates in the cities that are governed under the SOE. Besides, results for weighted regressions in which observations are weighted by the size of cities are presented in Models (5), (6) and (7). The results show that treatment has still a positive and significant impact on the unemployment rate for all control group specifications.

Apart from DID analysis, we have also performed propensity score matching method as a robustness check for the true effect of the SOE. After performing a logistic regression of the treatment dummy on the covariates, we can predict the propensity score for each observation³⁸. Insignificant coefficients of the logit model tell us that the corresponding covariates are balanced between the treated and control group prior to matching. After matching on the propensity score, the balance of the covariates is checked and it is observed that bias reduction is well above 50% for the majority of the variables.³⁹

Using propensity score matching to calculate the average treatment effect on the treated (ATET), we see that the estimate (8.9) is significant at a 1% level and fairly larger than the DID estimate presented above. In a regression model, the estimated effect is the average treatment effect, since it assumes that the treatment effect is constant over treated and non-treated cities. This is a rather restrictive assumption because cities in control groups can be thought of as having more power to resist the negative impacts of SOE due to their higher investment spending, higher labor force participation rate and higher education investments etc. Therefore, matching allows more sensible estimates for ATET, since the estimated ATET is the effect of SOE on unemployment rates in 2008 for the cities that were governed by the state of emergency. It is also important to note that the selection-on-observables assumption is taken into consideration since the post-treatment variable is adjusted for pre-treatment variables in 1980 and 1985 which can be seen as good proxies to

³⁸Treatment dummy is regressed upon the unemployment rates in 1980 and 1985, city population rate at 1985, share of workers in industrial sector in 1985 and net migration rate between years 1975 and 1980. All of the coefficients are found to be statistically insignificant.

³⁹All the detailed information about the propensity score matching results are available upon the request.

adjust for the unobserved confounders.

Table 6: Share of Agricultural and Industrial Employees in Total Employed Population

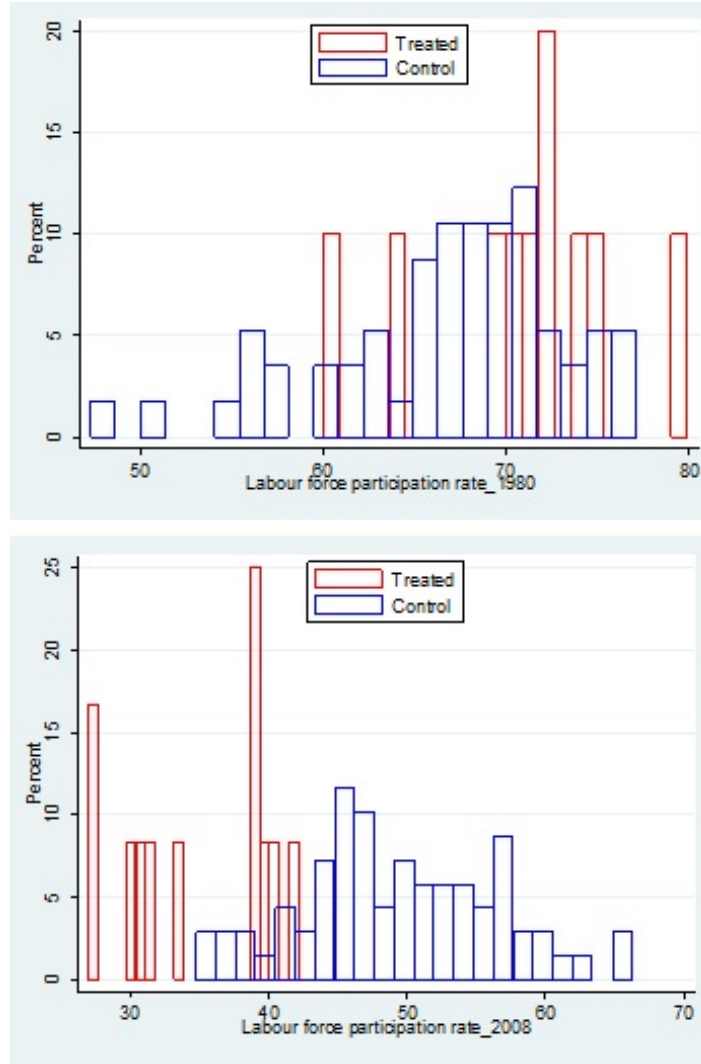
Region	Agricultural Employees				Industrial Employees			
	1980	1985	1990	2000	1980	1985	1990	2000
Adiyaman	82.8	83.2	79.2	73.6	3.8	3.6	4.8	4.8
Batman			70	63.5			6.7	6
Bingol	85	86	79.6	69.9	1.4	1	1.9	1.4
Bitlis	80.5	80.1	75.3	69.8	2.8	1.9	3.3	2.3
Diyarbakir	71.9	71.4	69	63.9	3.4	2.8	3.5	3.8
Elazig	66.3	67.4	63.4	58.6	8.3	6	6.9	6
Hakkari	82.5	74.3	64.9	52.4	.9	.7	1.8	1.3
Mardin	77.7	78	74.4	69.9	2.5	2.2	2.3	2.4
Mus	84.1	85.4	84.6	83.4	1.6	1.5	2.2	1.5
Siirt	76.9	75.5	71.6	56.9	4.1	3.6	2.5	2.6
Sirnak			68	46.6			2	1.8
Tunceli	79.5	79.9	72.6	42.3	1.8	1.5	1.9	1.8
Van	78.2	78.9	73.7	67.2	2.2	1.9	3	2.5
Rest of Turkey	54.53	54.14	54.68	58.34	7.84	7.5	8.84	9.71

Source: Turkish Institute of Statistics, Ankara.

Kirisci and Winrow (1997) confirm the analysis above arguing that "the depressed nature of the economy in the area has also led to high levels of unemployment, particularly among the youth". Besides, Table 6 above presents the share of agricultural and industrial employees in total employed population in each SOE city and also in the rest of Turkey. It can be observed that the share of agricultural employees declined excessively in almost all the SOE cities. This enourmous decrease can be also attributed to the forced emigration due to village evacuations. Moreover, there is also a reduction in the share of industrial employees which was way below than the average share in rest of Turkey in all the data points. Another striking finding is the simultaneous decrease in labor force participation in the treated cities. The change in labor force participation can be observed apparently in Figure 4 below. Surely the negative relationship between unemployment rate and labor force participation requires a deeper analysis in order to find out the correct reasons for this decrease in labor force participation. Aside from the mainstream arguments about the decrease in labour force participation, such as the increase in school attendance and/or the low levels of educational investment, the decrease in the labour force participation

can be attributed to the increase in the number of “discouraged workers” who are not defined as unemployed but as non-active searchers for jobs. It is possible that the lack of jobs and the low wage levels in the SOE region are important factors for people to be discouraged in the labor market. *Table 7* and *Table 8* replicates the DID and reduced-form regression analysis for the labor force participation rates.

Figure 4: Distribution of Labor Force Participation Before and After the SOE



Firstly, *Table 7* shows that there is a general decrease in labor force participation. Secondly, under the assumption of parallel trends, the difference-in-differences estimate is found to be -17.76% in the case of *control group 1*. Thirdly, the estimate is almost identical (-17.50%) when only prior-SOE matched cities are used as the control group. And lastly, if the non-SOE eastern cities are chosen as the control group, then this estimate decreases to -15.30% , which is still a big difference. This is an important finding which urges for the improvement of the labor market conditions in the SOE region.

It can also be noted from *Table 8* that the negative impact of the SOE on labor force participation is remarkable even after controlling for other covariates⁴⁰. This result does not change in different control group specifications. Additionally, *Table 9* presents the reduced-form regression results when observations are weighted by the size of city. Estimates are again found to be negative and significant. Besides, Joint F-test results in all of the estimations show that the inclusion of covariates are important, and when we check the estimation results with the additional controls, we observe that the decrease in the labor force participation rate for the treatment region ranges between 8.81% to 12.84%. However, whether this decrease in labor force participation is a cyclical phenomenon, rather than being a long-run issue, requires further investigation. Besides, Feridun and Sezgin (2008) conclude that “economic factors are important for explaining terrorism in South Eastern Turkey”. There is also an intensive literature about the link between terrorism and economic well-being. Some cross-country studies conclude that income inequality and economic deprivation is an important determinant of the terrorist acts. [Blomberg and Hess (2008b); Blomberg et al. (2004b); Li (2005); Abadie (2004); Bravo and Dias (2006)] Therefore, the impact of SOE on unemployment and labour force participation in the regions requires serious consideration.

⁴⁰Propensity score matching estimate (-4.7) is found to be statistically insignificant.

Table 7: Average Labor Force Participation (LFP) Before and After the SOE

Variable	Control Group 1 ^a			Control Group 1 ^b			Control Group 3 ^c		
	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)
(1) LFP before the SOE	67.46 (.76)	71.34 (1.66)	3.88 (1.83)	67.71 (2.79)	71.34 (1.66)	3.62 (3.25)	70.73 (1.30)	71.34 (1.66)	.60 (2.11)
(2) LFP after the SOE	49.66 (.90)	35.35 (1.53)	-14.31 (1.78)	48.48 (2.09)	35.34 (1.53)	-13.13 (2.59)	53.11 (2.50)	36.21 ^d (1.68)	-16.90 (3.02)
(3) Change in mean LFP	-17.36 (.96)	-35.13 (2.10)	-17.76 (2.31)	-19.83 (2.18)	-35.13 (2.11)	-15.30 (3.04)	-17.62 (2.50)	-35.13 (2.11)	-17.50 (3.27)

Notes: Standard errors are given in parentheses.

