Erasmus School of Economics

The Middle East: Measuring Economic Integration and the Role of Labor Migration

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Preface

This thesis presents the results of my research on the level of economic integration in the Middle East and North Africa and the role of labor migration in the region, which I conducted at the Erasmus University in Rotterdam as well as at the Royal Netherlands Embassy in Teheran, Iran. This way, I could combine performing academic research with experiencing the economic, political and cultural environment of the Middle East.

I could not have done this without the help of many people. I would therefore like to thank my thesis supervisor Jean-Marie Viaene for his specialized comments on the topic of economic integration and labor migration, and Julian Emami Namini for his interest in my journey to Iran. I also highly appreciate the analyses on the political and economic situation in the Middle East - and in Iran in particular - of Radinck J. van Vollenhoven, ambassador of the Kingdom of the Netherlands in Teheran, Iran. I furthermore am very grateful to Jeroen Zijp, for helping me with working in a Latex environment. Lastly, I would like to thank my family and friends for their interest in my research and trip to Iran.

Abstract

This research measures the level of economic integration in the Middle East and North Africa (MENA), using the method developed by Bowen et al. (2010a). This method - based on the distribution of output, physical capital and human capital in an integrated economic area - measures the level of integration based on the distance between the actual and theoretical distribution of shares. It therefore incorporates the effects of factor mobility on the level of economic integration, which makes it especially suitable for an area like MENA which is characterized by low intra-regional trade flows but high labor migration. Using this measure indeed shows that the level of economic integration in MENA is higher than would be expected on the basis of its intra-regional trade, due to the high amount of factor mobility - i.e. labor migration - within the region. This labor migration has resulted in both a more equal distribution of shares and the occurrence of income convergence in the region, which is shown using both beta- and sigma-convergence of per capita and per human capital income.

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Chapter 1

Introduction

Figure 1.1: The Broader Middle East

The Middle East and North Africa (MENA[1]) is an interesting geographical area for several reasons; fascinating landscape and architecture, the birthplace of most of mankind's important early ideas and discoveries, the native land of Islam, and nowadays the scene of several major conflicts. The area, however, does not only play a major role in the field of culture and history, but is also home to the largest oil reserves in the world, and is inherently a globally integrated area - as oil production and consumption are largely separate [Gerner, 2004]. Also interesting to notice is the fact that the region plays only a marginal role in every other form of global trade, and even within the area, intra-regional trade is low.[2]

However, this has not always been the case. During the Golden Age of Islam (around 1000 A.D.) the region was thriving; dominance of the Arab language and Islamic faith had created one economically integrated area stretching all the way from North-Africa until India, including the contemporary former Soviet Republics. Enormous trade flows as well as labor flows were common, and these further spread knowledge, language and religion through the area.

[1] In this research, MENA and ME (Middle East) is used interchangeably, and - without further specification - always refers to the broader Middle East.

[2] See chapter 2

Invasions of foreign tribes and later on the dominance of European colonialists brought an end to economic prosperity and economic integration. And despite the discovery of large oil reserves in the beginning of the 20th century, the ME is still lacking in economic development and intra-regional trade flows, compared to both Western countries, as well as their eastern neighbors like China and the Asian tigers. Only five countries in the ME belong to the 100 most developed countries in the world, based on the UN's Human Development Index [Gerner, 2004]. Prospects for catching up with developed countries currently look meager; the GNP per capita gap between MENA and the EU has only widened during the last two decades.

Economic cooperation and economic integration between MENA countries could help them make the necessary economic progress, reap the advantages of economic integration, and improve their HDI-scores. Research on the nature and extent of economic integration within MENA is therefore not only interesting from an economic point of view, but also of importance for the future of the region.

Economic integration is at the moment a hot topic, not only in academia, but also in our everyday lives; the successes of the EU, only 50 years after its birth, have emphasized the large advantages that can be reaped from opening up ones border to trade and foreign labor. Integration attempts have consequently been ubiquitous, judging by the amount of multi- or bilateral trade agreements that have been notified to the WTO in the last decade. This increase in global focus on regional trading blocks has brought with it renewed efforts from the academic world to measure the extent of economic integration. While research in the past focused mainly on measuring trade flows and the openness of countries, the desire to compare levels of integration between regions, as well as over time, has resulted in renewed efforts to measure economic integration more objectively.

The basic reasoning behind a very interesting one of these new measures [Bowen et al., 2010a] is the factor price equalization theorem. If trade is impossible - for whatever reasons - countries can interchange capital (physical capital) and labor (human capital), and still produce efficiently by equally dividing factor and output shares, and thus by means of equating marginal product of factors within the region. This method therefore measures the *outcomes* of economic integration: the distribution of productive factors and output in a region, instead of measuring solely the amount of intra-regional trade.

This type of research is especially interesting for a unique area like the ME, which scores low on intra-regional trade, but has improved its factor allocation by means of labor migration, as the highest share of migrant population is to be found in the Middle East [Baldwin-Edwards, 2005]. The rich - and labor scarce - countries of the Gulf region import large amounts of workers from their poor - labor abundant - neighboring countries, in order to fill all the vacancies in the construction and service industries that are created by their large oil revenues. Foreign workers bring home large amount of remittances, which are then both spent and invested in the home country, and which have reduced the income inequality that would have prevailed had these workers not migrated abroad.

This situation of low intra-regional trade but high labor mobility is unique; in most areas intra-regional labor migration only follows *after* trade integration. This makes the ME a particular interesting area to get to know better from an economic perspective. It immediately raises the question to what extent the ME is economically integrated today, as low intra-regional trade flows would suggest low levels of integration, but the high amount of labor migration can substantially change this picture. Previous integration measures usually focused solely on

intra-regional trade openness, and therefore have classified the area as little integrated (see e.g. Romagnoli and Mengoni (2009)).

The objective of this research is to apply this new integration measure [Bowen et al., 2010a] - that incorporates the effects of labor mobility - while investigating the level of economic integration in the ME. This measure is more objective in quantifying the level of economic integration, as it focuses on the effects of economic integration on the distribution of shares of output and productive factors in economically integrated areas, irrespective of whether this distribution is the result of trade flows or of factor movements. Based on the theory of factor price equalization, this measure compares the observed distribution of factor and output shares with the theoretical distribution that would exist in a fully integrated area - i.e. an area characterized by free movement of both goods and factors, as well as by policy harmonization [Bowen et al., 2010a].

The Bowen et al. (2010b) theory predicts three properties regarding the distribution of factor and output shares in an integrated economic area: 1) shares follow an equal share relationship, 2) the distribution of shares follows Zipf's law (power law distribution)) and 3) the shares follow a harmonic series (limiting distribution of shares). All these predictions will be tested in this paper, as the outcomes indicate whether the data is suitable for reliably measuring economic integration.

Interesting to notice is that if the equal share relationship indeed holds, this means that a country with twice as much GDP will have twice as much physical and human capital. Output per (human) capital will then also be equal among members, indicating that income convergence will take place when an area becomes more integrated [Bowen et al., 2010b], as initial income differences will be eliminated when factor rewards equalize. Measuring income convergence will therefore play a large role in this research, as it can function as an indicator of economic integration. Given the high amounts of remittances within MENA, predictions are that both income convergence - and subsequently economic integration - is indeed taking place.

A further advantage of this new measure is that it allows for comparison of levels of economic integration *between* areas, but also *within* areas over time. This way, not only the level of economic integration in the ME can be researched (compared to e.g. the US, the EU, and the world as a whole), but also its development over time.

In order to ultimately be able to measure the level of integration in the Middle East, this research aims to answer the following questions:

- To what extent has the ME been integrated in the past, and which forces, factors and/or political and economic characteristics played a role?
- What is the current pattern of trade within the ME, and with the rest of the world?
- Based on the objectives of this research, what is a suitable definition(s) of the ME?
- What are the characteristics of labor migration within MENA? And does it result in income convergence?
- Based on the outcomes of labor migration research, and the theoretical predictions regarding the distribution of output and factor shares, how integrated is the ME?
- What are the future prospects for economic integration within MENA?

In order to come to a well-founded judgment on the level of economic integration in the ME, this research will start with a short overview of the economic history of the ME, concentrating on

trade flows and labor migration, and describing a broad picture of previous levels of integration in the area. Chapter two will provide a literature overview, which will pay attention to both the state of research in the field of economic integration in general, as well as on academic writing on the economic situation in particularly the ME. Before any new research is conducted on the area, a precise definition - including motivation - will be given for the area that is in this paper called the ME. Chapter four will deal with the issue of labor migration and income convergence. It will start with an analysis of labor flows in the area, and will present the methodological background of several measures of income convergence: sigma and beta convergence. The chapter will end with the actual measurement of income convergence. The last chapter of this research constitutes the main aim of this paper: it gives an analysis of the theoretical background of this new measure of economic integration, will investigate whether the available data fulfills the theoretical predictions of this method, and will ultimately measure the level of economic integration in the ME. The paper finishes with concluding thoughts and future prospects for economic integration in the region.

Chapter 2

Economic History of MENA

Nowadays, the ME is an area characterized by extremes. Political tensions have led to devastating wars in Iraq and Afghanistan, clearly hampering the economic development within these countries. At the same time, the oil-rich countries have invested immensely in their economic development, culminating in global records like the new highest sky-scraper in Dubai. Economic progress in the region as a whole, however, is currently rather low. The region - except for its oil reserves - does not play a major role in the world economy. The US and China clearly dominate in the fields of international trade, technological development and financial institutions.

This, however, has not always been the case. Around 1000 AD, the ME fulfilled the role of economic powerhouse. International trade within the region was enormous, characterized by the so called 'silk-routes'. The main unifying forces in the region were its shared religion - Islam - and its entrepreneurial spirit, which set political tensions aside in favor of business opportunities.

In order to investigate contemporary economic relations between the countries in the ME, the extent to which they are integrated, the sources of their economic integration, and the prospects for further integration, the next pages give a concise background of the economic history of the region, paying attention to trade relations, economic development, as well as political issues. While this overview cannot measure the actual level of current economic integration, it provides an important background in which to put into perspective the sometimes unreliable data on output, trade and labor migration within MENA.

2.1 Early Economic Integration in the Broader Middle East

The first signs of coherence in the region that we now call the greater ME date back to the 7th century AD. The Arabs conquered large amounts of land, which resulted in dominance of Islam and the Arabic language in the region. The area the Arabs conquered from their home base Saudi Arabia extended all the way from North Africa, via Syria and Palestine through Mesopotamia and Iran to Afghanistan, the current former Soviet Republics, to even India [Findlay and O'Rourke, 2007] [Gerner, 2004].

The fact that Islam became the dominant religion and Arabic the dominant language made trade in goods and the movement of people much easier than in the periods before, when the Persian and Byzantine empires had their own languages, religions, and administrative systems. Even though some local communities still had their own languages and religions, they were familiar with Arabic and Islamic business ethics, to the extent that the cultures of the Arabs and e.g. the Persians blended into one dominant culture [Findlay and O'Rourke, 2007].

Enhanced trade relations, free movement of labor and the possibility to communicate over the

whole area with one dominant language and administrative system made the region prosper economically, even though domestic unrest was still widespread. This is a remarkable observation, as nowadays political stability is considered a prerequisite for both economic integration and economic prosperity. The people in the ME during this time were aware of the overarching advantages of trade in goods and movement of labor, which continued despite conflicts [Findlay and O'Rourke, 2007]. It is important to emphasize the enormous area that was involved in this Middle Eastern unity. The region controlled by the Arabs also included the contemporary former Soviet Republics, explaining the Islamic roots of, and Islamic dominance in these regions nowadays, as well as the Northern African states and Iran, countries that are currently not automatically included in definitions of the Middle East.

At the end of the first millennium, all the territories within the ME were - or had been - in close contact with each other. This contact was not just a luxury arrangement, but became necessary when population numbers rose, and regions became dependent upon each other for bare necessities like bread. Egypt was now in control of most of the long-distance trade routes, and conducted a laissez-faire economic policy along its routes. Custom duties were low or non-existent, and there were no hampering barriers to the free movement of goods, people and capital [Findlay and O'Rourke, 2007] which allowed Egypt to export wheat over large areas of the empire, making other regions dependent upon Egypt and guaranteeing economic stability. The peoples of the ME at this time traded mainly with each other, resulting in large intra-ME trade volumes. The rise of China and Europe after the 15th century would not necessarily diminish trade flows going through the area, but repositioned the final selling point of goods from within the ME to Europe and China. Economic slowdown would eventually bring intra-ME trade almost to a halt.

The economic might, prosperity, integration and dominance at this time was unprecedented for this area, but the attacks by the Mongols in the east, in combination with internal struggles brought an end to the economic and political dominance of the Arabs. Interesting to note is that the dominance of the Mongols brought no damage to the free flow of goods. Chinese silk could safely be traded, both during day and night, all the way from China to the Crimea, where silk was sold for only three times as much as in China itself [Findlay and O'Rourke, 2007]. This - relatively - low markup emphasizes the extent of economic integration in the area, by showing how easy it was to move goods.

Up until 1400, this greater ME area enjoyed economic prosperity, with only a few minor recessions. The rise of Europe, on the other hand, brought economic dominance quickly to an end. Trade between the ME and Europe flourished due to industrialization of the European economies, but intra-regional trade in MENA had come practically to a standstill. Only the discovery of oil slowly increased the economic power of the ME.

2.2 The Discovery of Oil

The discovery of enormous reserves of oil in the early years of the 20th century put the ME-region quickly back on the map of important economic areas, and made it the source of continuous political conflict. Great-Britain and France colonized the majority of countries in the MENA, and dominated oil extraction. It would take until WWII for the MENA countries to start becoming independent. In the 1960s and 1970s, when oil demand increased quickly and two international oil crises disrupted the world economy, global interest in the area continued to rise. But, not only the US and Europe tried to benefit from these enormous oil reserves; poor workers from underdeveloped countries in the region migrated en masse to the countries of the oil-rich Gulf region. Thus while trade within the region itself was still very low, labor mobility started to

pick up again, facilitated by the shared religion and language within MENA.

The nationalization of large parts of the oil industry in the 1970s gave state governments about 98% of the oil industry - up from the 50/50% deals between governments and private companies in the 1960s [Yergin, 1991]. This further increased demand for foreign labor as oil revenues now stayed in the ME and could be used for construction work and in the service sector. The OPEC countries had (and still have) relatively low population levels but experienced high demand for employment (both in the oil industry as well as in their newly created welfare states). This combination of high oil prices and labor migration from the poorer countries to the oil producers resulted- from the 1970s onwards - in impressive per capita economic growth in the MENA region, fuelled both by high growth rates of capital per worker as well as of human capital per worker [Nugent and Hakimian, 2003]. The MENA countries would benefit from these investments for the next two decades; only after the 1980 oil price drop would GDP growth slow down.

Supply of oil rose steadily after the oil crises; oil no longer came solely from the Gulf, but increasingly also from Russia, the North Sea and the US. At the same time, OPEC was unable to cut production, as several member states continued to cheat by producing more than their quotas [Gerner, 2004]. Consequently, prices continued to fall from the 1980s onwards (see figure 5.1), and so did the demand for foreign labor in the Gulf states, until oil prices stabilized during the late 1980s. Labor demand started to increase again, as production rose from 615 billion barrels in 1985 to 917 billion barrels in 1990 [Yergin, 1991].

2.3 Attempts at Economic Integration

The successes of the EU in the field of creating a free trade area, in combination with economic stagnation due to low oil prices, provided an incentive for MENA countries to consider opening up their economies towards each other. While the first serious steps towards integration in the MENA region had already started in 1945 with the birth of the League of Arab States, the 1980 establishment of the Gulf Cooperation Council (GCC) brought integration back on the agenda.

Governments in the Middle East are much aware of the benefits labor migration and economic integration can bring to the region, especially now the increase in intra-regional trade within global trading blocks is outgrowing the increase in world trade [Shafik, 1992]. MENA governments increasingly have reason to fear that the integration efforts of the EU and other regional blocks might hamper their exports, as the positive income effects experienced by integrated regions are not sufficient enough to outweigh the lower demand for extra-regional trade because of substitution effects [Shafik, 1992]. Stated differently, the ME might experience diminishing demand for its exports, as former trading partners can buy cheaper imports from their newly integrated trading partners.

Unfortunately for MENA economic development, the trade creation opportunities of economic integration within the area are not overwhelming. The main export products - oil and oil derivatives - are not the major imports of the region, which are food and manufactures. Although intra-regional trade creation effects for the ME might not be extremely large, they are still substantial. The disrupting effects from import substitution and other trade distorting measures are without doubt damaging economic development. Regional integration would not only create a more economically efficient resource allocation, but would also enhance competition and facilitate the flow of skills and knowledge. It could furthermore alleviate the enormous labor market problems; unemployment rates have been increasing due to high population growth[1] and

[1]Population growth in the Middle East has been enormous: in 1970, 127 million people lived in MENA, in 2005 this number had risen to 305 million. Population growth has only been more impressive in Sub-Saharan

increasing amounts of youth entering the labor market.

2.4 Current Trade Patterns in MENA

The current pattern of trade in the MENA region is interesting and special for at least two reasons: firstly, trade amongst countries in the Middle East is very low, and lower than would be expected on the basis of their gravity models [Nugent and Hakimian, 2003]. A gravity model forecasts an amount of trade between countries, usually based on their GDP levels, geographical distance and structural characteristics like resource allocations. The level of intra-ME trade is not only very low compared to this forecast, but also compared to other geographical regions. The ME (IMF definition, 2008 data[2]) trades only 12% of its total trade with itself, while this is 65% for the EU. Exports within the ME account for only 9% of total exports, indicating that the ME countries export more to both Japan (15%), the EU (15%), the US (9%) and Korea (9%) than to its member states. A similar pattern can be observed with respect to imports, although it is less extreme than the export situation; 27% of ME imports comes from the EU, while only 15% comes from the ME itself. Over the years, the percentage of total trade within the ME has risen however, from 9% in 1990, steadily up to 12% in 2008. The EU has not seen such an increase; trade within the region in 2008 still accounts for 65% of total trade, the same as in 1990.

The second reason why ME trade is peculiar, is the composition of its trade. The majority of exports consists of oil and oil products (exported by Kuwait, SA, UAE, Bahrain, Iran, Iraq, Oman, Libya and Algeria), and certain primary products like wheat (Egypt). The composition for imports is rather different; consumer goods and high-tech products mainly come from the US and Europe, while the oil-exporting countries also import large amounts of food and raw materials. Trade thus mainly flows between the ME and the rest of the world, even though there is substantial - though not enormous - opportunity for intra-ME trade. A possible explanation for this lack of intra-ME trade can be found in the recent political conflicts within the region - mainly as a result of oil interests, import substation measures, other forms of trade barriers, aid requirements (development aid can be tied to reciprocal trade obligations) and a tendency to try to catch up with development levels of the US and the EU. Furthermore, and maybe even more importantly, current trade patterns are a legacy of historical political alliances, as many formerly colonized countries are still inclined to trade mainly with their former colonizers [Gerner, 2004]. One should not overestimate the opportunities for intra-regional trade, however, as many countries in MENA duplicate each others products and therefore compete for the same export markets [Gerner, 2004]. But current intra-regional trade levels are still much lower than could be expected on the basis of their resource allocation.

Regarding the level of openness (the total of imports and exports as a percentage of GDP), the ME region as a whole shows average levels: ca 60% for MENA (World Bank-definition) compared to 75% for the euro-area, 85% for East-Asia, and only 30% for the US (2005 World Bank data)). Important to mention here is that the level of openness differs widely within the ME, with - in general - the poor agricultural countries being very closed (e.g. Egypt, 39%), while the rich oil-exporters are very open (e.g. Bahrain, 154%) towards the rest of the world. Interesting to see, furthermore, is the high level of openness of the former Soviet Republics Tajikistan and Turkmenistan.

Africa (Data World Bank)

[2]Constructed by means of comparing the amount of intra-ME trade with trade between ME and the rest of the world. Data obtained from IMF Direction of Trade Statistics.

Table 2.1: Trade Levels of MENA Countries (year 2000, source: WB WDI)

Country	Total Trade/GDP(%)	Exports/GDP(%)	Imports/GDP(%)
Afghanistan	N/A	N/A	N/A
Algeria	63	41	21
Armenia	74	23	51
Azerbaijan	77	39	38
Bahrain	154	89	64
Egypt	39	16	23
Georgia	63	23	40
Iran	40	23	17
Iraq	N/A	N/A	N/A
Israel	74	37	37
Jordan	110	42	68
Kazakhstan	106	57	49
Kuwait	87	56	30
Kyrgyzstan	89	42	48
Lebanon	50	14	36
Libya	51	36	15
Morocco	61	28	33
Oman	91	59	31
Pakistan	28	13	15
Qatar	90	67	22
Saudi Arabia	69	44	25
Syria	64	35	29
Tajikistan	200	99	101
Tunisia	93	45	48
Turkey	43	20	23
Turkmenistan	176	96	81
UAE	129	73	55
Uzbekistan	46	25	22
Yemen	79	42	37

2.5 Regional Trade Agreements in MENA

The peculiar nature of trade in the ME can already be seen from the low number of countries in the ME that are WTO member. Of the 29 countries, only 8 were already member during the 1995 establishment of the WTO out of the GATT. Only 8 countries have obtained full membership since (until 2008). Just 10 countries are observers, and 3 countries are in no way part of the WTO. To put these numbers into perspective, all of the 27 EU member states are part of the WTO.

The following Regional Trade Agreements (see table 2.2) - 5 multilateral, and 14 bilateral - have been entered into force, and have been notified to the WTO.[3]

Encompassing the most countries are the GCC (Gulf Cooperation Council), consisting of Bahrain, Kuwait, Oman, Qatar, SA and UAE. The CIS-countries (Commonwealth of Independent States), consisting of Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, and the non-ME countries Belarus, Moldova and Russia. the PAFTA (pan-Arab free trade area), consisting of Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman,

[3]Source: WTO RTA database: http://rtais.wto.org/UI/PublicSearchByMember.aspx

Qatar, SA, Syria, Tunisia, UAE, Yemen, and non-ME Sudan). And lastly the ECO-group (Economic Cooperation Organization), consisting of Afghanistan, Azerbaijan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkey, Turkmenistan and Uzbekistan.

All of these agreements focus solely on facilitating the movement of goods, and are characterized as Free Trade Areas (only the GCC is a Customs Union). Interesting to notice is that the majority of these agreements have come into force during the 1990s. Their effects - increases in intra-regional trade - can only be expected after several years of implementation. This sudden increase in these RTA's could explain the increase in intra-regional trade during the last decade.

Aside from these WTO-notified agreements, at least four other important trade facilitation agreements are worth mentioning: The League of Arab States (formed in 1945), consisting of all the Arab states, which amongst other goals tries to promote economic integration in the Arab world[4]. The Council of Arab Economic Unity (formed in 1957), which consists of Egypt, Iraq, Jordan, Kuwait, Libya, Tunisia, Syria, UAE, Yemen, and non-ME countries Mauretania, Palestine, Somalia and Sudan. Its main goal is economic unity in the area (i.e. free movement of both labor, goods and capital)[5]. The Arab Maghreb Union also focuses on economic integration[6], but specifically for the North-African countries: Algeria, Libya, Morocco, Tunisia and non-ME Mauritania. Lastly there is O(A)PEC (Organization of (Arab) Oil Exporting Countries) which not necessarily has as major goal economic integration of the region[7], but plays an important role in oil trade. The O(A)PEC consists of Algeria, Bahrain, Egypt, Iraq, Kuwait, Libya, Qatar, SA, Syria, Tunisia and UAE. OPEC does not include Bahrain, Egypt, Syria and Tunisia.

While the list of trade agreements in table 2.2 looks impressive, countries in MENA are still - on average - part of only 5 RTA's. This is even below the world average of 6, and far below that of the countries of the Northern Hemisphere, which belong to 13 agreements [WorldBank, 2005].

Summarizing, the ME has been a fully integrated area in the past, with both high levels of intra-regional trade and free flows of productive factors. Up until now, intra-regional trade has been surprisingly low, and while the number of RTA's in the region is a sign of serious attempts to stimulate economic integration, they have - until now - only modestly increased intra-regional trade.

This, however, does not necessarily mean that MENA shows no signs of economic integration. Depending on one's definition of economic integration, MENA has much more to offer when it comes to labor migration. Before delving into this source of deeper economic integration, an overview of the current literature on economic integration will provide a useful starting point for further analysis.

[4] www.arableagueonline.org
[5] www.fao.org/world/regional/RNE/regionalorganisations
[6] www.maghrebarabe.org/en/uma.cfm
[7] www.oapecorg.org

Table 2.2: Regional Trade Agreements

RTA	Members	Type	Coverage	Entry into Force
Multilateral				
Gulf Cooperation Council (GCC)	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE	CU	Goods	2003
Commonwealth of Independent States (CIS)	Armenia, Azerbaijan, Georgia (former member), Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, and non-MENA Belarus, Moldova, Russia and Ukraine	FTA	Goods	1994
Pan Arab Free Trade Area (PAFTA)	Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, UAE, Yemen	FTA	Goods	1998
Economic Cooperation Organization (ECO)	Afghanistan, Azerbaijan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkey, Turkmenistan, Uzbekistan	FTA	Goods	1992
Eurasian Economic Community (EAEC)	Kazakhstan, Kyrgyzstan, Tajikistan, and non-MENA Belarus and Russia	CU	Goods	1997
Bilateral				
Armenia - Kazakhstan	Armenia and Kazakhstan	FTA	Goods	2001
Armenia - Turkmenistan	Armenia and Turkmenistan	FTA	Goods	1996
Armenia - Kyrgyzstan	Armenia and Kyrgyzstan	FTA	Goods	1995
Egypt - Turkey	Egypt and Turkey	FTA	Goods	2007
Georgia - Azerbaijan	Georgia and Azerbaijan	FTA	Goods	1996
Georgia - Kazakhstan	Georgia and Kazakhstan	FTA	Goods	1999
Georgia - Turkmenistan	Georgia and Turkmenistan	FTA	Goods	2000
Georgia - Turkey	Georgia and Turkey	FTA	Goods	2008
Turkey - Israel	Turkey and Israel	FTA	Goods	1997
Kazakhstan - Kyrgyzstan	Kazakhstan and Kyrgyzstan	FTA	Goods	1995
Kyrgyzstan - Uzbekistan	Kyrgyzstan and Uzbekistan	FTA	Goods	1998
Turkey - Morocco	Turkey and Morocco	FTA	Goods	2006
Turkey - Tunisia	Turkey and Tunisia	FTA	Goods	2005
Turkey - Syria	Turkey and Syria	FTA	Goods	2007

Chapter 3

Literature Overview

Unsurprisingly, with the growth in the number of regional trade agreements, and the impressive achievements of the EU, the interest of academics in research on the topic of economic integration has also been growing.[1] Still, there is always room for new and more specialized research. This, however, cannot be done without knowledge of the contemporary state of research on the topic. This chapter will therefore firstly deal with a short overview of both contemporary and historical core literature on measuring economic integration in general as well as within MENA. It will also touch upon the most important literature on the topic of labor migration within MENA.

3.1 The Theory of Trade and Economic Integration

One of the core texts on international trade - by the famous international economist Robert A. Mundell (1957) - argues that impediments to trade in goods can, at least partly, be compensated by trade in factors. This is an interesting notion, as impediments to trade in MENA are one of the highest in the world, while factor mobility (i.e. labor mobility) is relatively easy. The absence of easy trade in goods within MENA would initially hamper commodity price equalization. But, the easy trade in factors can contribute to factor price equalization, and thus ultimately in a tendency towards commodity price equalization[2]. Both forms of factor and commodity price equality would bring about a Pareto optimal distribution of goods and factors. The distribution of output and productive factors is thus an important feature of economic integration, and can provide an objective measure of determining the level of economic integration within in area. The academic literature up till now, however, has not substantially investigated this possibility, and that is why the Bowen et al. (2010a) method provides an interesting measure for economic integration within MENA.