^aControl group consists of all non-SOE cities except Istanbul, Izmir and Ankara. Sample size for this control group is 53 and 65 respectively for the years before the SOE and after the SOE.

^bControl group consists of all eastern non-SOE cities. Sample size for this control group is 7 and 10 respectively for the years before the SOE and after the SOE.

^cControl group consists of cities that are matched prior to the treatment with Mahalanobis distance procedure. Sample size for this control group is 9.

^dThe number of observations for the treated cities decreased in this specification if the data is not available for the variables that are used matching with Mahalanobis distance method.

Table 8: Reduced-Form Models for Change in Labor Force Participation

	Model ^c					
	(1)	(2)	(3)	(4)	(5)	(6)
SOE city dummy	-17.93*** (2.62)	-12.842*** (2.39)	-15.298*** (3.18)	-8.808** (3.02)	-17.505*** (3.25)	-10.658** (3.59)
Controls for pre-treatment city characteristics ^a	no	yes	no	yes	no	yes
Std. error of regression	7.651	6.346	6.572	4.895	7.232	6.007
Adj R-sq.	0.409	0.594	0.566	0.759	0.596	0.721
Joint F-test p-values ^b	—	.00	—	.01	—	.03
Number of observations	64	64	18	18	20	20

Notes: Standard errors are given in parantheses. Mean and standard deviation of the dependent variable are -19.78 and 9.96 respectively.

All models include an unrestricted constant.

^aCity population rate at 1985, share of workers in industrial sector in 1985 and net migration rate between years 1975 and 1980 are used as controls.

^bProbability value of joint F-test for the exclusion of control variables.

^cModels (1) and (2) uses *control group 1*; models (3) and (4) employs the *control group 2* and, models (5) and (6) is estimated using *control group 3*.

Table 9: Reduced-Form Models for Change in Labor Force Participation (observations are weighted by city size)

	Model ^c		
	(1)	(2)	(3)
SOE city dummy	-13.671*** (2.288)	-8.382* (4.314)	-10.127*** (2.964)
Controls for pre-treatment city characteristics ^a	yes	yes	yes
Std. error of regression	5.342	4.579	4.806
Adj R-sq.	.66	.83	.86
Joint F-test p-values ^b	.00	.00	.02
Number of observations	64	64	18

Notes: Standard errors are given in parantheses. Mean and standard deviation of the dependent variable are -19.78 and 9.96 respectively. All models include an unrestricted constant.

^aCity population rate at 1985, share of workers in industrial sector in 1985 and net migration rate between years 1975 and 1980 are used as controls.

^bProbability value of joint F-test for the exclusion of control variables.

^cModels (1) and (2) uses *control group 1*; models (3) and (4) employs the *control group 2* and, models (5) and (6) is estimated using *control group 3*.

4.2. Forced Migration from Villages to Urban Areas

As it is explained above, violence continued at full strength during the SOE years. SOE ruling enabled security forces to forcibly vacate and/or burned villages mostly along the mountainous regions and along the borderline and the aim is explained as to protect villagers from the PKK. Kirisci and Winrow (1997) argue that the aim to target these villages was also to prevent those villages from being used for the logistical purposes of PKK itself and, in fact, this violence led to migration and a further worsening of the socio-economic and political situation. McDowell (1996), on the other hand, argues that these evacuation policy was directly to defeat PKK. Besides, there were also attacks of PKK towards some villages which were seen as pro-government by the PKK. Violence both from the evacuation policies and the PKK resulted increase in the forced migrations from the SOE region. Therefore, it can be argued that there was a remarkable increase in emigration flows from the villages that were governed under the SOE and forced migration is soared especially after 1990s. These forced emigration flows were mainly towards the urban areas of the cities where those villages belonged. However, there were also an apparent population movement towards the other metropolitan cities in Turkey, which also coincided with the years that Kurdish people had became more visible in the eyes of the “white Turkish” population. The period of forced migration, also caused important reformations in the structure of the labor market, apart from having a social impact on both destination and source regions. Downwards wage pressure for low-skilled workers forced them to move more towards middle-skilled jobs and the emptied low-skilled jobs were filled by the Kurdish immigrants in the cities. Yoruk (2012) argues that this replacement was one of the main factors behind the “Kurdization” of the working-class in Turkey. All in all, evidence about the impact of SOE on migration flows is important to analyze in order to understand its effect more carefully.

Figure 5 shows the distributions of net migration per thousand individuals and city population rate before and after the SOE rule. The negative net migration means a higher rate of emigration compared to immigration. Graphs in the first column present an apparent increase in emigration from SOE cities. Moreover, the

change in the city population rate between 1980 and 2007⁴¹ shows that the average city population rate has almost doubled in the SOE region. However, there is also a clear upward movement in the city population rate for the treatment group and also an increase in net migration for control cities, although to a lower extent. Thus, it is necessary to check the DID estimates to find the average effect of treatment on the treated. *Table 8* and *Table 9* below present the results of the empirical analysis.

Column (i) and (ii) in *Table 10* show that the decrease in net migration was comparatively larger in the treated region, although as level is above the control group rates, both before and after the SOE. For the *control group 2*, where we only use eastern and south eastern cities, the change in average net migration for the treated is now slightly smaller compared to neighbor cities. The DID estimate when *control group 3* is used, is 10.46 and thus its value is between the estimates found with other control groups. The difference-in-differences estimates are 17.63, -3.42 and 10.46. When we control for other variables such as ratio of villages in a city with sufficient water and city population rates in 1985, and also weighting observations with the size of cities, it is found that the SOE has an increasing impact for control group 1 and control group 3 on net migration under the parallel trends assumption. On the other hand, treatment effect for the control group 2 is found to be negative and statistically significant which in fact confirms the spillover impact the SOE on neighboring region. It seems that emigration from the cities in control group 2 increased compared to the immigration they have received during the SOE years.

⁴¹Data before 2007 would be better to use so that normalization effect would be eliminated however the data were not available for an earlier period. Therefore, there is a possibility for the underestimation of true impact. This should be kept in mind when interpreting the results.

Figure 5: Distribution of Net Migration and City Population Rate Before and After the SOE