On measuring the extent of economic integration, varying methods have been applied, from simply measuring the size of export and import flows, to measuring openness, to trade impediments and a gravity equation determining the intra-regional trade potential for an area (see e.g. [Brada and Mendez, 1985]). While these methods have a sound theoretical basis and have been able to predict the effects of economic integration on inter-member trade flows, they do not deal with the effects of free movements of productive factors and other economic cooperation efforts on (the difference between theoretical and actual) factor and output distributions. Nor do they come up with an objective benchmark against which to judge the level of integration. They thus provide useful, though less objective measures of economic integration, as they also have to deal

[1] A quick look at the major journals of economic research (e.g. American Economic Review) shows not only an increase in the number of articles on economic integration during the last decade, but also a wider variety of research methods and definitions of economic integration.

[2] The prices of factors of production (labour and capital) ultimately determine largely the price of the good (under specific assumptions, see [Mundell, 1957])

with quantifying structural characteristics of the countries of an integrated economic area (IEA). A further complication in measuring economic integration is that most quantifications are not comparable both over time and between countries. A measure that could possibly do that is the Integration Achievement Score, developed by Hufbauer and Schott (1994). They compare IEA's with the EU on the basis of the level of free trade, capital movements, supra-regional institutions, and monetary and fiscal coordination. There exists, however, no objective method to assign values for countries on these topics. More advanced methods of measuring economic integration mainly focus on specific types of integration or specific effects of trade integration. There exists, e.g. an impressive amount of literature on financial market integration, which measures for instance returns on comparable financial assets (see e.g. Phylaktis and Ravazzoli (2002)).

The method designed by Bowen et al. (2010a) - that addresses the distributional effects of trade and factor mobility on the shares of members of an IEA - manages to objectively quantify the level of economic integration, and thus sheds new light on this fascinating field of research. The objective of this paper is therefore to apply this method to the MENA region, which has thus far not been investigated in this way.

3.2 Economic Integration in MENA

Efforts to measure the consequences of economic integration attempts in the Middle East specifically have been put forward by Romagnoli and Mengoni (2008), who look at the level of economic integration in MENA by evaluating the results of regional trade agreements on the level of intra-regional trade and policy coordination. Hakimian and Nugent (2003) provide a thorough analysis of the economies of the region and their potential to increase trade. All these and comparable studies conclude that intra-regional trade within the Middle East is low, and below its potential. Even though trade between MENA and the rest of the world is large compared to intra-regional trade, Söderling (2005) argues that even on this front MENA has much to win. These studies, however, only look into trade flows, and therefore do not incorporate the effect of labor migration on economic integration. Studies that do investigate labor flows, however, do not intent to quantify their effects on economic integration.

3.3 Labor Migration and Income Convergence in MENA

The academic insights in the field of labor migration within MENA are very well captured by a 1992 World Bank paper by Nemat Shafik, who gives a detailed overview of the composition of labor migration, as well as its development over time and its effects on the level of integration within MENA. Shafik finishes his research with the conclusion that labor migration has taken the role of economic integration within MENA. As this research was conducted in the early 1990s, it cannot deal with the characteristics of labor migration during the last decade. More up-to-date literature comprises of articles by f.i. Yousef (2005), who argues that labor migration has been diminishing during the late 1980s as a result of decline in oil prices, and thus that during the 1990s the role of labor migration in economic integration was not as large as before 1990. Both authors on labor migration within MENA also provide a well-documented insight in the role of the oil price on labor migration. As oil prices constitute a large part of remittances, and as they continue to be highly volatile, their effects on labor migration can be substantial. This research will therefore also look into the development of the oil price between 1990 and 2005 and its consequences for labor migration within the region. While both authors thus deal with labor migration, economic integration and the role of the oil price, they do not, however, extent their research by actually measuring economic integration within MENA, nor do they measure

the effect of labor migration or economic integration on income dispersion within MENA.

As per capita income convergence goes hand-in-hand with economic integration in the Bowen et al. (2010b) method, the empirical research of this paper will start with investigating income convergence and dispersion. Income convergence has first been documented by Robert Solow in his famous 1956 growth model, and since then been expanded mainly by Barro and Sala-i-Martin (2004), who put forward two different methods of measuring income convergence: sigma and beta convergence. Income convergence has extensively been measured for areas like the US and the EU, as well as for the world as a whole, but outcomes have depended largely on research methodologies and data-sets and periods [Islam, 2003]. This research uses the method put forward by Barro and Sala-i-Martin (2004), which thus far - and to my knowledge - has not yet been applied to MENA.

Chapter 4

Country Selection and Descriptions

The MENA is a very broad and largely unspecified concept, both in everyday use as well as in academia.[1] Depending on the selection criteria and definitions one uses, one ends up with very different country groupings. As this research focuses on economic relations - both trade relations as well as movement of factors - the selection is based on the existence of contemporary as well as historical economic and social ties between countries, and tries to put together a group of countries that most closely resembles an IEA. Other variables important for economic integration are geographical proximity, a colonial past, and cultural, religious and linguistics similarities. These characteristics have all been considered when constructing the definition of MENA.

4.1 MENA Countries Included in this Research[2]

An initial selection is made based on countries that belong to the Gulf Cooperation Council (GCC), a group of six Arab states around the Persian Gulf, plus five both geographically and culturally (as well as religiously and linguistically) close countries that are included in almost every definition of the ME. Historically, this group of countries has been known as the 'Mashrek' (land of the sunrise), indicating its cultural and geographical proximity.

- Saudi Arabia (SA)
- Kuwait (KU)
- Bahrain (BA)
- United Arab Emirates (UA)
- Qatar (QA)
- Oman (OM)

- Jordan (JO)
- Lebanon (LE)
- Syria (SY)
- Yemen (YE)

[1] The number of countries used in research on MENA varies enormously, and usually depends on the field of investigation as well as on data availability. Any number of countries between 10 and 30 can be found in the literature.

[2] 2-letter abbreviations of country names are used in the graphs.

- Iraq (IQ)

To this initial core group are added five North African Arab countries, all part of what is known as the 'Maghreb'[3] (land of the sunset). Not only share these countries Arab cultural ties with previously mentioned countries, they also - as will be shown later - send large number of migrants to the GCC countries. With the exception of Algeria, this core group of countries also constitutes the 16 members of the Pan Arab Free Trade Area (PAFTA).

- Egypt (EG)
- Libya (LI)
- Tunisia (TN)
- Algeria (AL)
- Morocco (MO)

Added to this MENA selection are then countries that are either geographically close, or economically important. They are all Islamic countries, but not all Arab countries and thus not always considered as part of MENA. They are, however, important members (Iran, Pakistan and Turkey are founding members) of the Economic Cooperation Organization (ECO), which strives towards full economic integration [Pomfret, 1997]. Furthermore, many Afghans, but Pakistani in particular, work as guest workers in the GCC countries [Baldwin-Edwards, 2005].

- Iran (IN)
- Afghanistan (AF)
- Turkey (TR)
- Pakistan (PA)

The following former Soviet Union, central Asian Islamic republics share close historical ties with the rest of the region[4] and are predominantly Muslim countries.

- Turkmenistan (TM)
- Tajikistan (TA)
- Kazakhstan (KA)
- Kyrgyzstan (KY)
- Uzbekistan (UZ)

Based on their geographical location between Turkey and Iran, their historical integration with MENA, and the fact that they are also former Soviet Union countries reorienting their international focus away from Russia, the following countries in the Caucasus are also part of the selection.

- Azerbaijan (AZ)
- Armenia (AR)

[3]The list of countries belonging to both the Maghreb and Mashrek tend to differ as well.

[4]These countries played a central role in the so called Silk-road trade. See Chapter 2 on Economic History of MENA.

- Georgia (GE)

The last country to be added is geographically surrounded by countries already included in the selection:

- Israel (IS)

While several countries in Africa are home to large Muslim populations, they are excluded from this research for two reasons: first of all, barely any reliable data can be found for these countries. Secondly, they hardly share in the common history of the rest of MENA, and are - from a social economic perspective - closer to the rest of Africa, than to MENA. This is why Sudan, Mauretania, Somalia, Djibouti, Eritrea and Western-Sahara are excluded.

Furthermore, Palestine is excluded, solely on the basis of the lack of reliable data.

4.2 Different Definitions Used in this Research

As several countries have been subject to extreme external shocks and reliable data is hard to get for the least developed countries within MENA, this research uses four different selections of MENA countries. In this way, unexpected outcomes for the full number of countries could be explained by looking at sub-groups. The full group (i.e. MENA 28), however, remains the central focus of this research.

MENA 28: All countries, except sometimes Bahrain, due to its limited data availability.

MENA 20: MENA 28 minus the former Soviet Republics. These former communist countries have experienced an economic and social transition to capitalism during the early 1990s, which had extreme influences on GDP-growth, capital stock investments, schooling, trade orientation and productivity. Their values of output and productive factor shares, as well as their per capita income levels, are therefore likely to be the result of both political turmoil as well as of economic integration.

MENA 18: MENA 20 minus Afghanistan and Iraq. These two countries also experienced extreme political unrest - even in the form of full scale war - during the period 1990-2005, and are therefore subject to the same disturbances as the former Soviet republics.

MENA 17: [5] MENA 18 minus Israel. Israel always has played a peculiar role in the area; geographically it is surrounded by MENA countries, but politically and socially it is Western oriented.

The World Bank (WB) MENA definition is quite close to MENA 20, except that the WB does include Gaza, Djibouti, Cyprus and Israel, but leaves out Turkey, Afghanistan and Pakistan. The IMF uses a slightly more restricted definition - and calls this the Middle East, and not MENA - by also leaving out Morocco, Algeria and Tunisia. From the North-African countries the IMF thus only includes Egypt and Libya. Academic research most often uses the MENA 20 definition, although the inclusion of Pakistan, Turkey, Iran, Afghanistan and Israel is contested.

[5] Outcomes of analyses on MENA 17 show that differences with MENA 18 are very limited. MENA 17 will therefore play only a marginal role in this research.

4.3 Country Descriptions

While the MENA countries were step by step added to comprise the full selection of countries, this does not automatically imply that countries added simultaneously are economically alike. In order to get a firm grasp of the economic characteristics of the whole MENA region, table 4.1 provides information on the economic and social status of the countries. The next section elaborates on this information, and provides some further characteristics which are useful in assessing current levels of economic integration, as well as future prospects.

Table 4.1: Country Characteristics (Source: WB WDI)

Country	Population mln (2000)	GDP PPP per capita (2000) (in constant 2005 $)	Land Area (sq. km)[a]	Type of economy (major export products)[b]	WTO membership?
Afghanistan[c]	24	326	652090	Foods	Observer
Algeria	30	6087	238174	Fuels	Observer
Armenia	3	2294	28200	Foods and raw materials	Yes (2003)
Azerbaijan	8	2490	82605	Fuels	Observer
Bahrain	0.7	23292	710	Fuels	Yes (1995)
Egypt	70	3992	995450	Fuels and processed goods	Yes (1995)
Georgia	5	2342	69490	Foods	Yes (2000)
Iran	64	7667	1628550	Fuels	Observer
Iraq	23		437370	Fuels	Observer
Israel	6	22991	21640	Processed goods	Yes (1995)
Jordan	5	3632	88240	Foods and processed goods	Yes (2000)
Kazakhstan	15	5406	2699700	Fuels and foods	Observer
Kuwait	2	33603	17820	Fuels	Yes (1995)
Kyrgyzstan	5	1501	191800	Foods	Yes (1998)
Lebanon	4	8328	10230	Processed goods	Observer
Libya	5	11870	1759540	Fuels	Observer
Morocco	28	2980	446300	Foods, metals and processed goods	Yes (1995)
Oman	2	16963	309500	Fuels	Yes (2000)
Pakistan	138	1931	770880	Foods and processed goods	Yes (1995)
Qatar	0.6	62161	11000	Fuels	Yes (1996)
Saudi Arabia	21	19716	2000000	Fuels	Yes (2005)
Syria	17	3725	183780	Fuels and foods	No
Tajikistan	6	1002	139960	Foods and metals	Observer
Tunisia	9	5444	155360	Foods and processed goods	Yes (1995)
Turkey	66	9409	769630	Foods and processed goods	Yes (1995)
Turkmenistan	5	2322	469930	Fuels and foods	No
UAE	3	44515	83600	Fuels and processed goods	Yes (1996)
Uzbekistan	25	1632	425400	Fuels and foods	Observer
Yemen	18	2064	527970	Fuels	No

[a]Important to keep in mind is that large land area does not necessarily make a country suitable for agriculture, as scarce water supply is the major limiting factor (Gerner, 2004)

[b]Source: UNCTAD in [Gerner, 2004], [Shaw, 1995] and [Kort, 2004]

[c]Source: PWT 6.3

Based primarily on their economic background, the MENA countries can be - roughly - divided

into four groups. The first is the group of oil-exporting, labor scarce, economically advanced countries of the Gulf region, like Bahrain, Kuwait, Qatar, UAE and SA (and possibly Oman), who use their oil revenues to import all bare necessities, as their land is unsuited for agriculture. Politically, socially and culturally, they share adherence to strict interpretations of the Islam, and rule by emirs or royal families.

Secondly, there are Libya, Algeria, Iran, Iraq (and possibly Oman), who all export oil, but have fewer resources for refining, are economically developed countries but substantially less rich, and in general politically less stable than the Gulf countries (although Oman could also have been grouped under the Gulf countries). Local production of goods is much higher in this second group of countries mainly due to a much larger local population.

The third group consists of the former Soviet Republics. While some of them do possess oil reserves (Kazakhstan and Azerbaijan), they are all relatively poor, struggling to catch up with the western world after their economically challenging period under Soviet rule. Living standards are increasing due to higher investment and the opening up for trade with the rest of the world, but remain low (especially in Turkmenistan and Tajikistan). Culturally, these countries are influenced by proximity to Russia, but religiously they are closer to the other Islamic MENA countries (although Christianity is the predominant religion in both Armenia and Georgia).

Then there are - fourth - the countries without substantial oil reserves, and an intermediate level of socio economic development: Egypt, Lebanon, Turkey, Morocco, Jordan and Pakistan. An important characteristic of these countries is that they experience labor migration to either the Gulf States, Libya, Algeria, or to Europe. These countries furthermore are the only ones in the region (with Israel) who benefit from tourism.