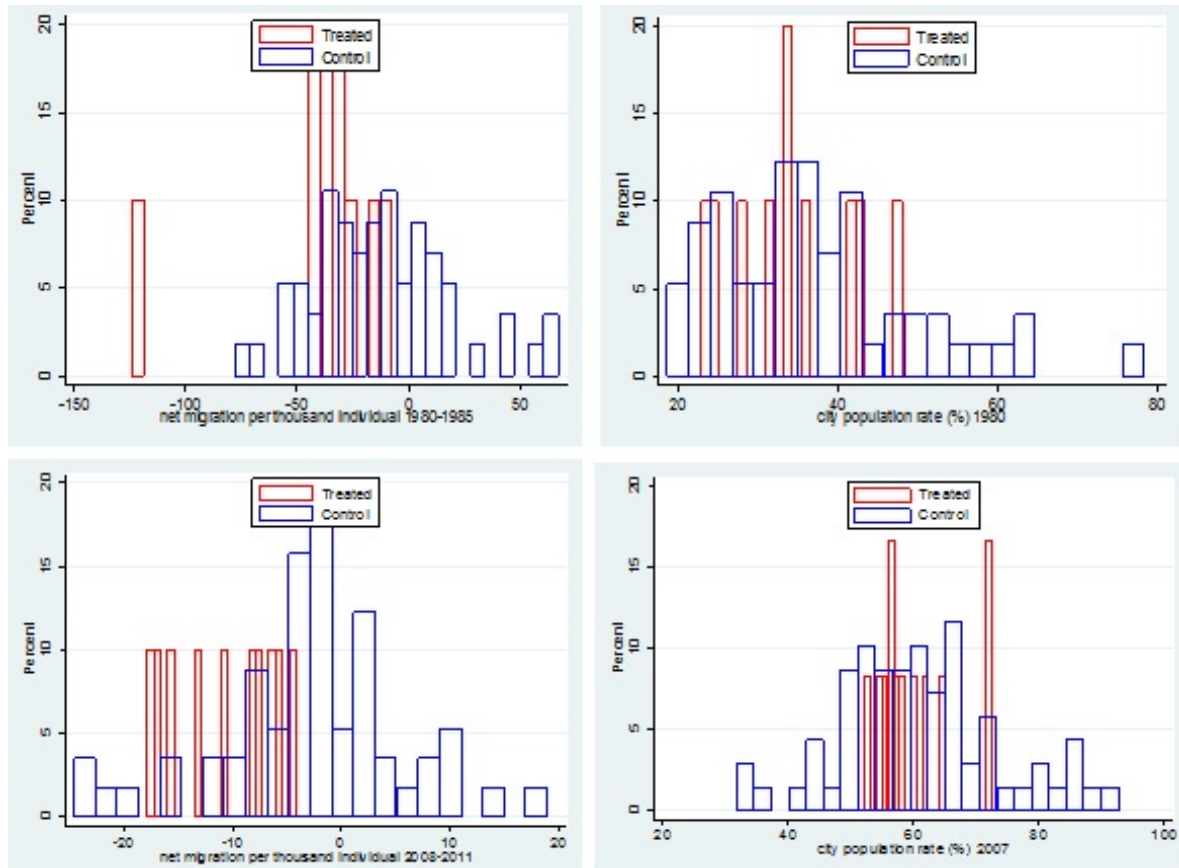


Table 10: Average Net Migration per thousand Before and After the SOE

Variable	Control Group 1 ^a			Control Group 1 ^b			Control Group 3 ^c		
	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)
(1) Net Migration before the SOE	-14.09 (3.93)	-40.38 (9.11)	-26.29 (9.92)	-41.38 (9.95)	-40.38 (9.11)	1.00 (13.48)	-25.19 (6.29)	-40.38 (9.11)	-15.19 (11.07)
(2) Net Migration after the SOE	-3.50 (1.06)	-10.46 (1.76)	-6.95 (2.06)	-10.78 (2.97)	-10.46 (1.76)	.33 (3.45)	-7.01 (1.95)	-11.73 ^d (1.80)	-4.73 (2.66)
(3) Change in mean Net Migration	11.01 (3.27)	28.64 (9.63)	17.63 (10.17)	32.06 (6.85)	28.64 (9.63)	-3.42 (11.82)	18.19 (4.77)	28.64 (9.63)	10.46 (10.75)

Notes: Standard errors are given in parentheses.

^aControl group consists of all non-SOE cities except Istanbul, Izmir and Ankara. Sample size for this control group is 53 and 65 respectively for the years before the SOE and after the SOE.

^bControl group consists of all eastern non-SOE cities. Sample size for this control group is 7 and 10 respectively for the years before the SOE and after the SOE.

^cControl group consists of cities that are matched prior to the treatment with Mahalanobis distance procedure. Sample size for this control group is 10.

^dThe number of observations for the treated cities decreased in this specification if the data is not available for the variables that are used matching with Mahalanobis distance method.

Table 11: Reduced-Form Models for Change in Net Migration

	Model ^c				
	(1)	(2)	(3)	(4)	(5)
SOE city dummy	17.63** (8.38)	12.09* (7.16)	10.35* (5.33)	-14.86** (5.62)	13.20* (7.67)
Controls for pre-treatment city characteristics ^a	no	yes	yes	yes	yes
Std. error of regression	25.30	21.27	20.85	13.26	15.67
Adj R-sq.	0.051	0.329	0.343	0.452	0.389
Joint F-test p-values ^b	—	.00	.00	.00	.05
Number of observations	64	64	64	18	18

Notes: Standard errors are given in parentheses. Mean and standard deviation of the dependent variable are 11.98 and 27.51 respectively. All models include an unrestricted constant.

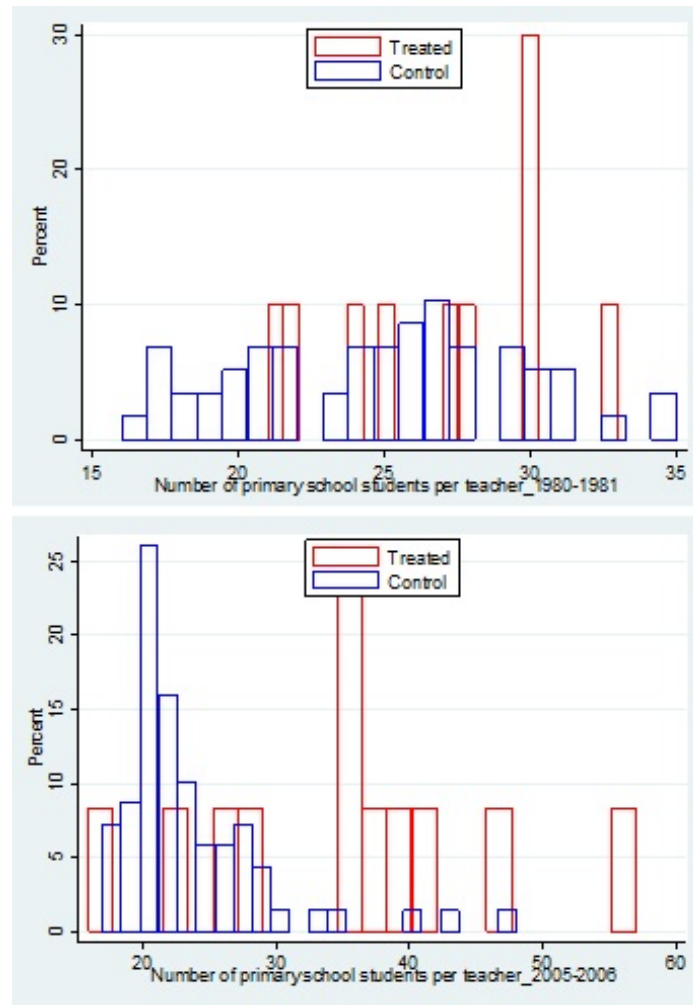
^aCity population rates and share of villages in a city with sufficient water in 1985 are used as controls.

^bProbability value of joint F-test for the exclusion of control variables.

^cControl group 1 is used in the Model (1) and (2). Besides, the Model (3), (4) and (5) present estimates of the weighted regressions using Control group 1, 2 and 3 respectively.

Moreover, one needs to dig up the findings in order to understand the direction of forced migration, and; thus, its true impact. When the changes in city populations are analyzed it is seen that the majority of the population from emptied villages flow towards the urban areas of the SOE cities in a large extent compared to the control cities. Therefore, downward wage pressure for sure is felt in the SOE region, and this can be an important contributor to the increase in unemployment rates in the region. Besides, although the number of emptied villages is argued to be around 3,000, the share of their population among the total population movements in Turkey are small. However, when we talk about the issues that are very much related with human rights, we should not only pay attention to big scale quantitative analysis, but to the impact of any policy on individual lives. Furthermore, McDowell (1996) reports that the estimated loss of produce in 1994 was 13 trillion TL (350 million US dollar) according to the Turkish Agriculturalists Association and in Mardin alone 371,492 dekar of arable land and 115,447 hectares of pasture fell into disuse as a result of the evacuations. If we think of the overall region and the 15 years impact of the SOE, then the economic cost of the forced migration would be realized better.

Figure 6: Distribution of Primary School Students per Teacher Before and After the SOE



4.3 Investments in Education

In addition to the impact of the SOE on the labor market and population flows, there is also another important dimension to be analyzed which is the investments at least in basic education level in the SOE region. In this respect, the numbers of primary school students per teacher before and after the treatment are analyzed again using DID estimates. *Figure 6* presents rough evidence for the low levels of investment in education for the SOE region especially after the SOE ruling.

As it can be seen from the Figure 6, before the treatment the distribution of treated and control groups stay in the same range, however this situation is very different after the SOE with a clear improvement in the control group and a worsening of the situation in the treated cities. Besides, it must be noted that although governments' investment on education did not satisfied expectations and, in addition to that, there was also a negative impact of the PKK attacks on schools and teachers during the SOE years. Yildirim and Ocal (2012) argues that "there have been 128 attacks against schools or teachers between 1984 and 2000".

Table 12: Average Primary School Students per Teacher Before and After the SOE

Variable	Control Group 1 ^a			Control Group 1 ^b			Control Group 3 ^c		
	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)
(1) Net Average Primary School Students per teacher before the SOE	24.43 (.62)	26.91 (1.12)	2.48 (1.28)	28.29 (1.97)	26.91 (1.12)	-1.37 (2.27)	26.85 (1.14)	28.12 (1.22)	1.27 (1.67)
(2) Net Average Primary School Students per teacher after the SOE	23.15 (.53)	32.08 (1.71)	8.92 (1.79)	28.3 (2.07)	32.08 (1.71)	3.78 (2.68)	25.43 (2.26)	32.37 (1.88)	6.95 (2.94)
(3) Change in mean Net Average Primary school students per teacher	-1.296 (.54)	4.09 (1.51)	5.39 (1.60)	.714 (2.03)	4.09 (1.51)	3.38 (2.53)	-1.43 (2.22)	4.25 (1.89)	5.68 (2.92)

Notes: Standard errors are given in parentheses.

^aControl group consists of all non-SOE cities except Istanbul, Izmir and Ankara. Sample size for this control group is 54 and 65 respectively for the years before the SOE and after the SOE.

^bControl group consists of all eastern non-SOE cities. Sample size for this control group is 7 and 10 respectively for the years before the SOE and after the SOE.

^cControl group consists of cities that are matched prior to the treatment with Mahalanobis distance procedure. Sample size for this control group is 7.

^dThe number of observations for the treated cities decreased in this specification if the data is not available for the variables that are used matching with Mahalanobis distance method.

Table 12 shows that primary school students per teacher is strikingly increases in the treated group between 1980 and 2003, whereas the control groups have an improvement in the educational investment during the same period with a decrease in the average number of primary school students per teacher both for *control group 1* and *control group 3* although the improvement may not be seen as remarkable at first sight, its betterment can be understood more better if one considers the increasing urbanization rate in Turkey in the period after 1980. If we only take eastern and south eastern cities as the control group, than we again see that treated group has a lower educational investment than *control group 2*. Moreover, the difference-in-differences estimates (5.39, 3.38 and 5.68, respectively for *control group 1*, *control group 2* and *control group 3*) are significant at the .05 level.

Reduced-form specification results that are presented in Table 13 support the DID estimate (The estimate found in Model (4) is insignificant, although close to the other coefficients in magnitude). In Models (1), (2) and (3), the impact of the SOE ruling is found to be negative on the educational development in the region, since the results show an increase in the number of students per teacher after the SOE in both specifications. Thus, it can be concluded that, under the common trends assumption, cities governed by SOE rule had comparatively lower public investments in basic education level. This result is also confirmed by the estimations from Models (4), (5) and (6) in which observations are weighted by the size of city.

Table 13: Reduced-Form Models for Change in Primary School Students per Teacher

	Model ^c					
	(1)	(2)	(3)	(4)	(5)	(6)
SOE city dummy	5.39*** (1.37)	4.77** (1.68)	5.06** (2.05)	5.68* (2.90)	5.36 (3.18)	5.33* (2.70)
Controls for pre-treatment city characteristics ^a	no	yes	yes	no	yes	yes
Std. error of regression	4.144	2.465	3.877	5.597	5.969	3.688
Adj R-sq.	.18	.45	.33	.17	.05	.65
Joint F-test p-values ^b	—	.00	.02	—	.70	.01
Number of observations	64	64	55	15	15	15

Notes: Standard errors are given in parentheses. Mean and standard deviation of the dependent variable are 6.28 and 3.27 respectively. All models include an unrestricted constant.

^aCity population rate in 1985, ratio of villages with sufficient freshwater in 1985 and ratio of asphalt road in villages in 1985 are used as controls.

^bProbability value of joint F-test for the exclusion of control variables.

^cModels (1), (2) and (3) use control group 1; models (4), (5) and (6) employ the control group 3. Estimation results for the control group 2 are not reported since they are statistically insignificant. Besides, observations are weighted by the size of city in Models (3) and (6) respectively for control group 1 and 3.

Furthermore, we can construct the propensity scores and then find the impact of the SOE ruling on the educational investments using propensity score matching. Logit regression of the treatment dummy on all of the controls shows that the propensity score is balanced. Moreover, the average treatment effect on the treated is found to be 5.5 and it is significant at a level of 5%. Thus, we can be confident with the DID estimates above, since propensity score matching estimates also confirm the previous results we have found.

5. Placebo and Sensitivity Tests

In this section, placebo test for the common trend assumption and sensitivity analysis are performed in order to check the robustness of findings. For placebo tests, data for two pre-treatment periods is used for the diff-in-diff estimates. If no effect would be found of the “fake” treatment then this will bring more credibility to the results. Moreover, as it can be understood from the test procedure, it is only possible to perform this test when two data points before the treatment intake are available which enables the robustness check for the impact of the SOE on unemployment rates and labor force participation rates. For sensitivity tests, time span of the analysis is changed both before and after the treatment in order to check if short term and long term effect of the SOE is different. It is important to check because common trend assumption is normally less likely to hold when time period gets longer. Moreover, this would be useful to see if there are any anticipation effects (people know that SOE will be likely to be implemented might change their behavior) or also some sudden change in violence just before the SOE in treated regions that might affect the validity of the estimates. Moreover, standard errors are adjusted using “clustering” by cities. (Bertrand, Duflo and Mulainathan (2004) and Kezdi (2004)).

5.1 Robustness checks for Unemployment Rates

Table 1A below presents the results of Diff-in-Diff on unemployment in 1980 and 1985 both of which are pre-treatment years. As it can be seen from the table, the impact of treatment is negligible in all control group specifications. Besides, *Table 2A* shows the estimates from the reduced-form regression results controlling for pre-treatment city characteristics which are statistically insignificant for all model specifications.

Table 1A: Average Unemployment Rate Before and After the SOE

Variable	Control Group 1 ^a			Control Group 1 ^b			Control Group 3 ^c		
	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)
(1) Unemployment before the SOE	2.87 (.17)	3.93 (.41)	1.04 (.44)	3.00 (.18)	3.92 (.41)	.92 (.44)	3.07 (.39)	3.92 (.41)	.86 (.56)
(2) Unemployment after the SOE	3.83 (.21)	5.09 (.46)	1.25 (.50)	3.98 (.22)	5.09 (.46)	1.10 (.51)	4.02 (.49)	5.09 (.46)	1.06 (.67)
(3) Change in mean unemployment	.95 (.10)	1.16 (.30)	.21 (.32)	.97 (.10)	1.16 (.31)	.19 (.32)	.96 (.28)	1.16 (.31)	.21 (.41)

Notes: Standard errors are given in parentheses.

^aControl group consists of all non-SOE cities except Istanbul, Izmir and Ankara. Sample size for this control group is 53 and 65 respectively for the years before the SOE and after the SOE.

^bControl group consists of all eastern non-SOE cities. Sample size for this control group is 7 and 10 respectively for the years before the SOE and after the SOE.

^cControl group consists of cities that are matched prior to the treatment with Mahalanobis distance procedure. Sample size for this control group is 7.

^dThe number of observations for the treated cities decreased in this specification if the data is not available for the variables that are used matching with Mahalanobis distance method.

Table 2A: Reduced-Form Models for Change in Unemployment

	Model ^c			
	(1)	(2)	(3)	(4)
SOE city dummy	.207 (.26)	-.002 (.31)	.577 (.57)	.226 (1.37)
Controls for pre-treatment city characteristics ^a	no	yes	yes	yes
Std. error of regression	.801	.700	.858	.877
Adj R-sq.	.35	.45	.37	.27
Joint F-test p-values ^b	—	.00	.09	.08
Number of observations	64	64	18	18

Notes: Standard errors are given in parentheses. Mean and standard deviation of the dependent variable are 6.28 and 3.27 respectively. All models include an unrestricted constant.

^aCity population rate at 1985, share of workers in industrial sector in 1985 and net migration rate between years 1975 and 1980 are used as controls.

^bProbability value of joint F-test for the exclusion of control variables.

^cControl group 1 is used in the estimations of Model (1) and (2). Control group 2 is used in the estimations of Model (3) and Control Group 3 in Model (4).

Furthermore, graphical presentation of the trends in control region (dummy=0) and treated region (dummy=1) before the starting year of the SOE ruling can be observed below which shows a similar trend in both regions.

Sensitivity analysis is done by enlarging the time period using 1980 as pre-treatment period and 2010 as post-treatment period. The results below show that there is still significant impact of SOE on the unemployment rates in the control groups although common trends assumption is normally less likely to hold in a longer time span.

Table 3A: Sensitivity Analysis for the Unemployment Rate

Variable	Model		
	Control Group 1	Control Group 2	Control Group 3
SOE city dummy	2.87** (.883)	3.097** (1.435)	2.268 (1.407)
Std. error of regression	2.665	2.967	2.910
Adj. R-sq.	.13	.18	.09
Number of observations	64	18	18

Notes: Standard errors are given in parentheses. All models include an unrestricted constant.

5.2 Robustness checks for Labor Force Participation Rates

When the same analysis above is repeated for the labor force participation rates, it is also found that the effect of the treatment is negligible in all control group classifications. For the Table 4A below the two time periods before the SOE ruling are 1980 and 1985.

Graph 1A: Trends in Control Region vs. Treated Region

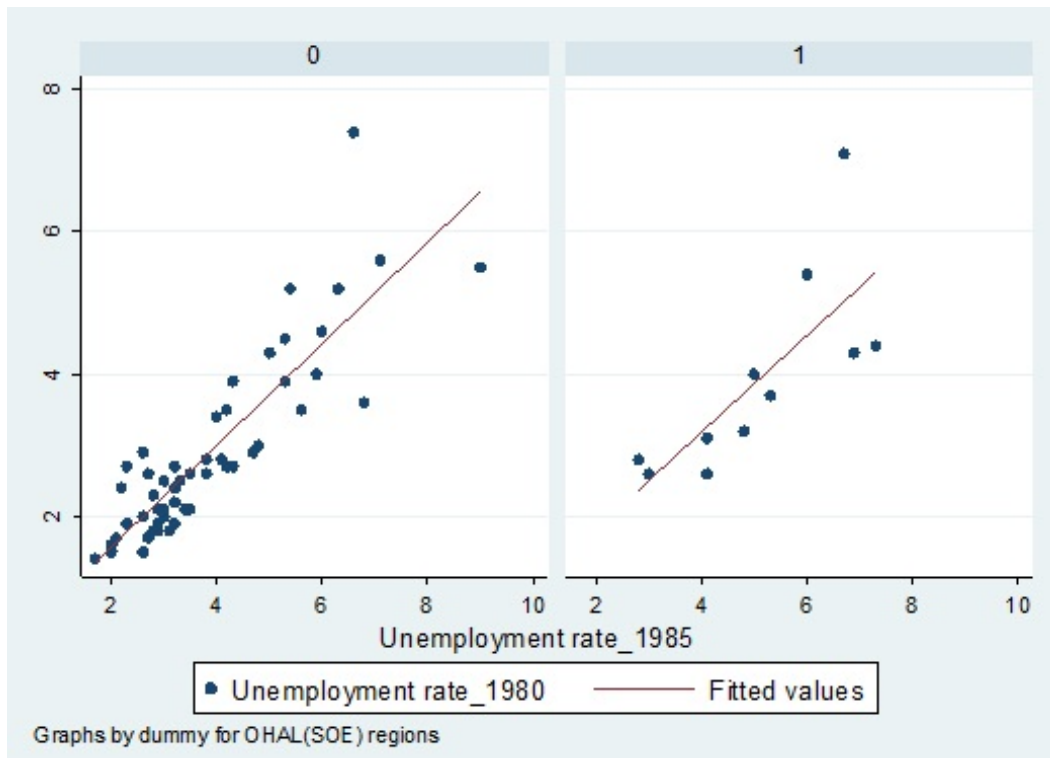


Table 4A: Average Labour Force Participation Rate Before and After the “fake” SOE