Afghanistan, Yemen and Israel cannot easily be included in any group. Afghanistan and Yemen are both very poor, even though Yemen does own some oil. Israel is - on the hand - a rich and economically developed country, but not an oil exporter, nor an Islamic country.

This background of the economies of MENA already shows the vast differences between these countries. Extreme differences in employment opportunities and development levels have provided a fruitful basis for labor migration in MENA. Chapter four will further investigate this phenomenon.

Exports of the region are dominated by oil, natural resources, and some foodstuff, while imports mainly consist of agricultural products and processed/consumer goods. The possibilities for intra-region trade are therefore less substantial, though there is probably still enough room for closer economic integration - even on the basis of intra-regional trade - than is currently the case. The last chapter of this research will investigate the level of economic integration within MENA during 1990-2005.

Chapter 5

Labor Migration and Income Convergence

5.1 Labor Mobility Within MENA

A very interesting observation about the economies in the ME is the high amount of labor migration within the region, especially because trade levels are low. This situation is very specific for MENA; the world's most important economically integrated regions, the EU, NAFTA, as well as East Asia, experience high intra-regional trade but - at least until the 1990s - low intra-regional labor migration [Shafik, 1992]. In order to investigate whether, and if yes to what extent, these migration patterns contribute to economic integration, this chapter will start with an overview of the migration flows in the area. Sources of labor migration, their destinations, build-up, and changes over time will all be dealt with. On the basis of these observations predictions regarding income convergence can be made, and consequently regarding the level of economic integration within MENA.

In order to provide a thorough analysis of the effects of labor migration, income convergence will be evaluated as broadly as possible; thus on the basis of both sigma- and beta-convergence, as well as on absolute and conditional convergence. The theoretical basis of these two concepts will be explained, as well as their practical application for this research. Their outcomes - and their possible effects on economic integration - will then be assessed and explained, both for different country groupings, as well as over time.

Data on Gross National Income (GNI) per national of a country is examined in order to investigate the influence of labor migration on economic integration. The reasoning is as follows: if labor is highly mobile, workers will offer their labor in exchange for the highest return (i.e. wage). The highest return can be obtained where the greatest amount of capital is available, as the neo-classical growth model features decreasing returns to both factors of production. This implies lower labor productivity in labor abundant areas. As labor is paid its marginal product, workers will flog to capital abundant areas, thereby increasing their wages, but at the same time lowering the initial wages paid to labor in the capital abundant areas. An example will show this theoretical prediction more intuitively: assume a low paid, low skilled worker in a labor abundant, but capital scarce country like Egypt. Marginal product - and thus wages - of this worker in Egypt are much lower than if this worker would migrate to a capital abundant but labor scarce country like Qatar. Migrating implies higher national product (and thus income) per Egyptian national, but a lower national product for a worker from Qatar. Capital owners in Egypt see their (initially high) returns falling as the amount of available labor diminishes, while the opposite is the case for capital owners in Qatar. Thus via migration, rewards to productive factors tend to equalize, and the poorer countries are expected to catch up with the richer ones.

A possible way to measure whether poorer countries are catching up with the average income level is by means of absolute beta-convergence.

The notion of labor mobility contributing to economic integration in the Middle East is not new, however, and has already been emphasized in the literature:

> (...) labor migration has done more over the course of the past forty years to advance the goals of Arab economic integration than any other instrument of regionalism. [Yousef, 2005]

and, more explicitly on income distribution:

> (...) workers in the Arab world - especially the poor - benefited from both income growth and an increasing share of income. Migration played a central role in these gains. [Yousef, 2005]

Table 5.1: Distribution of Productive Factors

Labor relatively more abundant than capital	Capital relatively more abundant than labor[1]	No specific division
Algeria (+)	Saudi Arabia (-)	Kazakhstan (-)
Tunisia (+)	UAE (-)[3]	Iraq (N/A)
Morocco (+)	Qatar (-)[3]	Pakistan (+)
Egypt (+)	Kuwait (-)[3]	Libya (-)[4]
Yemen (+)	Bahrain (-)[3]	Oman (-)[4]
Jordan (+)[2]	Israel (+)	Azerbaijan (-)[4]
Lebanon (+)[2]		Iran (N/A)
Syria (+)		
Turkey (+)		
Afghanistan (N/A)		
Armenia (+)		
Georgia (+)		
Turkmenistan (N/A)		
Uzbekistan (N/A)		
Tajikistan (N/A)		
Kyrgystan (N/A)		

[a]The major Arab oil-exporting countries do not publish the amount of remittances paid, but these countries are very likely to pay high amounts of remittances, as explicitly mentioned by IFAD: http://www.ifad.org/remittances/maps/brochure.pdf. Remittances from Saudi-Arabia are larger than those of all other oil-exporting countries together, and only topped by remittances from the US [Yousef, 2005].

[b]Lebanon and Jordan in particular have surpluses of skilled labor [Shafik, 1992]

[c]UAE, Qatar, Kuwait and Bahrain not only have extremely low numbers of national laborers, but also negligible amounts of arable land [Shafik, 1992].

[d]Libya, Oman and Azerbaijan have larger domestic populations than the GCC states, but still import some labor because of their oil reserves.

An initial look at data on the availability of factors in the MENA countries shows a fruitful basis for labor mobility (see table 5.1). The poorer countries tend to be labor abundant and capital scarce. The oil-producing and/or -exporting countries are rich in capital, but have very small national populations. Data on remittances in the region is - unfortunately - scarce and unreliable. The available data shows a picture much in line with the division based on capital/labor ratios: a plus or minus sign between brackets behind the country's name indicates whether the country is a net receiver (+) or payer (-) of remittances. Data on the number of migrants and

the level of remittances is given in table 5.2 and table 5.3, which shows that both the number of foreign workers and the amount of remittances has been high, and in general steadily increasing during 1990-2005.

Table 5.2: Migrant Population (Source: WB WDI)

Country	Number of migrants	% of total pop.	Number of migrants	% of total pop.	% Δ 1990-2005
	1990		2005		
Armenia	658,789	19	492,570	16	-25
Bahrain	173,200	35	278,166	38	61
Iran	4,291,601	8	2,062,218	3	-52
Israel	1,632,704	35	2,661,261	38	63
Jordan	1,146,349	36	2,345,235	43	105
Kazakhstan	3,619,200	22	2,973,574	20	-18
Kuwait	1,585,280	75	1,869,665	74	18
Kyrgyzstan	623,083	14	288,053	6	-54
Lebanon	523,693	18	721,191	18	38
Libya	457,482	10	617,536	10	35
Oman	423,572	23	666,263	25	57
Qatar	369,816	79	712,861	81	93
SA	4,742,997	29	6,336,666	27	64
Syria	690,349	5	1,326,359	7	92
Turkey	1,150,463	2	1,333,883	2	16
UAE	1,330,324	71	2,863,027	70	115
Uzbekistan	1,653,000	8	1,267,839	5	-23

5.2 The Role of Remittances

The amount of remittances paid and received in the Middle East is extensive. According to Shafik (1992) remittances have exceeded the value of both trade and development aid in the region. Several countries have received remittances exceeding 5% of GDP, especially Jordan (22%), Lebanon (9%), Armenia (5%), Georgia (9%), Morocco (6%), Tajikistan (20%) and Yemen (14%). The pattern is also explicit; financial capital (in this case remittances) flows from the rich oil-producing states to the poor labor abundant states. Countries paying large amounts of remittances as % of GDP are therefore Bahrain (13%), Kuwait (5%), Oman (7%), Saudi Arabia (8%) and even Azerbaijan (19%).

The size of remittances in the MENA constitutes such an important part of regional GDP, that certain countries start attracting labor because of economic growth fuelled by remittances [Shafik, 1992]. A clear example is Egypt, who's relatively high skilled labor - employed in the Gulf region - sent home oil-boom-fuelled remittances of such high value, that a local construction boom resulted in the import of low skilled labor from Jordan. The distinction between labor exporting and labor importing countries based on the division between the oil-exporting countries versus the rest of MENA has therefore become less pronounced, especially after the 1990s. Several non-oil-exporting countries (like Morocco and Egypt) now receive labor flows (mainly low-skilled workers), while at the same time large numbers of inhabitants keep migrating abroad in search of better employment opportunities. Unfortunately, empirical analysis of the influence of differences in educational levels on migration patterns is nearly impossible due to the lack of

Table 5.3: Remittances Paid and Received (Source: WB WDI, in current USD, year 2000)

Country	Received	% of GDP	Paid	% of GDP	GNI/GDP
Afghanistan	N/A	N/A	N/A	N/A	1.08
Algeria	7.90×10^{8}	1	N/A	N/A	0.85
Armenia	8.75×10^{7}	5	4.70×10^{6}	0	1.03
Azerbaijan	5.71×10^{7}	1	1.01×10^{9}	19	0.94
Bahrain	N/A	N/A	1.01×10^{9}	13	0.97
Egypt	2.85×10^{9}	3	3.20×10^{7}	0	1.01
Georgia	2.74×10^{8}	9	3.88×10^{7}	1	1.04
Iran	5.36×10^{8}	1	N/A	N/A	1.00
Iraq	N/A	N/A	N/A	N/A	NA
Israel	4.00×10^{8}	0	3.26×10^{9}	3	0.91
Jordan	1.85×10^{9}	22	1.97×10^{8}	2	1.02
Kazakhstan	1.22×10^{8}	1	4.40×10^{8}	2	0.93
Kuwait	N/A	N/A	1.73×10^{9}	5	1.09
Kyrgyzstan	8.84×10^{6}	1	5.43×10^{7}	4	0.94
Lebanon	1.58×10^{9}	9	N/A	N/A	1.02
Libya	9.00×10^{6}	0	4.63×10^{8}	1	0.99
Morocco	2.16×10^{9}	6	2.92×10^{7}	0	0.97
Oman	3.90×10^{7}	0	1.45×10^{9}	7	0.96
Pakistan	1.08×10^{9}	0	2.00×10^{6}	0	1.02
Qatar	N/A	N/A	N/A	N/A	NA
SA	N/A	N/A	1.54×10^{10}	8	1.00
Syria	1.80×10^{8}	1	2.90×10^{7}	0	0.96
Tajikistan	4.67×10^{8}	20	N/A	N/A	0.97
Tunisia	7.96×10^{8}	4	2.70×10^{7}	0	0.95
Turkey	4.56×10^{9}	2	N/A	N/A	0.98
Turkmenistan	N/A	N/A	N/A	N/A	0.97
UAE	N/A	N/A	N/A	N/A	1.05
Uzbekistan	N/A	N/A	N/A	N/A	0.98
Yemen	1.29×10^{9}	14	6.05×10^{7}	1	0.94

reliable data.

5.3 Reasons Behind Labor Migration

Not only is the Middle East characterized by the existence of both labor abundant and capital abundant countries, the differences in these factor endowments are huge. The UAE, e.g. has ca. 10 times more capital than Yemen, while Yemen has almost 10 times the amount of labor. These differences had become apparent, and increased in importance, during the oil boom of the 1970s, which brought unprecedented riches to the oil-exporting countries, facilitated the development of the construction, health care, education and service industries, and started the labor flows towards this region. Labor from Egypt, Jordan, Tunisia, Yemen and Lebanon migrated to the rich oil-exporting countries of the Gulf, as well as to Libya and Iraq [Gerner, 2004].

These differences in factor endowments, in combination with the low amount of trade in the region, has provided a fruitful basis for labor migration, especially because development policies from the governments of countries in the ME have been designed in such a way that labor migration is attractive. Not only low-skilled workers who can find jobs in the construction industry,

but also educated workers, who are needed in the service industry of the GCC countries have found their ways abroad [Baldwin-Edwards, 2005].

The rich oil-exporting - capital abundant and labor scarce - economies tend to attract large amounts of labor from the nearby region to work in the non-tradables industries like construction and health care. To meet their demand for tradables, these countries still focus on the rest of the world, mainly because high-tech consumption goods can only be delivered by the world market. The poor labor exporting countries - on the other hand - have always been very inward oriented when it comes to tradable goods. Their import substitution policies have closed their economies towards both the region, as well as to world markets. This is especially the case for Egypt and Syria, who could have exported manufactures and food to other countries in the region, but instead chose for import substitution and thereby 'discouraged the production of tradable goods' [Shafik, 1992]. As these import substitution measures favored capital intensive production - and these countries have a huge low-skilled labor supply - favorable migration rules proved an easy policy measure for governments to diminish domestic unemployment. Not only the poor labor-abundant countries have been reluctant to open up their borders to imports; also the rich oil-producers have set up large subsidy programs to produce 'basic necessities' like wheat and other agricultural products domestically. This is the reason why e.g. Saudi Arabia is reluctant to import large amounts of Egyptian wheat, but prefers to import Egyptian labor in order to produce domestically [Shafik, 1992]. As Egyptian workers observe very few barriers towards leaving their country and repatriating their remittances, this demand could both mutually, and beneficially, be met. Intra-regional trade, however, has been suffering under these measures, and its levels are therefore lower than could be expected based on the allocation of resources within MENA.

The GCC and other oil producing Arab countries[1] are now the largest destination region for MENA migrants. It accounted for 45% of total migrants in 2000-2003, against 42% for migrations to Europe and 13% only for those to North America and Australia. For a country like Egypt, 2 million workers had - temporarily - migrated to the GCC and other Arab countries, while only 800.000 were - permanently - working in the rest of the world [Baldwin-Edwards, 2005]. Countries like Algeria and Morocco, however, send more migrant to Europe than to MENA.

5.4 The Role of the Oil Price

As the oil price has a major influence on the amount of money available for wages of foreign workers in the GCC-countries, the amount of remittances also depends strongly on the oil price. While the 1970s oil price boom resulted in enormous amounts of remittances paid, this number started to fall after the drop in oil prices in the 1980s, but increased with the oil price rise halfway the 1990s. In the period 1990-2005, all the major remittances receiving countries have seen an annual increase in the amount of remittances they receive - except for Egypt - of between 1.0% for Yemen up to 10.5% for Jordan. The GCC-countries were paying more in 2005 than in 1990, with Bahrain and Kuwait paying 10% more each year [Adams, 2006]. Therefore, *worker remittances are evidently an ever-increasingly important aspect of the economies of most Middle East and North Africa countries* [Adams, 2006].

The rich oil-producing and labor importing countries have over time - and especially during low oil prices - tried to reduce their dependency on foreign labor, by means of shortening work permits for foreign workers and encouraging labor participation of their national workforce. While these policies have been partly successful in times of recessions, economic prosperity - mainly as a result of high oil prices - usually has put these resolutions quickly aside in favor of easy

[1] I.e. Saudi Arabia, Kuwait, Bahrain, UAE, Qatar, Oman, and Libya

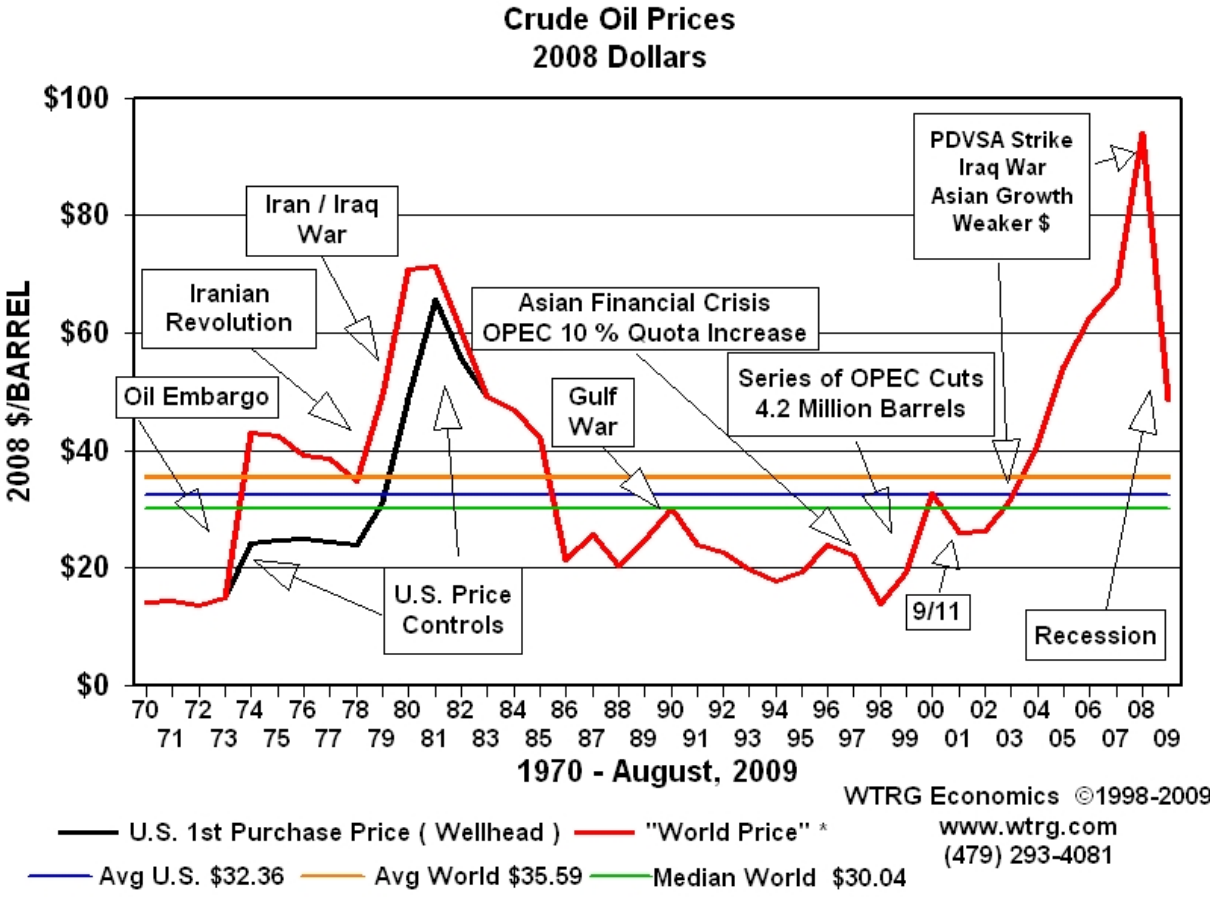


Figure 5.1: Oil Price Development 1970-2009 (Source: WTRG-economics)

access to cheap foreign labor. One only has to think of the construction boom in the Gulf-states (the Palm-island in Dubai!) to get an idea of the amount of foreign labor needed to construct these excesses. Shares of foreign labor in the six GCC countries were still extraordinarily high in 2005, comprising 26% to 80% of the total labor force [Baldwin-Edwards, 2005]. Even though Asian labor has been competing fiercely with Arab labor, the share of Arab labor in total foreign employment within MENA has been relatively stable during 1995-2005 [Kapiszewski, 2006].

These large numbers of migrant workers, and the remittances they sent home, have resulted in a more equal income distribution compared to a situation without labor migration. Whether this indeed is the case in the ME can be measured by means of income convergence. The next part of this chapter will therefore measure convergence of per capita national income as well as per human capital national income.

5.5 Theoretical Derivation of Convergence

One of the major interests of economic growth research has been the study of income convergence. Based on the neo-classical growth model, the theory suggests that countries with lower initial income levels tend to grow faster than rich countries. Crucial factors determining growth are the diminishing marginal returns to production inputs physical capital and human capital, which brings the economies of an IEA to a steady state with per (human) capita(l) output, per (human) capita(l) physical capital stock and per (human) capita(l) consumption growth at the exogenously given rate of technological progress.

The theoretical derivation of this prediction is as follows. The production function is of the familiar Cobb-Douglas form:

$$Y_t = K_t^{\alpha}(A_t L_t)^{1-\alpha} \tag{5.1}$$

where Y is output, K is physical capital, and AL is effective labor, all at time t. α represents capital's share in output. As the Bowen et al. (2010a) method uses human capital as an input in the production process, AL can also be replaced by H.

The growth rate of labor is: $\frac{\dot{L}}{L} = n$, while capital grows at: $\dot{K} = sY - \delta K$, technology grows at: g, where s is the savings rate and δ the depreciation rate of physical capital. The dynamic equation of the growth rate of capital per effective worker ($\frac{\dot{K}}{AL} = \dot{\tilde{k}}$) is therefore:

$$\dot{\tilde{k}} = s\tilde{y} - (n + g + \delta)\tilde{k} \tag{5.2}$$

Rewriting gives:

$$\dot{\tilde{k}} = s\tilde{k}^{\alpha} - (n + g + \delta)\tilde{k} \tag{5.3}$$

When an economy reaches its steady state, the growth rate of capital per effective worker is zero. Rewriting gives the level of capital per effective worker in the steady state (where * indicates a steady state value):

$$\tilde{k}^* = \left(\frac{s}{n + g + \delta}\right)^{\frac{1}{1-\alpha}} \tag{5.4}$$

As output per effective worker is a function of capital per effective worker, output per effective worker - or per human capital - becomes:

$$\tilde{y}^* = \left(\frac{s}{n + g + \delta}\right)^{\frac{\alpha}{1-\alpha}} \tag{5.5}$$

And finally, output per worker:

$$y^* = \left(\frac{s}{n + g + \delta}\right)^{\frac{\alpha}{1-\alpha}} A \tag{5.6}$$

Equation 5.6 shows that in the steady state, output per worker depends on the savings level, rate of technology, population growth rate, and the depreciation rate. Assuming these to be the same across countries - and the rate of technology exogenously determined - implies that all countries will eventually experience the same level of income per effective worker, and countries initially below their steady state value of output per effective worker will tend to catch up with the richer countries. This is called unconditional, or absolute beta-convergence. Given that countries within an IEA are expected to equalize their rates of return on productive factors (factor price equalization), and are structurally alike, these countries will in their steady states all grow at the level of technological progress. Initial income differences will disappear when countries reach their steady state, implying absolute beta-convergence.

Countries with structurally different characteristics will not necessarily experience the same output levels, however. The only convergence will then come from countries moving towards *their own* - structurally determined - long run steady state levels, with growth rates in the steady state differing between countries. The resulting income convergence - thus after conditioning for these different characteristics - is called conditional beta-convergence. Unfortunately, reliable data on structural characteristics within MENA is hard to obtain, so - unlike absolute beta-convergence - its testing will be limited.

In order to be able to investigate income convergence visually (i.e. by means of a graph), let the average growth rate of per capita national income be:

$$\frac{1}{T} \times \log\left(\frac{y_{it}}{y_{i0}}\right) \tag{5.7}$$

where T is the length of the time period, y_{i0} is per capita income at the beginning of the period for country i, and y_{it} is per capita income at the end of the period.

Important to note, however, is that this research focuses on the period 1990-2005, which covers only 15 years. This is a rather short period for obtaining reliable convergence estimates (Islam, 2003), but the limited availability of reliable data makes longer estimates - unfortunately - nearly impossible.

In order to perform OLS regressions[2] on the relationship between initial income and the subsequent growth level, we start from equation 5.2, and perform a first order Taylor expansion of the right hand side. This gives:

$$\dot{\tilde{k}} = \left\{sf'\left(\tilde{k}^*\right) - (n+g+\delta)\right\}\left(\tilde{k} - \tilde{k}^*\right) \tag{5.8}$$

Substituting for s using: $sf\left(\tilde{k}^*\right) = (n+g+\delta)\tilde{k}^*$ gives:

$$\dot{\tilde{k}} = \left(\frac{f'\left(\tilde{k}^*\right)\tilde{k}^*}{f\left(\tilde{k}^*\right)} - 1\right)(n+g+\delta)\left(\tilde{k} - \tilde{k}^*\right) \tag{5.9}$$

As the capital share of output α equals $\frac{f'(\tilde{k}^*)\tilde{k}^*}{f(\tilde{k}^*)}$ this gives:

$$\dot{\tilde{k}} = \lambda\left(\tilde{k}^* - \tilde{k}\right) \tag{5.10}$$

where $\lambda = (1-\alpha)(n+g+\delta)$ and is a measure of the rate of convergence, as it tells us the speed at which the gap between current and steady state capital per human capital is closed.

In order to perform a regression we rewrite, using $\dot{\tilde{y}} = f'\left(\tilde{k}*\right)\dot{\tilde{k}}$ and get as a first order approximation:

$$\tilde{y}^* - \tilde{y} = f'\left(\tilde{k}^*\right)\left(\tilde{k}^* - \tilde{k}\right) \tag{5.11}$$

where substitution gives for the growth rate of output per human capital:

$$\dot{\tilde{y}} = \lambda\left(\tilde{y}^* - \tilde{y}\right) \tag{5.12}$$

After switching to logarithms, solving the first order non-homogeneous differential equation and rearranging the outcome we get [Islam, 2003]:

$$\ln y_{it} - \ln y_{i0} = \left(1 - e^{-\lambda T}\right)\left(\ln \tilde{y}^*_{i0} - \ln \tilde{y}_{i0}\right) \tag{5.13}$$

Equation 5.13 tells us that the growth rate of per (human) capita(l) income (LHS) depends on the distance to steady state per (human) capita(l) income. Given that all countries move towards the same steady state income levels, the growth rate of income per (human) capita(l) thus solely depends on the initial income level.

[2]Mathematical derivations based on Islam (2003)

In order to investigate this prediction of absolute beta-convergence within the MENA region we estimate the following regression, where the LHS represents the average yearly growth rate of income, and the RHS is a function of the initial level of income [Barro and Sala-i Martin, 2004]:

$$\frac{1}{T} \times \log\left(\frac{y_{it}}{y_{i0}}\right) = b_1 - \frac{1 - e^{-b_2 T}}{T} \times \log(y_{i0}) + u_{it} \tag{5.14}$$

If $b_2 > 0$, this indicates that per capital national income shows absolute β-convergence.

Absolute beta-convergence is expected to only take place when countries have the same structural characteristics, and thus the same steady states. Although this could be the case in an IEA like the US - where structural characteristics between *regions* are minor - the *countries* of MENA, however, are not necessarily structurally alike. This means that one needs to condition for these differences. Unfortunately, for the variables that might influence the growth rate of per (human) capita(l) income, reliable data could only be found for the occurrence of a political crisis during 1990-2005 (representing political stability (*dummypolcrisis*)), the level of government expenditures (representing the role of the government in an economy (*govtex*)) and the level of openness of a country (representing freedom to trade (*openness*)).

Adding these variables that could control for structural characteristics results in the following equation for measuring *conditional* beta-convergence:

$$\begin{aligned} \frac{1}{T} \times \log\left(\frac{y_{it}}{y_{i0}}\right) = \quad & b_1 \quad -\frac{1 - e^{-b_2 T}}{T} \times \log(y_{i0}) \\ + \quad & b_3 \quad \times \text{dummypolcrisis} + b_4 \times \log(\text{govtex}) \\ + \quad & b_5 \quad \times \log(\text{openness}) + u_{it} \end{aligned} \tag{5.15}$$

Beta-convergence (absolute) thus measures whether - and if yes how quickly - initially poor countries tend to catch up with the average income levels. However, this does not necessarily mean a reduction in the per capita income *dispersion*, which can be measured by means of sigma-convergence. The following paragraph will elaborate on sigma-convergence, and its relation to beta-convergence, which says that absolute beta-convergence is a necessary though not sufficient condition for sigma-convergence.[3]

Let σ_t^2 be the cross-economy variance of the log of per capita income at time t, which can be computed in the familiar way of calculating the population standard deviation:

$$\sigma_t = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (x_{i,t} - \mu_t)} \tag{5.16}$$

where $x_{i,t} = \log(y_{it})$, N is the number of countries within an IEA and μ_t is the average income per (human) capita(l), all at time t.

Sigma-convergence takes place if the value of the standard deviation of the log of per capita income at time t is lower than at time 0, i.e.: $\sigma_0 > \sigma_t$[4]
Assuming that the error term has mean 0, and that its variance is distributed independently of the log of initial income, we get as first order difference equation of equation 5.13:

$$\sigma_t^2 = e^{-2\beta} \times \sigma_0^2 + \sigma_{ut}^2 \tag{5.17}$$

[3]For an advanced analysis of the mathematical relation of causality between sigma and beta convergence see Furceri (2005).