Variable	Control Group 1 ^a			Control Group 1 ^b			Control Group 3 ^c		
	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)	Control (i)	Treated (ii)	Difference Treated-Control (iii)
(1) LFP before the SOE	67.46 (.75)	71.34 (1.66)	3.88 (1.83)	67.71 (2.79)	71.34 (1.66)	3.62 (3.25)	70.73 (1.30)	71.33 (1.66)	.60 (2.11)
(2) LFP after the SOE	66.04 (.75)	70.95 (2.00)	4.91 (2.14)	66.7 (2.70)	70.95 (2.00)	4.25 (3.36)	69.8 (1.21)	70.95 (2.00)	1.15 (2.34)
(3) Change in mean LFP	-1.42 (.21)	-.38 (.57)	1.04 (.61)	-1.01 (.55)	-.38 (.57)	.63 (.79)	-.93 (.52)	-.38 (.57)	.55 (.77)

Notes: Standard errors are given in parentheses.

^aControl group 1 consists of all non-SOE cities except Istanbul, Izmir and Ankara. Sample size for this control group is 52 and 65 respectively for the years before the SOE and after the SOE.

^bControl group 2 consists of all eastern non-SOE cities. Sample size for this control group is 7 and 10 respectively for the years before the SOE and after the SOE.

^cControl group 3 consists of cities that are matched prior to the treatment with Mahalanobis distance procedure. Sample size for this control group is 7.

^dThe number of observations for the treated cities decreased in this specification if the data is not available for the variables that are used matching with Mahalanobis distance method.

The reduced form regression outcomes are presented in the *Table 5A* also show that treatment is not significant when we consider the difference in the labor force participation rates for the two periods before the SOE ruling. It can be seen below that the treatment is slightly significant if the controls for the pre-treatment city characteristics are omitted from the regression. It is always statistically insignificant if these controls are added in the regression regardless of the control group specification. Besides, the trend in the labor force participation rates is found to be similar in the control and treated regions as it can be seen from the *Graph 2A* below.

Table 5A: Reduced-Form Models for Change in Labor Force Participation

	Model ^c			
	(1)	(2)	(3)	(4)
SOE city dummy	1.04* (.53)	.71 (.62)	.19 (1.01)	.65 (.86)
Controls for pre-treatment city characteristics ^a	no	yes	yes	yes
Std. error of regression	1.60	1.57	1.78	1.65
Adj R-sq.	.06	.14	.18	.28
Joint F-test p-values ^b	—	.13	.35	.16
Number of observations	64	64	18	20

Notes: Standard errors are given in parantheses. Mean and standard deviation of the dependent variable are -19.78 and 9.96 respectively.

All models include an unrestricted constant.

^aCity population rate at 1985, share of workers in industrial sector in 1985 and net migration rate between years 1975 and 1980 are used as controls.

^bProbability value of joint F-test for the exclusion of control variables.

^cControl group 1 is used in the estimations of Model (1) and (2). Control group 2 is used in the estimations of Model (3) and Control Group 3 in Model (4).

Graph 2A: Trends in Control Region vs. Treated Region



Table 6A: Sensitivity Analysis

Variable	Model		
	Control Group 1	Control Group 2	Control Group 3
SOE city dummy	-13.96*** (1.91)	-10.27*** (3.44)	-10.94*** (2.89)
Std. error of regression	5.75	5.49	6.44
Adj. R-sq.	.45	.59	.41
Number of observations	64	18	20

Notes: Standard errors are given in parentheses. All models include an unrestricted constant.

It is also important to check the impact of the treatment when a longer time span is considered. With this aim, labor force participation rates in 1980 and in 2010 are used in the calculation of the difference of the rates between these years and then the difference is regressed upon the treatment dummy. The results are presented in *Table*

6A above and it shows that the treatment is still significant and thus the results are found to be not sensitive for the time period that it used.

6. Conclusion

This paper analyzed socio-economic the impact of 15-year SOE ruling in East and South-East Turkey using DID estimation technique. It is found that the SOE had a significant worsening impact both on unemployment rates and labor force participation rates in the region. Moreover, when the changes in city populations are analyzed, it is seen that the majority of the population from emptied villages flowed towards the urban areas of SOE cities or neighboring Eastern cities to a larger extent, in comparison to the control cities. Therefore, downward wage pressure for sure is felt in the SOE region and this can be an important contributor to increased unemployment rates in the region. Furthermore, under the common trends assumption, cities that are governed by the State of Emergency rule had comparatively lower investments in public education.

Thus, one can claim that political motivations for the implementation of the SOE ruling in the 13 cities for almost 15 years, did not take into account its socio-economic outcomes. Increased unemployment, low levels of educational investments and lower levels of labor force participation are the main factors behind economic stagnation, which could also stimulate ethnic tensions in the region and among the Kurdish population in general. Therefore, the government should find an effective way of improving the economic conditions in the region together with educational investment. After 2002, the increase in the number of universities in the region and investments in the basic education level should be maintained. Moreover, incentive programs for private investment in the region should be reachable with less bureaucracy and more efficiency. Otherwise, the famous rhetoric of previous governments on targeting the Kurdish conflict in the region especially in 1960s –which was “backwardness”- will continue to be used and therefore, ethnicity perspectives of the conflict will be disregarded, which unfortunately will not help Turkey either from an economic or socio-political point of view.

To sum up, results of the analysis have crucial importance since it has been always argued that ethnic conflict and terror activities were the source of underdevelopment in the Eastern and South-eastern region of Turkey but this argument were in need of a quantitative analysis. Thus, this paper shows that SOE implementation, although it has been argued to eliminate the political instability in the region, in fact contributed

to an upsurge in the ethnic conflict. It can be also seen as an important source of continuing ethnic tensions because many people who had to empty their villages and faced force migration started to support the PKK actively and thus the tension is also migrated to the cities with the implementation of the SOE. Thus, this 15-year ruling under the SOE had been caused a huge financial cost in addition to deterioration of the ethnic conflict in Turkey. Moreover, the results showed that SOE ruling and its spillover impacts were in fact feeding back into the ethnic conflict in Turkey which makes the solution even harder to achieve. Thus, it can be argued that not a new SOE ruling but more investments in the region is necessary to handle the issue. In that sense, government needs to find a way to attract investors to the region and thus decrease unemployment rate in the region which is more widespread among the youth.

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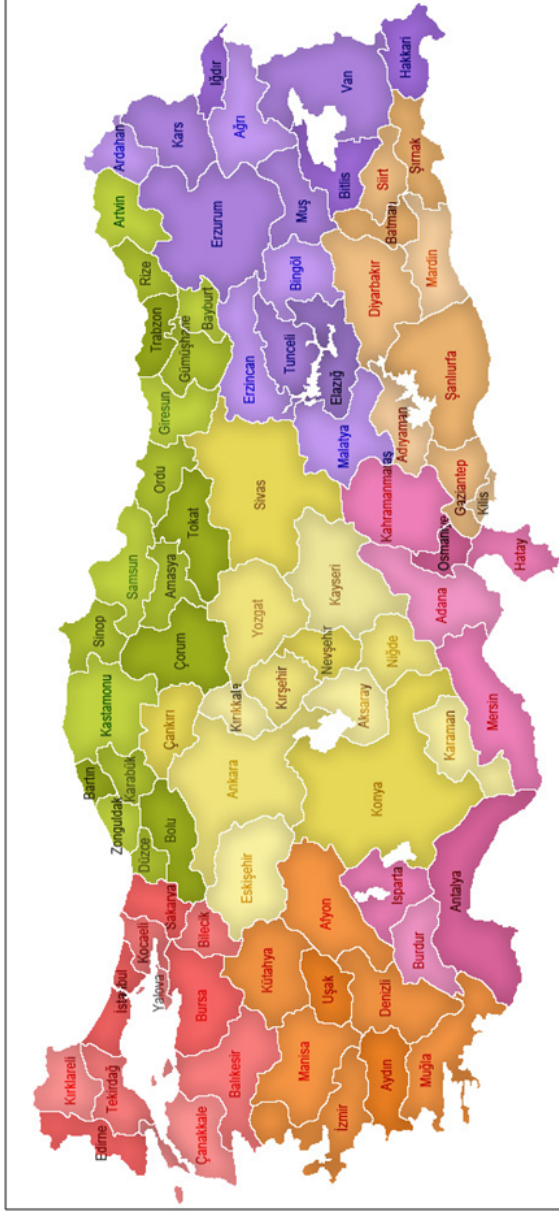
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Appendix

Figure 7: Regional Map of Turkey



Notes: The cities that are governed under the State of Emergency between 1987 and 2002 are Adıyaman, Batman, Bingöl, Bitlis, Diyarbakır, Elazığ, Hakkari, Mardin, Muş, Şırnak, Tunceli and Van which are located in the East and South East regions coloured in brown and purple.