[4]Mathematical derivations based on Islam (2003)

The solution of the first order difference equation - given that the variance of the error term is constant over time - is then of the form [Islam, 2003]:

$$\sigma_t^2 = \frac{\sigma_u^2}{1 - e^{-2\beta}} + \left(\sigma_0^2 - \frac{\sigma_u^2}{1 - e^{-2\beta}} \right) \times e^{-2\beta t} \tag{5.18}$$

This equation shows a very interesting notion regarding the necessity though non-sufficiency of beta-convergence for sigma-convergence [Barro and Sala-i Martin, 2004]. It shows that as t approaches infinity, the second term on the RHS approaches zero, indicating that the variance of per capita income at time t approaches its steady state level (= first term on RHS). This steady state level decreases with the convergence coefficient β, indicating the necessity of beta-convergence for sigma-convergence. Over time, the variance of income at time t only *decreases* if it was initially (at $t = 0$) *higher* than its steady state level. If it was initially *below* its steady state level, it will actually *increase* towards its steady state level, and thus show an *increase* in income dispersion. In conclusion, beta-convergence is necessary, though not sufficient for sigma-convergence.

5.6 Results

This section describes and analyses the results of both absolute and conditional beta-convergence, and sigma-convergence, for income per capita and per human capital.

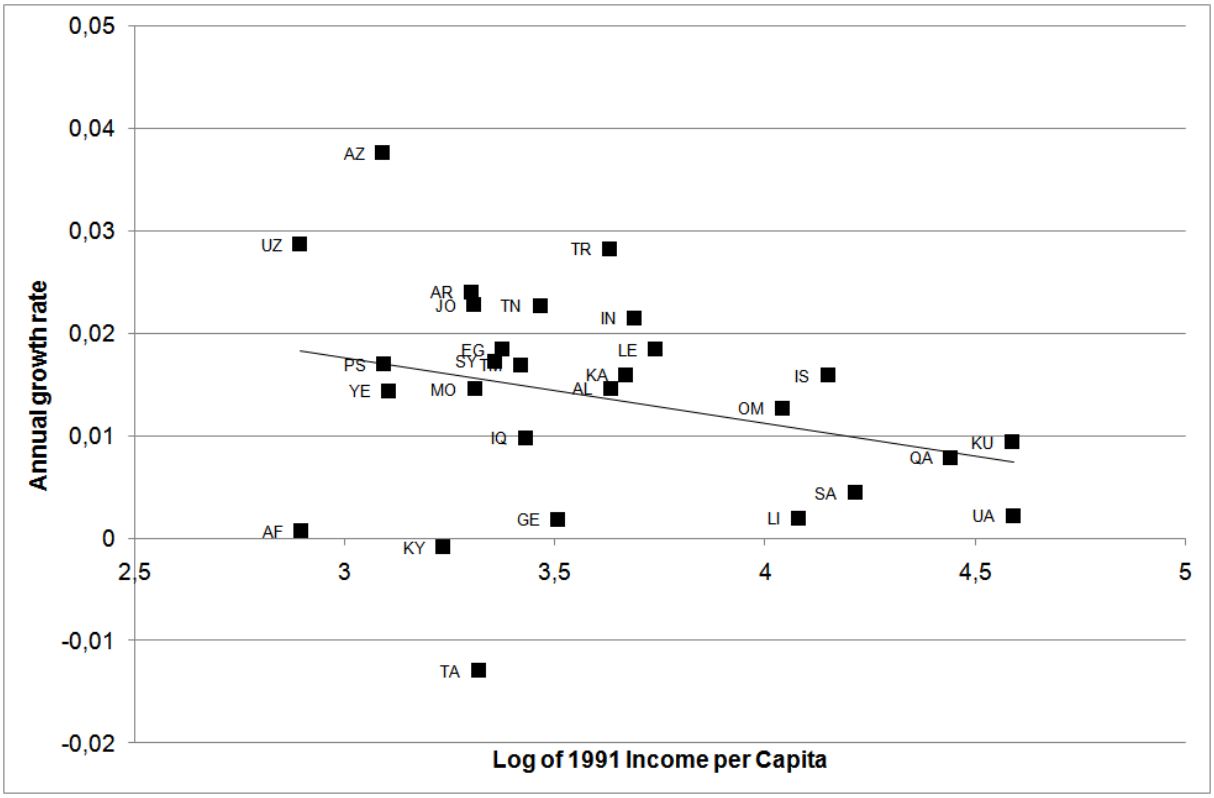
5.6.1 Absolute β-Convergence

Visual inspection of figure 5.2 indicates that absolute beta-convergence of per capita income seems to take place during the period 1991-2005 for MENA 28, suggesting that countries with initially lower levels of income have indeed higher growth rates than richer countries. The outcomes (see table 5.4) of regressions of equation 5.14 show, however, that absolute beta convergence is significant (at 5% level) only for the period 1995-2005 (with R^2-value of 0.44). Plausible explanations for the lack of significant income convergence during 1991-2005 could be the economic devastation in Afghanistan and Iraq, as a result of war, as well as the break up of the Soviet Union, which caused substantial economic and political instability for former Soviet Republics like Tajikistan and Kyrgyzstan during the early years of the 1990s.

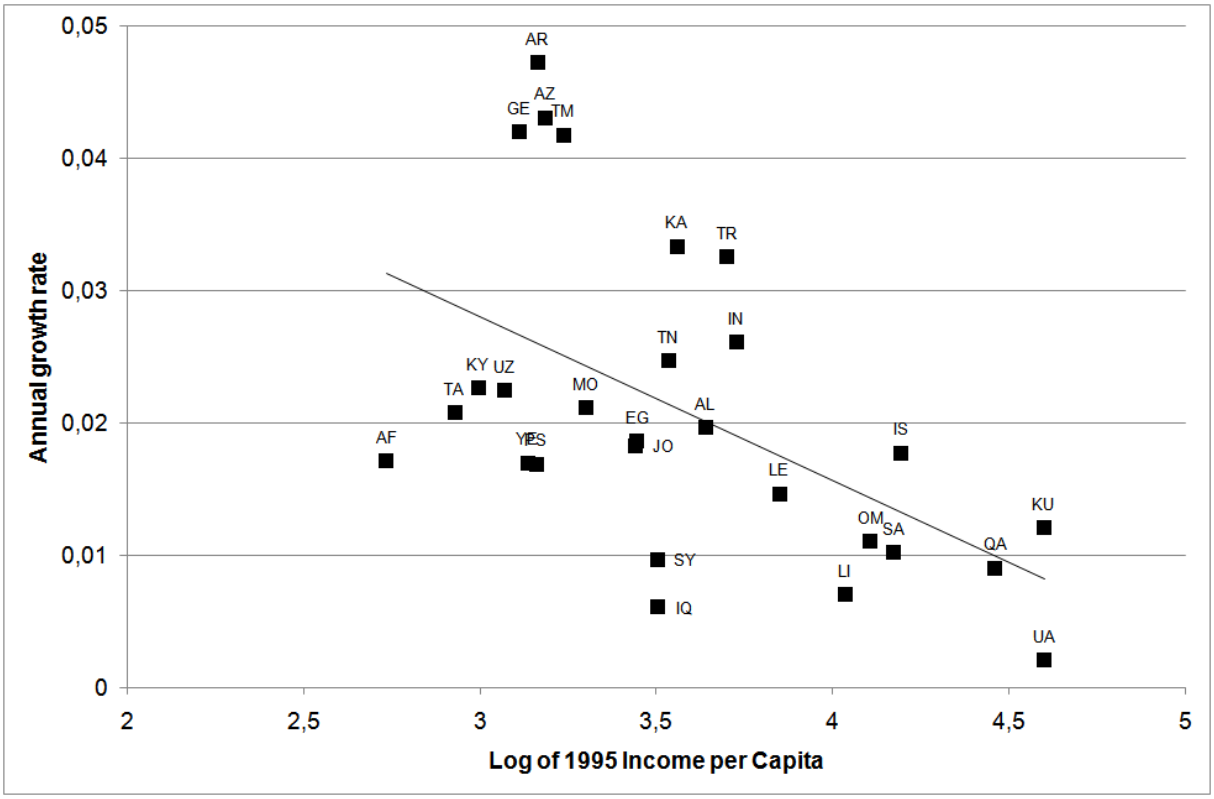
It is therefore interesting to investigate absolute beta convergence for the subgroups of MENA 28. Eliminating the former Soviet Republics, however, does not change outcomes; income convergence is still only significant during 1995-2005. Eliminating both Afghanistan and Iraq (MENA 18), however, results in significant income convergence (at 5% with R^2 of 0.44) during a period that extents further back in time: 1991-2005.

Further investigating possible explanations for the lack of income convergence during 1990-2005 can be done by looking at other sub-periods. The period 1990-1995 for MENA 28 shows a tendency towards income *divergence* (as the beta-coefficient is negative, though not significantly so). Not surprisingly, this divergence during the early years of the 1990s has made incomes converge only after 1995. Furthermore, eliminating Israel from the sample does not substantially change outcomes.

In short, absolute beta-convergence takes place for the full set of countries during 1995-2005, and for the MENA 18 group also during 1991-2005.