STATE OF EMERGENCY LAW⁴²

PART ONE GENERAL PROVISIONS

Purpose:

Article 1 - The purpose of this Act, in case of,

a) Natural disasters, dangerous epidemic diseases or serious economic crises, or

b) The appearance of serious indications resulting from widespread acts of violence designed to eliminate the free democratic order established by the Constitution or fundamental rights and freedoms or violent actions causing serious deterioration of public order, is to determine the declaration of a state of emergency and the procedures to be applied in states of emergency.

Scope:

Article 2 - This Act covers provisions of the declaration of a state of emergency; the financial, material and working obligations imposed on citizens during states of emergency declared in the case of natural disaster, dangerous epidemic diseases or serious economic crises. Provisions shall differ for each type of state of emergency concerning how fundamental rights and freedoms shall be limited or suspended; how and in which way necessary measures shall be taken; what sort of powers shall be given to public service officials; what changes shall be made in the position of officials; and administrative procedures of emergency.

DedARATION of States of Emergency:

Article 3 - The Council of Ministers assembled under the chairmanship of the President shall declare the states of emergency:

a) in the case of observing the existence of one or more natural disasters, dangerous epidemic diseases or serious economic crises,

b) in the case of appearance of serious indications resulting from widespread acts of violence which are designed to eliminate free democratic order or fundamental rights

⁴²State of Emergency Law, dated 25.10.1983, Law No:2935, see Official Newspaper on 27.10.1983 no:18204.

and freedoms or violent actions causing serious deterioration to public order, after consulting with the National Security Council, in one or more regions or the whole of the country for a period not to exceed six months.

The state of emergency decision shall be published in the Official Gazette and immediately submitted for approval by the Grand National Assembly of Turkey. If the Grand National Assembly of Turkey is closed, it shall be called for an immediate meeting. The Assembly may amend the duration of the state of emergency. On demand of Council of Ministers, the Assembly may prolong the duration in each case for a period not exceeding four months, or may abrogate the state of emergency.

The Council of Ministers, after the declaration of states of emergency in accordance with the provision «b» of this Article, shall also consult with the National Security Council before making a decision on the subjects related to prolonging the duration, to alter the scope or to abrogate the state of emergency.

The reasons for states of emergency decision, its duration and region, shall be announced by the Turkish Radio and Television and if the Council of Ministers deems necessary, by other instruments.

Decree Having Force of Law:

Article 4 - During a state of emergency, the Council of Ministers meeting under the chairmanship of the President of the Republic, may issue decrees having force of law on matters necessitated by such state of emergency without complying with the restrictions and procedures provided by Article 91 of the Constitution. Decrees having force of law shall be published in the Official Gazette and submitted to the Grand National Assembly of Turkey for approval.

PART TWO

OBLIGATIONS AND MEASURES TO BE TAKEN

CHAPTER ONE

Obligations and Measures to be Taken in Natural Disasters and Dangerous Epidemic Diseases.

Obligations:

Article 5 - In the case of states of emergency declared due to natural disasters and dangerous epidemic diseases, to rescue victims of catastrophes, to provide the necessary money and any type of property real or personal not immediately available but which are needed in order to compensate the damage and detriment incurred and to do whatever else needs to be done in terms of financial, material and labour obligations.

Financial Obligations:

Article 6 - In the case of states of emergency declared due to natural disasters and dangerous epidemic diseases, necessary expenses shall be provided primarily by the public resources and assistance.

If the sufficient money shall not be provided on time from public resources for urgent and vitally needed materials, the facilities of the credit institutions in that region shall be used.

In the application of financial obligations, efforts shall be made not to disrupt the service and activities of the institutions.

Material Obligations:

Article 7 - Public institutions and natural and artificial persons within the region of the states of emergency declared due to natural disasters and dangerous epidemic diseases, shall be compelled to give land, buildings, establishments, instruments, materials, food, medicine and medical supplies in order to fulfill the obligations imposed on them.

For this purpose, obligations shall be imposed first on governmental department having their own budget; governmental department depending on general budget; State Economic Enterprises; and establishments with institutions connected to them and local administrative bodies within that region. If the needs shall not be met sufficiently within requisite time and from these resources, taking into consideration the capabilities and resources, obligations shall be placed on resources belonging to private establishments and natural persons in that region.

If the necessary items such as food, clothing, instruments, materials, medicine and medical supplies can not be provided from within the limits of the region, they can be supplied from the nearest regions according to the provisions of this Act.

Labour Obligations:

Article 8 - All citizens between 18 and 60 years of age, who are resident within the region of the states of emergency declared due to natural disasters and dangerous

epidemic diseases, are obliged to perform the services imposed on them under the states of emergency.

In putting into operation, the related labour prohibition provisions the age, sex, health, profession, occupation and social situation of those persons charged with these obligations and those of their family and dependents shall be taken into account.

The organization of the Work and Worker Supply Institution shall be used in providing the employee needs and transfer of employees among establishments.

If it is deemed necessary, the working hours, both day and night, in work places may be increased in accordance with the nature and the level of the need of the work. The application of provisions of the Law on Weekend Holidays, the Law on National Feast Days (Bairam) and General Holidays, the Law on Midday Rest may be totally or partially suspended.

In the application of labour obligations, consideration shall be given to not disrupting the duties and services of the establishments and the professional activities of the persons under obligation.

Measures to be Taken:

Article 9 - In the case of states of emergency declared due to natural disasters and dangerous epidemic diseases, the following measures may be taken in consideration of the events which necessitated the declaration of states of emergency:

a) To prohibit from residing in certain locations of the region; to restrict entry into and departure from certain areas; to evacuate certain areas or to transfer people to other places,

b) To suspend training at all levels of official and private education and training institutions and to close, permanently or temporarily, student dormitories,

c) To control and to limit the opening and closing times and if deemed necessary, to close and to use in a manner required by the states of emergency, places such as casinos, restaurants, pubs, drinking places, taverns, discotheques, bars, dancing places, cinemas, theatres and similar places of entertainments and similar gambling saloons, hotels, motels, campgrounds, holiday villages and similar holiday establishments;

d) To limit or suspend annual vacation leave of personnel in charge of carrying out the services required under the states of emergency of that region;

- e) To use (benefit from) all communication media and instruments in that region and if necessary for this purpose temporarily seize them;
- f) To demolish unsafe buildings; to destroy real estate and personal property which threaten health, and articles of food and products which are deemed unhealthy;
- g) To control, to limit or if necessary to prohibit certain articles of food, animal and animal fodder and animal produce taken in and out of the region;
- h) To regulate the distribution of the essential needs;
- i) To take necessary measures, if deemed necessary to obtain and control necessary articles of food, goods, and every sort of oil used in cooking, heating, cleaning and lighting; medicine, chemical materials, tools and other items used in protecting health, treatment and medical science; goods and materials used in construction, industry, transportation and agriculture; production, sale, distribution, store and commerce of the other goods, material, instrument and every type of material necessary for the public; and to close work places which are not of vital importance to the region considering the nature and method used to slow down and stop production, to sell at excessively high prices, to confiscate, hide, or to refrain from selling such goods;
- j) To take measures in relation to land, sea and air traffic, to order and prohibit or restrict the transportation of vehicles in or out of the region.

CHAPTER TWO

Obligations and Measures to be Taken in the Event of Serious Economic Crises

Obligations and Measures to be Taken in the Event of Serious Economic Crises:

Article 10 - In the case of states of emergency declared due to a serious economic crisis, the Council of Ministers may issue decrees having force of law to direct markets in goods, capital and services as they effect tax, monetary, credit, rent, remuneration and price policies; and determine regulate and implement every kind of measure and obligation in relation with labour In order to regulate and improve the economy.

The Council of Ministers may authorize related Ministries or the States of Emergency Co-ordination Council on Economic Affairs which will be formed by the following provision, in order to apply the decisions taken in accordance with the competence given to itself by the Decrees Having Force of Law.

The States of Emergency Co-ordination Council on Economic Affairs shall be formed by the following members: The Prime Minister, as President of this Council; Minister of State, who is responsible for economic affairs; and Ministers of Finance, Commerce, Agriculture and Forest, Industry and Technology, Energy and Natural Resources, Customs and Monopoly; and Labour.

This Council may entrust either the governor of provinces or regions, or if necessary, other public institutions or establishments, in order to implement certain decisions.

Decisions taken by the Council of Ministers and the determination of implementation of decisions taken by the States of Emergency Co-ordination Council on Economic Affairs, shall be declared in the Official Gazette and shall be notified to all interested parties.

CHAPTER THREE

Measures to be Taken in the case of Violence

Measures:

Article 11 - In the case of states of emergency declared in accordance with the Article 3/1, b, in order to protect general security, safety and public order and to prevent the spread of acts of violence, in addition to the measures taken in accordance with Article 9, the following measures may also be taken:

- a) Imposing of a limited or full curfew,
- b) Prohibition of any kind of assembly or procession or movement of vehicles in certain places or within certain time limits,
- c) Empowering officials to search people, their vehicles or goods and to seize goods deemed to have evidentiary value,
- d) Imposition of obligations to carry identity cards upon the residents or any parties entering to the region in which states of emergency are declared,
- e) Prohibition of or requiring permission for the publication, issuing of reprints or editions, and distribution of newspapers, magazines, brochures, books, etc.; and prohibition of importation and distribution of publications published and reprinted outside the region where states of emergency are declared; and to confiscate books,

magazines, newspapers, brochures, posters and similar publications of which the publication and dissemination have been banned,

f) To control, if deemed necessary and to restrict or prohibit every kind of broadcasting and words, writings, pictures, films, records, sound and image bands (tapes),

g) To order, take or increase special security measures for internal security of banks and sensitive public and private entities,

h) To control, if deemed necessary to suspend or prohibit the showing all kinds of plays and films,

i) To prohibit carrying or conveying all types of weapons and projectiles even though licensed,

j) To prohibit or to require permission for the holding, preparing, manufacturing or conveying of every type ammunition, bombs, destructive materials, explosives, radioactive materials or corrosive, caustic, ulcerating chemicals

or every kind of poisons and suffocating gas and similar materials; and to confiscate or demand the submission of goods, instruments and tools used in preparing or manufacturing of the above mentioned items,

k) To forbid persons or groups believed to be disrupting public order or public security from entering the region; to expel such persons from the region or to force them to reside or enter specified places in the region,

l) To prohibit or restrict or regulate the entry into and exit from establishments or institutions which are considered to be necessary for the security of the region,

m) To prohibit, postpone or require permission for assemblies and demonstrations both in enclosed and open places; or to determine, publicize and provide the time and place of assemblies and demonstrations; or to supervise or deemed necessary, to disperse all kinds of permitted assemblies,

n) (Amended by Law No: 3076, dated 14/Nov./1984) To postpone or to require permission, for a period of not more than three months, the removal of labour considering the conditions of the employer, except in cases of the termination or cancellation of labour contracts on demand of workers, situations contrary to morals and good faith, health reasons, normal retirement and expiration of a specified period,

o) (Amended by Law No: 3076, dated 14/Nov./1984) To suspend the activities of associations for not more than three months by taking separate decisions for each association,

ö) (Amended by Law No: 3076, dated 14/Nov./1984) To postpone the application

of strike and lock-out decisions for a maximum of one month,

p) (Additional provision by Law No: 3310, dated 3/Sept./1986) In the case of the existence of the events that caused the declaration and continuity of states of emergency within the borders of the Republic of Turkey and related regions according to the Article 121 of the Constitution and where it has been determined that the people who carried the actions are taking refuge in a neighbouring country, within the framework of an agreement between the government of the Republic of Turkey and that of the said neighbouring country and in each case with the permission of the Council of Ministers through the Office of the Chief of the General Staff, upon request of the governor, the competent commander shall plan and execute an operation, in so far as necessary, beyond the Turkey's borders, along with elements of Army, Navy and Air Forces in order to capture or incapacitate these people.

PART THREE

ORGANS AND IMPLEMENTATION

CHAPTER ONE

Organs

Coordination:

Article 12 - (Amended by Law No: 3432, dated 21/April/1988) In the case of declared states of emergency, co-ordination shall be provided by the Prime Ministry or a ministry designated by the Prime Minister.

For this purpose, a States of Emergency Co-ordination Council shall be established by the representatives of ministries related to the cause of the declaration of states of emergency. Moreover, the ministries which participate in this Council may designate a unit for the same purpose within the central administration or form a special unit.

The formation and function principles of the States of Emergency Co-ordination Council shall be provided by a regulation to be promulgated.

The provisions of Article 10 are limited to states of emergency declared due to serious economic crises.

States of Emergency Council and Offices:

Article 13 - Within the region of declared states of emergency, the State of Emergency Council shall be established by the following members: the Regional Governor as the chairmanship of this Council and the governors of provinces and other directors of public establishments and the garrison commander or a representative entrusted by the commander. The purpose of this Council is to appreciate and to supervise the application of measures taken and events that resulted the states of emergency and to prepare propositions related to these subjects. The tasks of the organization of Regional Governancy and its institutions are kept.

If the Regional Governor deems it necessary if state of emergency is declared in one province, the States of Emergency Bureau shall be established in the province's center and districts (towns). The Province Bureau presidency shall be held by the province governor or designated by the governor. District bureau presidency shall be held by the governor of district.

During the states of emergency, with the exception of the personnel employed in the civil and administrative judiciary and within the organization of the military, public service personnel designated by their director may be employed with their own staff in these bureaux and Council.

The formation, meeting, decision taking, procedures and principles of States of Emergency Council and Bureaux shall be determined by regulation.

CHAPTER TWO

Implementation of states of emergency

Implementation of States of Emergency:

Article 14 - The duty of and authority for implementing states of emergency shall belong to,

- a) the governor of a province, if the state of emergency covers one province;
- b) the regional governor, if states of emergency are declared in more than one province administratively connected to a regional governancy;
- c) the regional governors, with co-ordination and cooperation being provided by the office of the Prime Minister, if states of emergency are declared throughout the country or in provinces which are within the jurisdiction of more than one regional governor.

All necessary actions shall be carried out by them.

Regional governors may transfer, totally or partially, the duty and authority to governors of provinces where states of emergency are declared.

The Notification and Application of Obligation:

Article 15 - General obligations shall be announced through every kind of mass media instrument. If necessary specific obligations shall be notified to interested persons in written form and, in urgent cases notification may be made orally to be later confirmed by written notification.

Upon notification, persons under obligation shall compulsorily deliver money, real estate and movables subject to the obligations to authorities within the recognized period and according to procedure, and if they are under labour obligation, such persons may be required to start work on the specified day and at the time.

Establishing Repayment Obligations:

Article 16 - An official document shall be given to persons whose goods have been delivered or used, and/or who have performed compulsory labour.

Payment shall be made to persons under labour and material obligation upon submission of this document to the relevant authorities. The States of Emergency Council or Bureaux shall establish and value the price, rent, remuneration or compensation for the delivered goods and compulsory labour by taking into consideration local current or selling prices.

In the case of delay in payment or payment by instalments, repayment shall include interest at the legal rate.

Interested persons, in accordance with the general provisions, may apply to the civil judiciary if they dispute the valuing of price, rent money, remuneration or compensation.

Goods Taken for Temporary Period:

Article 17 - Transportation vehicles and other goods which are taken for a temporary period shall be returned to interested persons when the obligation has terminated.

Implementation provisions of Article 16 and this provision shall be shown in regulation.

Returning of Goods Belonging to Public Establishments:

Article 18 - Real estate, movables and materials which are not consumed which belong to governmental departments having their own budget, governmental departments depending on general budget, State Economic Enterprises and establishments with institutions connected to them and local administrative organs, shall be returned. No price, remuneration, rent money or compensation shall be paid for them.

Exceptions:

Article 19 - The provisions of Article 9/b,d and e and Article 11/c shall not apply to civil judiciary and military institutions and judges, prosecutors and military personnel.

In imposing obligations and taking measures, the provisions of International Law that recognize privileges for diplomatic representatives and members and legislative immunities shall be complied with.

PART FOURTH DEMAND OF AID

Aid Demand in Case of Natural Disaster and Epidemic Diseases:

Article 20 - Regional governors of the regions where states of emergency are declared according to this Act Article 3/1, a, will apply to other regional governors in that area, where Urgent Rescue and Aid Organizations in civil administration institutions under their administration can not satisfy the needs.

Regional governors, when faced with urgent emergency situations or until aid sent by the nearest regional governors reaches them, may require aid from the highest military commandship in that region.

Demands of the regional governor mentioned above shall immediately be provided.

Demand of Force:

Article 21 - Regional governors of regions where states of emergency have been declared in accordance with Article 3/1, b of this Act shall try to repress and prevent

existing or potential social occurrences in their regions by the use of forces under their command or by the use of security forces organized for this purpose.

If they are unable to prevent or think that it is impossible to prevent, or if they are unable to implement measures with the above mentioned forces, or think that it is impossible to implement the measures with the said forces, they shall apply to other regional governors in the area, in order to demand the assistance of that region's security forces or forces organized for this purpose. The Ministry of Interior shall also be notified of this situation.

If all these measures can not be considered adequate or if it is faced with an urgent and extraordinary events, the regional governor may require aid from the highest military commandership in that region.