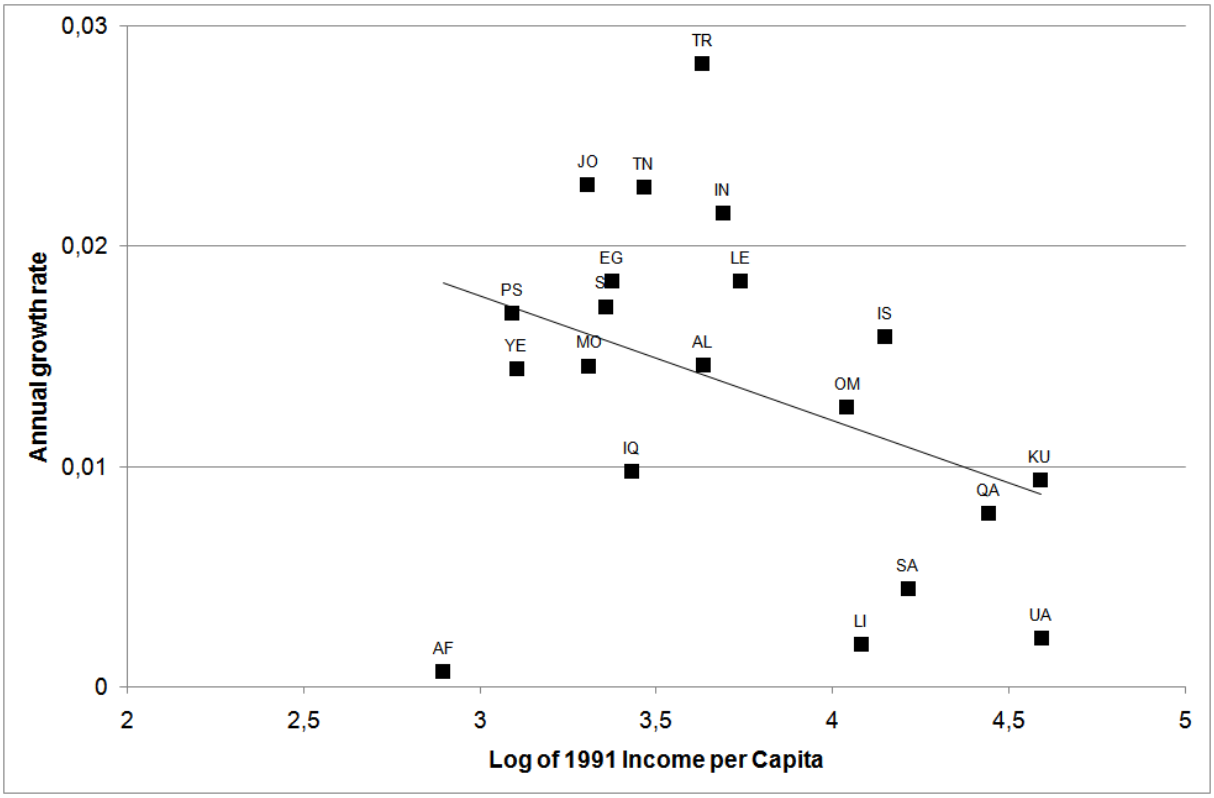


(a) 1991-2005

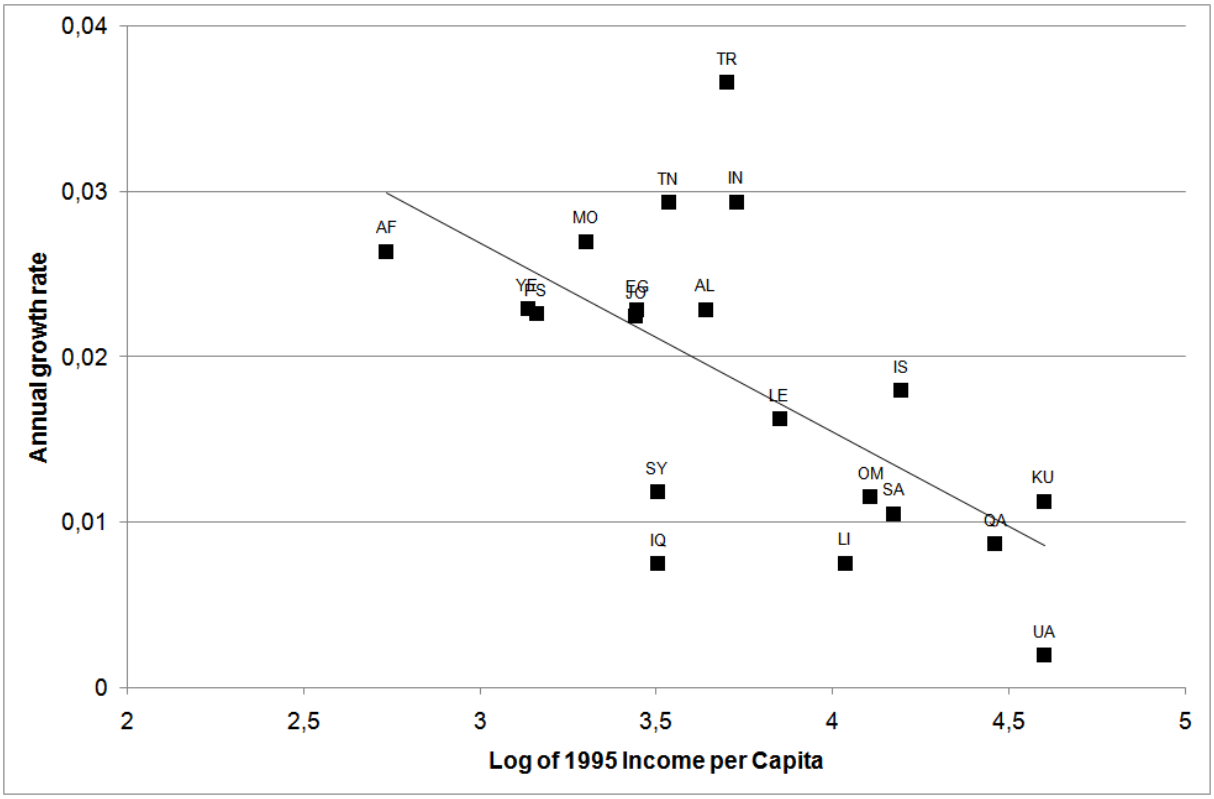


(b) 1995-2005

Figure 5.2: MENA 28 - Convergence of Income per Capita



(a) 1991-2005



(b) 1995-2005

Figure 5.3: MENA 20 - Convergence of Income per Capita

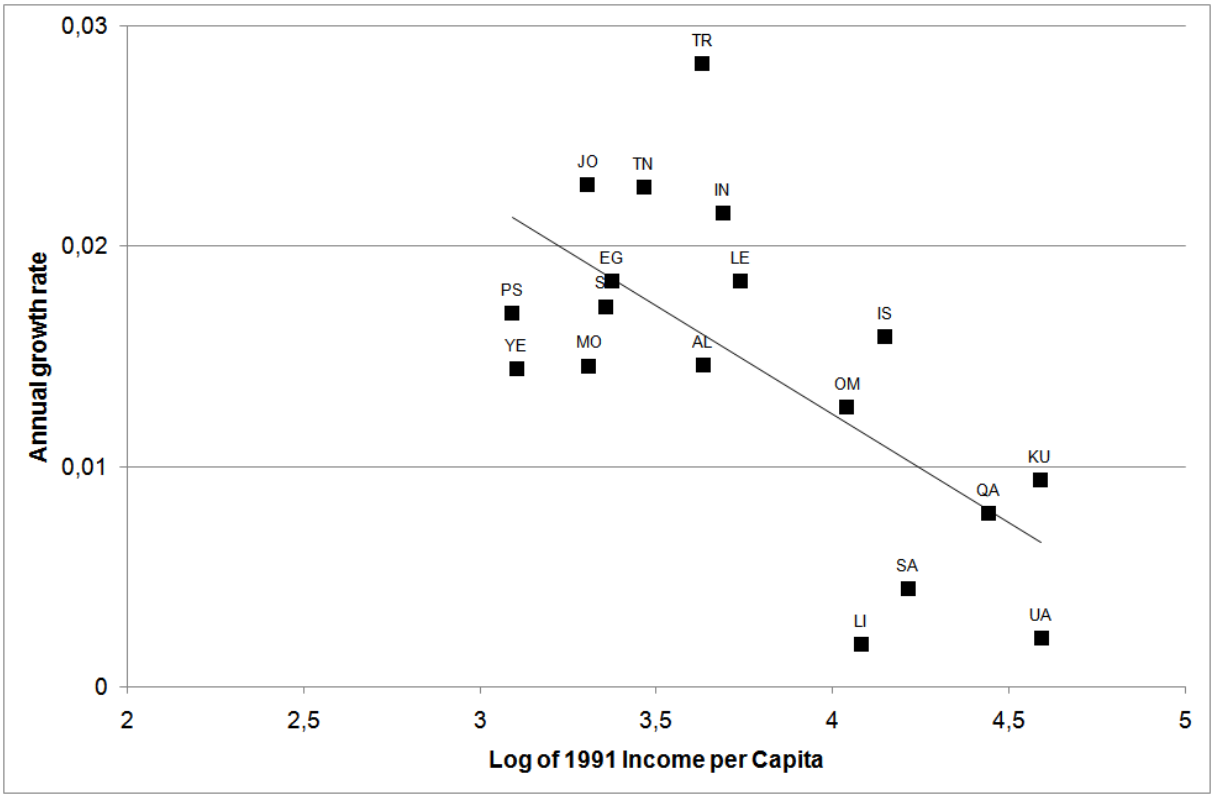


Figure 5.4: MENA 18 - Convergence of Income per Capita 1991-2005

The longest period during which income convergence has taken place, 1991-2005 for MENA 18, has a beta coefficient of 0.0105. As the absolute beta value represents the annual rate at which the economies tend to converge to the steady state, a value of 0.0105 indicates that incomes converged during this period on average with 1 percent per year. This is below the finding of 2% per year, which is repeatedly found in the academic literature [Sala-i Martin, 1996].

Income convergence of 1% per year indicates that only after 66 years[5], half of the initial income differences relative to the final steady state have been reduced. For MENA 28, during 1995-2005, beta is only 0.0019, resulting in a half life of 364 years. The future, however, looks brighter for income convergence in MENA 28; the regression equation reports a value of beta for 2000-2005 of 0.0255, which is much closer to the 2% benchmark, and suggests a time period for income difference to fall by 50% of only 27 years.

As labor migration reduces the spatial disparities of capital per unit of labor [Ozgen et al., 2009], and thus the return (i.e.wage) to labor, it is - however - also of interest to look at income convergence of income per *human capital*. The method of measuring economic integration of Bowen et al. (2010) is based on a production function in which both physical and human capital are inputs in the production process. If convergence of income per human capital also takes place, this would indicate that returns to human capital are becoming more equal within MENA, and thus that economic integration seems to take place.

Starting with MENA 28, results (see figure 5.5 and table 5.5) of income per *human capital* are in line with those of income per capita; absolute beta-convergence takes place (statistically significant at the 5% level) during 1995-2005, with a beta-coefficient of 0.0169, and R^2 of 0.22. While the explanatory power is thus lower than for convergence of income per capita, the speed

[5]Calculated as $\frac{log(0.5)}{log(1-\beta)}$

Table 5.4: Absolute β-Convergence Values

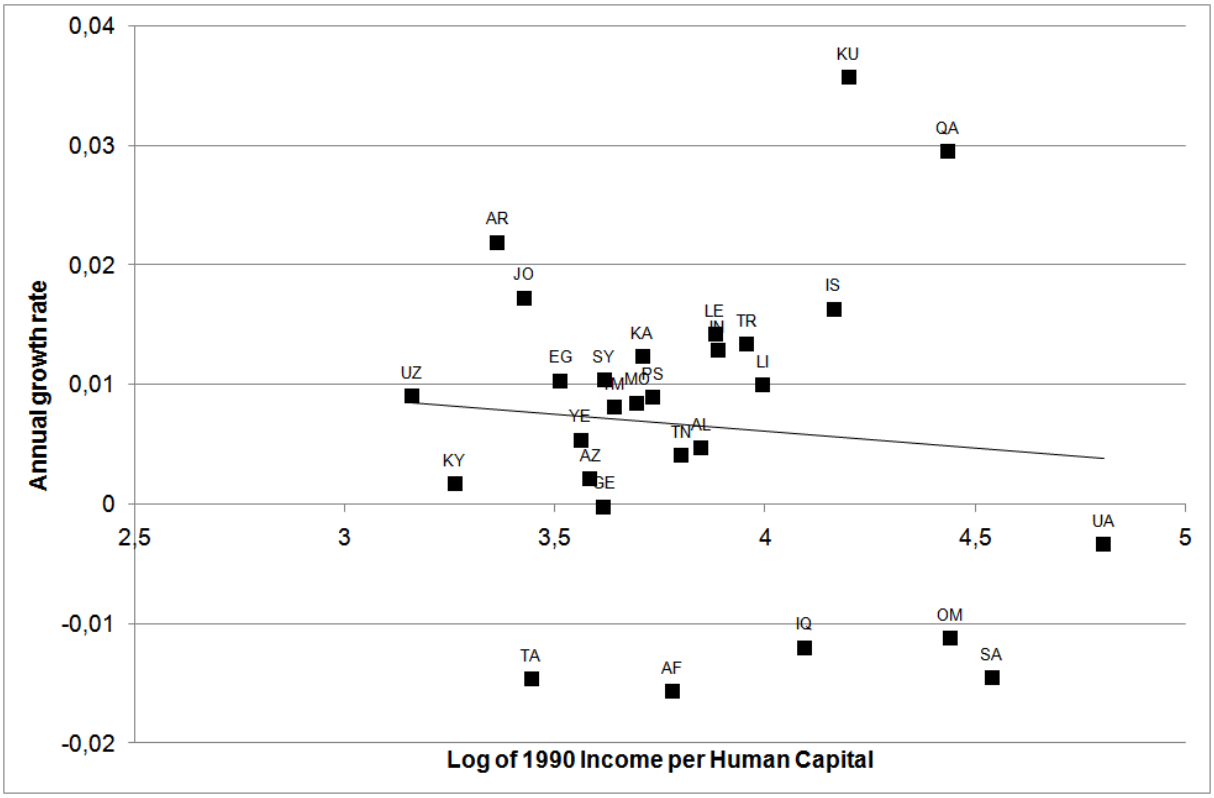
	Period	b_2	S.E.	R^2	S.E.	p-value
MENA 28	1990-2005	0.006	0.01	0.04	0.01	0.33
	1991-2005	0.007	0.00	0.08	0.01	0.16
	1995-2005	0.002	0.00	0.40	0.00	0.00
	1990-1995	-0.006	0.02	0.01	0.01	0.71
	1995-2000	0.002	0.01	0.01	0.01	0.71
	2000-2005	0.026	0.01	0.32	0.02	0.00
MENA 20	1990-2005	0.005	0.01	0.03	0.01	0.46
	1991-2005	0.006	0.00	0.14	0.01	0.12
	1995-2005	0.001	0.00	0.39	0.00	0.00
	1990-1995	-0.003	0.02	0.00	0.03	0.86
	1995-2000	-0.001	0.01	0.00	0.02	0.93
	2000-2005	0.017	0.01	0.24	0.02	0.03
MENA 18	1990-2005	0.008	0.00	0.15	0.01	0.13
	1991-2005	0.011	0.00	0.44	0.01	0.00
	1995-2005	0.001	0.00	0.48	0.00	0.00
	1990-1995	0.004	0.01	0.01	0.02	0.72
	1995-2000	0.008	0.01	0.09	0.01	0.22
	2000-2005	0.011	0.00	0.29	0.01	0.03
MENA 17	1990-2005	0.008	0.01	0.16	0.01	0.13
	1991-2005	0.011	0.00	0.47	0.01	0.00
	1995-2005	0.001	0.00	0.50	0.00	0.00
	1990-1995	0.004	0.01	0.01	0.02	0.74
	1995-2000	0.011	0.01	0.16	0.01	0.12
	2000-2005	0.009	0.00	0.24	0.01	0.05

at which incomes converge is much higher; a beta of 0.0169 indicates that 1,7% of income differences are eliminated each year, resulting in initial income differences reduced by half after only 41 years. Furthermore, visual inspection of the 1990-2005 period seems to indicate convergence, but this is not significant at the 5% level. The period 2000-2005 shows again clear (and significant) absolute beta-convergence. The speed of convergence is only slighter higher this time: beta is 0.022. These relatively high values of beta indicate that returns to *human capital* have become more equal in MENA 28, and thus that economic integration can be taking place.

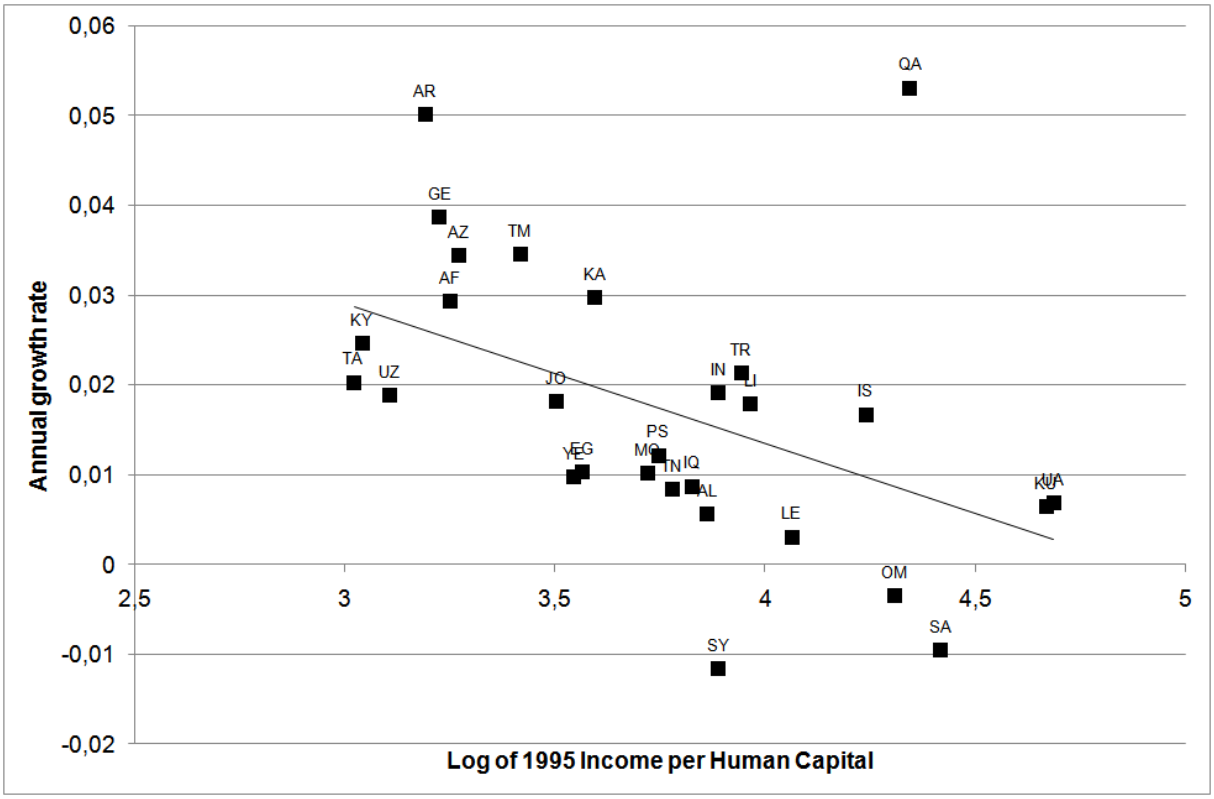
Table 5.5: Absolute β-Convergence Values for Human Capital

	Period	b_2	S.E.	R^2	S.E.	p-value
MENA 28	1990-2005	0.017	0.01	0.00	0.01	0.66
	1995-2005	0.017	0.01	0.22	0.01	0.02
	1990-1995	-0.015	0.02	0.02	0.04	0.43
	1995-2000	0.011	0.01	0.08	0.02	0.15
	2000-2005	0.022	0.01	0.16	0.02	0.05

Convergence of income per *human capital*, however, does not seem to take place for subgroups of MENA 28, indicating that the group of the former Soviet countries and Afghanistan, Iraq and Israel does catch up during 1995-2005 with the core-group of MENA, but that the core-group itself does not necessarily see income differences reduced. A possible explanation is the fact that the national incomes of the former Soviet countries and Afghanistan grow much quicker than their level of human capital, while in the core-group national incomes and human capital grow



(a) 1990-2005



(b) 1995-2005

Figure 5.5: Convergence of Income per Human Capital

at approximately the same rate. Important to keep in mind is that only four data points are available for these regressions, while subgroups of MENA 28 already consist of a limited number of countries. This complicates this type of statistical analysis.