The above mentioned demands of regional governor shall be met by the authorities without any delay.

If a regional governor demands aid from the military, the action shall be carried out in accordance with the following provisions;

a) In urgent cases this demand may be made orally later to be replaced by written demand,

b) The military force demanded for potential events and of which capacity fixed by the military commandership, taking into consideration the views of the governor of the province in question, shall be made ready in a place appropriate for intervention into the events.

if it is military force which is demanded for urgent and extraordinary events, the duty assigned by the regional governor shall immediately be carried by the military force with the responsibility of its commander and under its orders and directions, in accordance with the competence regulated in Turkish Armed Forces Internal Service Act and the competence recognized for security forces in order to provide general security.

c) The co-operation and co-ordination between security forces and military forces which come to assist and the principles to order and command shall be determined by the regional governor and the highest military commander in that region. But if certain tasks carried out by together security forces and the military unit which come to assist, the command, administration and direction shall be undertaken by the commander of military or the senior commander of military on duty.

d) The expenses necessitated in the use of military force shall be provided by

appropriation in the budget of the Ministry of Interior without waiting an order for payment.

Aid and Force Demand by the Governor of Provinces:

Article 22 - a) The governors of provinces in whose cities states of emergency have been declared in accordance to Article 3/1, a of the Act, shall demand aid on the basis of competence recognized in the existing Acts which regulate those subjects.

b) The governors of provinces in whose cities states of emergency have been declared in accordance to Article 3/b, shall try to repress and prevent existing or potential social occurrences by the use of force under their command. If they are unable to prevent or think that it is impossible to prevent or if they are unable to implement the measures with this force or think that it is impossible to implement the measures with this force, they shall apply to the regional governor which they are connected. The security forces which are sent in order to assist, will function under the command of the province governor.

If it is faced with urgent and extraordinary events or until forces which are being sent by the regional governor arrive, the governor of the province shall demand aid from the nearest military commandership. The governor of the province shall also notify the regional governor and Ministry of Interior of this situation.

Demands of the governor of the above mentioned province shall immediately be met.

In case of a demand for aid from the military by the governor of a province, the provisions of Article 21 shall apply. In this case, the duty and competence of the regional governor shall be exercised by the governors of provinces.

The Competence on the Use of Arms:

Article 23 - After the declaration of states of emergency, while carrying out their duties security forces and special security forces shall have the authority to use arms, if one of the conditions laid down in Acts related to the use of arms exists.

In cases of states of emergency declared in accordance with Article 3/b of this Act, security forces on duty may shoot directly and without hesitation, if the order to surrender is not obeyed or if there is an attempt of armed resistance or if the security forces is in a situation of lawful (legitimate) defence.

The provisions of Article 87/V, VI of the Turkish Armed Forces Internal Service Act and Article 3 of the Law on the Prevention of Offences Against Law and Order (Law No: 1481), shall be applied to all personnel using arms. Moreover, investigations against them shall be carried out without detention.

The orders given by the regional governor and governor of province in accordance with this Article which permit the above mentioned personnel to use arms in order to protect the authority of State and the safety of life and the security of materials, shall be proclaimed by appropriate means.

PART FIVE

JURISDICTION, PROCEDURE AND PENAL PROVISIONS

Jurisdiction and Procedure in States of Emergency:

Article 24 - Except for crimes within the jurisdiction of State Security Courts and Military Courts, crimes committed within areas where states of emergency have been declared shall be under the jurisdiction of the civil judiciary.

The investigation and prosecution against people committing crimes regulated by this Act shall be carried out according to the Law of Legal Procedure on Flagrant Offences (No: 3005) without considering the location and time of the crime.

Penal Provisions:

Article 25 - a) Within areas where states of emergency have been declared due to natural disaster, dangerous epidemic diseases or heavy economic crises,

1) Persons whose actions constitute a breach of the measures taken by the regional governor or governor of province in accordance with the authority provided in this Act or other Acts, who disobey the orders or who can not carry out the requirements or who intentionally provide false proof of identity or who refrain from providing proof of identity shall be faced with an additional imprisonment of up to three months, even though such action in itself constitutes a crime.

2) Persons who spread or transmit unreal or exaggerated news or information for the special purpose of creating public emotion and excitement, shall be faced with additional imprisonment of three months to one year and a minimum heavy fine of five thousands Turkish Liras. If the crime is committed by someone associated with

a foreigner, imprisonment shall not be less than one year and a heavy fine of thirty thousands shall be levied. If these crimes are committed by the use of publication and broadcasting organs, a double penalty shall be imposed on the person who committed the crime and other responsible persons.

b) Within the areas where states of emergency have been declared in accordance with Article 3/b of this Act,

1) Persons whose actions constitute a breach of the measures taken by the regional governor or governor of province in accordance with the authority provided in this Act or other Acts, who disobey the orders or who can not carry out the requirements or who intentionally provide false proof of identity or who refrain from providing information about identity shall be faced with an additional imprisonment from month to six months, even though such action constitutes another crime.

2) Persons whose actions constitute a breach of the Article 25/a,2, shall be faced with double penalty.

Extension of Custody:

Article 26 - In cases where states of emergency have been declared in accordance with Article 3/b of this Act, custody periods provided in the Code of Criminal Procedure (Art. 128) shall be doubled by written order provided by the Public Prosecutor or by civil or investigation court judge if damage is expected in case of delay.

PART SIX

VARIOUS PROVISIONS

Authority of Local Administrations:

Article 27 - Regional governors in states of emergency, may decide that local administrative organs' decisions or actions in whole or in part related to certain subjects shall be put into force upon approval of the regional governor, or governor of province if appointed by the regional governor or district governor.

The authority to take this decision belongs to the governor of a province, if states of emergency are declared in one province.

The Cases of Injury, Mutilation and Death:

Article 28 - The principles and procedures of required cash compensation and monthly salary to be paid and cash compensation to be paid in case of injury shall be calculated and paid in accordance with the provisions of Law No: 2330 of 3/XI/1980 Law on Cash Compensation and Determination of Monthly Salary, for persons on duty and performing labour obligations according to this Act, if such persons are wounded or die as a result of illness or become mutilated due to such duty or obligation or even if such service has terminated.

Over-time Pay:

Article 29 - After the declaration of states of emergency over-time payments shall be made to the public service personnel, in accordance with the decision of Council of Ministers which determines the amount and scope of this payment considering

the degree to which each hour of work exceeds normal working hours, and the characteristics of events and nature of the task. However, the time limit and the cadre level of the staff shall not be taken into account. This payment shall not be subject to any tax, except stamp-duty.

The provisions of Law on Travel - Pay (No: 6245) shall apply.

Allocation:

Article 30 - The Council of Ministers has the authority to increase the general budget allocations by up to 5% in order to bear the expenses necessitated by the states of emergency and the Minister of Finance has the authority to register this allocation with the administrations belonging to related general budget and to the existing and newly formed funds under the budgets of governmental departments having their own budget and to take measures which provide for the urgent use of this allocation.

Declaration of Decisions:

Article 31 - Decisions taken according to this Act, the publication of which is obligatory or the publication of which is required by the competent authorities shall be published and declared to the nation free of charge by the institution of Turkish Radio and TV and in the Official Gazette and by the publication and editing instruments of local administrations. The requirements of the competent authorities shall be met immediately and without delay.

Application of Disciplinary Penalties:

Article 32 - The regional governor and the governor of a province if entrusted or on duty shall be entitled to impose directly and to apply the disciplinary penalties of reprimand, warning and discontinuation of monthly salary, taking the gravity of the situation into consideration but without considering whether or not these actions necessitated a disciplinary penalty in accordance with the disciplinary regulations, on all public personnel except the military and judiciary, if this personnel can not perform or discharge the duties assigned to them or disobey the measures which are taken.

The regional governor and the governor of a province may apply the penalty of discontinuation of monthly salary to other public personnel who are not covered by the first provision of this Article and to other persons who are put on duty, because of their actions mentioned above. Governors shall determine the amount of the penalty which shall be between 1/30 and 1/8 of gross monthly salary.

Prohibition from Issuing Staying Order:

Article 33 - Issuing of staying order shall be prohibited in actions taken against the governors' administrative acts based on the use of authority provided for the governors.

Regulation:

Article 34 - Under the co-ordination of the Ministry of Interior and with the participation of related ministries, the regulations issued according to this Act, shall be prepared within a period of three months following the promulgation of this Act and shall be put into force by the Council of Ministers by publication in the Official Gazette.

Additional Article 1 - (by Law No: 3076, dated 14/November/1984) Actions for compensation against the administration based on the use of authority regulated in the State of Emergency Law shall be brought in administrative courts. If the personal fault is so evident and serious, the administration may have recourse to the public personnel on the basis of personal fault. An action for recourse shall not be brought unless approval is given by the related minister.

Temporary Article - The duties and powers provided for regional governors by this Act shall be carried out by the governors of provinces until the organization of Regional Governancy shall be formed and is functioning.

Application:

Article 35 - This Act shall be put in force on the date of its publication.

Enforcement:

Article 36 - The provisions of this Act shall be enforced by the Council of Ministers.