5.6.2 Conditional Convergence

Absolute convergence assumes that all countries converge to a common steady state. As MENA countries are structurally not necessarily alike, it might be necessary to control for these differences when measuring income convergence. Availability of reliable data on structural characteristics, however, is very limited, and therefore only three variables are added to the model. Suitable variables are those that contribute to economic growth, but are either structural, i.e. are relatively stable over time, or one time shocks. Previous research has used a wide range of these variables, like oil-shocks, government policies, and countries being land-locked (see e.g. [Barro and Sala-i Martin, 1992]).

Table 5.6: Conditional β-Convergence Values

	Period	b_2	S.E.	R^2	S.E.	p-value
MENA 28	1995-2005	0.001	0.00	0.52	0.00	0.08
MENA 20	1995-2005	0.001	0.00	0.55	0.00	0.02

Trying to eliminate the possible cross country differences in growth rates as a result of diverging government policies, political instability and differences in economic openness, by adding variables to the model results in lower values of beta, 0.001 (significant at 10%), indicating 0.1% decrease in income differences per year. This is, however, the speed at which countries tend to catch up with *their own structurally determined steady state*. Interpreting the speed of convergence for the whole group is therefore complicated, as it does not tell the speed at which countries catch up with *each other* (Islam, 2003).

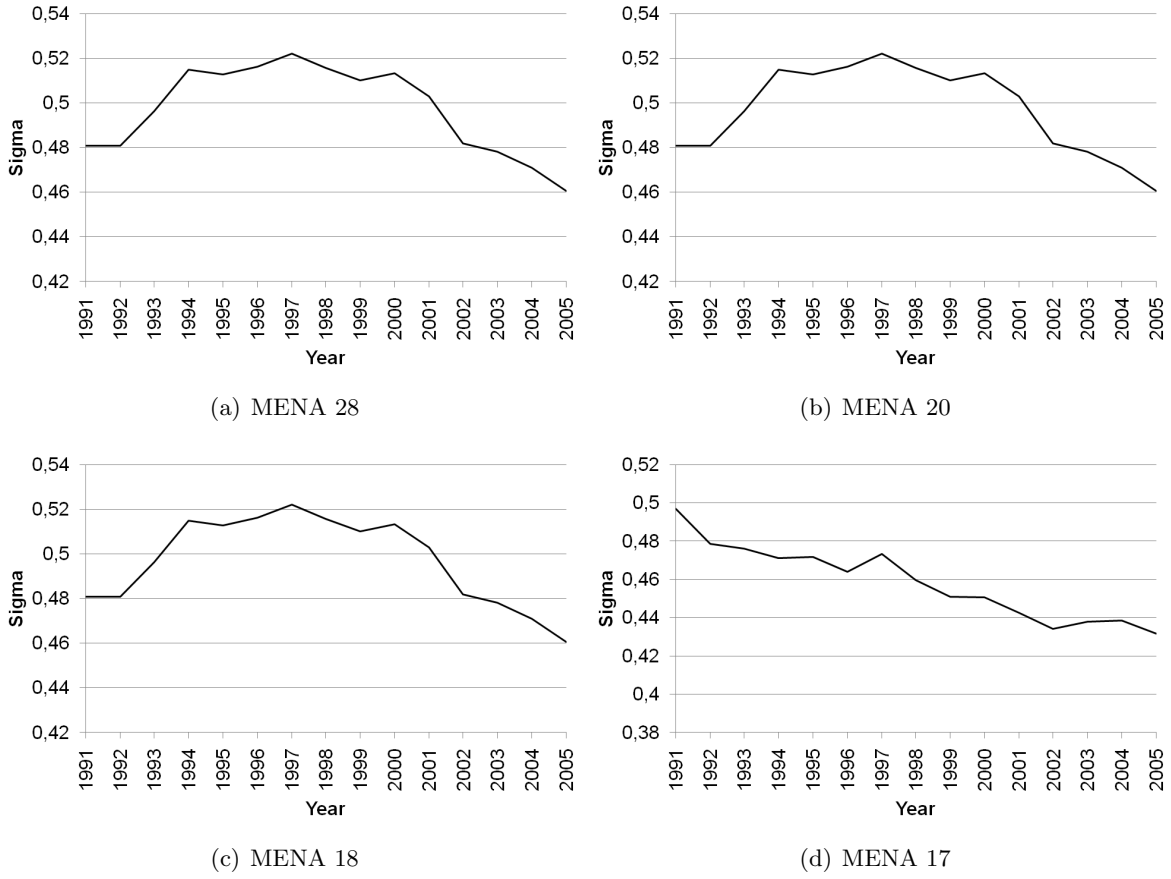
The explanatory power of the model has increased however, as R^2 has risen to 0.52 for MENA 28. Of the added structural characteristics, only political instability was statistically significant (at 10% level). This structural characteristic thus seems to explain part of the income convergence within MENA during 1991-2005.

Adding these structural characteristics to the regression on convergence of income per human capital also improves the model (R^2 rises from 0.22 to 0.33), but the beta is no longer statistically significant. This is an interesting phenomenon, as conditioning for country differences usually results in a higher (and more significant) value for beta (see e.g. [Sala-i Martin, 1996]). However, the problems involved in obtaining reliable data might explain part of this phenomenon.

Table 5.7: Conditional β-Convergence Values for Human Capital

	Period	b_2	S.E.	R^2	S.E.	p-value
MENA 28	1995-2005	0.001	0.00	0.33	0.00	0.6

The theoretical analysis of convergence has shown that absolute beta convergence is a necessary though not sufficient condition for sigma convergence. Based on this relationship, and being now familiar with the results of beta convergence, sigma convergence of income per capita can only take place for MENA 28 and MENA 20 during 1995-2005 and for MENA 18 during 1991-2005. For convergence of income per human capital, it can only take place during 1995-2005 for MENA



(a) MENA 28

(b) MENA 20

(c) MENA 18

(d) MENA 17

Figure 5.6: Sigma Convergence of Income per Capita

28.

5.6.3 σ-Convergence

Visual inspection of sigma-convergence (figure 5.6) shows that sigma convergence of per capita income has taken place during 1995-2005 for both MENA 28 and MENA 20 (although 1995-1997 is not clear), and during 1991-2005 for MENA 18 (the graph for MENA 17 resembles MENA 18).

For income per human capital, convergence only seems to take place for MENA 28 during 1995-2005. Comparing 1995 with 1990 shows clear income per human capital *divergence*. Possible explanations include again the political unrest in Afghanistan, Iraq and the former Soviet Countries. Eliminating these countries indeed results in income convergence during 1990-2000, but produces income *divergence* during 2000-2005. These slightly diverging outcomes of convergence of income per capita versus human capital could again be the result of different growth rates of population and human capital. The existence of income convergence of per capita income for subgroups of MENA, but not of income per *human capital* of these subgroups could be the result of poorer countries within the subgroups seeing their amount of human capital increase quicker than their total population.

These sigma-convergence results are plausible outcomes based on the relationship between beta- and sigma-convergence; there are no periods that show clear sigma-convergence, but lack statistically significant beta-convergence. While beta-convergence can take place without showing sigma-convergence, this does not occur in the results of this research.

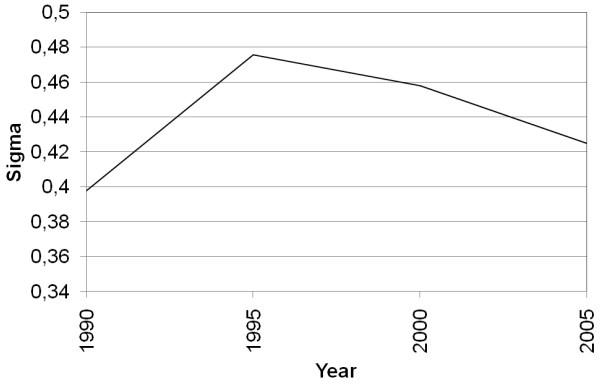


Figure 5.7: MENA 28 - Sigma Convergence of Income per Human Capital

The values of sigma convergence fluctuate between 0.5 and 0.4, and are lower (indicating less income dispersion) for income per *human capital*, than for income per capita. Weighing these values against similar research on the US and Japan by Barro and Sala-i-Martin (2004) shows that sigma-convergence outcomes of around 0.4 compare to values for the US during the early 20th century, and for Japan in the first years after WWII.

This chapter has shown that income convergence in MENA does at least take place during 1995-2005 for MENA 28, for both income per capita and income per *human capital*, and measured both by beta- and sigma-convergence. The next chapter will measure whether this has resulted in higher levels of economic integration than could be expected on the basis of the low levels of intra-regional trade within MENA.

Chapter 6

Economic Integration in MENA

As has been described in chapter 3 on the literature on economic integration, no standard method for measuring economic integration exists within academia, nor is there agreement on the exact definition of economic integration, and do different measures result in different outcomes [Pritchett, 1991].

This means in practice that several measures exist next to each other, which makes objective comparison of integration between regions problematic and provides no clarity on exactly what kind of economic integration is being measured. Different definitions resulting in different outcomes is no surprise; this chapter will therefore first analyze briefly the outcomes of different measures with respect to economic integration in the ME. It will then provide an overview of the theoretical background of the Bowen et al. (2010b) method, and will elaborate on the three theoretical predictions of this model. The chapter will conclude with the actual measurement of economic integration in MENA.

6.1 Different Measures of Economic Integration

A large amount of research investigates and compares the development and size of trade flows over time. Intuitively this makes sense: an increase in the amount of trade relative to the size of a country suggests that a country has become more integrated with the rest of the world, or when looking at intra-region trade, with the rest of the region. This measuring of 'openness' of a country is usually based on the following formula, using the value of imports and exports:

$$Openness(\%) = \frac{import + export}{GDP} * 100 \tag{6.1}$$

This measure however, only evaluates how much a country trades based on its size, does not incorporate factor movements, and when applying to the ME, shows average levels of openness for the ME region as a whole with the rest of the world (ca 60% for MENA (World Bank-definition)). Using this measure to investigate intra-regional trade results in very low scores for the ME (see chapter 2).

Another frequently used assessment of economic integration is based on measuring barriers to trade. This can be done by investigating the development of tariffs over time. While it is very hard to objectively measure trade barriers (tariffs might not be enforced, hidden barriers might exist), they again solely focus on trade flows. Outcomes of this measure are similar to the openness ratio; poor agricultural countries have high barriers in place, while the rich oil-exporters trade freely both with the rest of the world as well as their MENA partners (UNCTAD data [Shafik, 1992]).

A slightly different but interesting measure - one that takes into account different trade potentials between countries - is the gravity model. This model investigates how much countries could be trading with each other, based on their geographical location and structural characteristics. Research shows that the ME is trading below its potential regarding intra-regional trade [Nugent and Hakimian, 2003] as well as with the rest of the world [Söderling, 2005].

While these measures provide an intuitively clear and straight-forward understanding of economic cooperation between countries they have several disadvantages. Most importantly, they focus primarily on the development of trade flows. More advanced methods of investigating economic integration allow also for the free movement of all - or several - of the factors of production. Furthermore, and this applies especially to the tariff based measures, not every method measures whether openness has really improved. Lowering import charges can easily be done in theory, but whether it facilitates the free movement of goods in practice cannot be known for certain, as lower tariff barriers could stimulate the growth of hidden barriers to trade. Also, these measures are subject to diverging interpretations and measurement methods; unofficial trade and unreliable data on trade flows impede reliable examination of economic integration.

6.2 Measuring Integration Based on Distribution of Shares

Measuring factor and output shares and comparing them to an ideal type as a measurement of economic integration circumvents most of these difficulties. The Bowen et al. (2010a) method is based on this type of measurement; it uses the factor price equalization theorem to predict that when countries open up to either trade or factor movements and form an IEA, their relative factor prices (labor and capital) equalize because of competition. One of the strengths of this method is thus that it allows for economic integration based on the movement of both productive factors as well as (final) products.

While being built on a solid theoretical basis, the Bowen et al. (2010a) measure is - unfortunately - also subject to measurement difficulties for certain specific areas. Reliable measures for output (GDP) and quite reliable measures for human capital (number of inhabitants with secondary schooling) can relatively easily be found for the ME. Reliable data on physical capital is, regrettably, much harder to obtain. This is especially the case for the less developed countries in the ME, the ones subject to political instability, and the former Soviet Republics. These measurement difficulties, however, do not harm the theoretical strength of the method, but require careful and conservative interpretation of outcomes, especially when they are based on data on physical capital shares. For a detailed description of data selection please see appendix A.

The Bowen et al. (2010b) method predicts three theoretical observations regarding the behavior of output, physical and human capital shares in a fully integrated area. The method is based on a costant-returns-to-scale (CRS) production function with only two productive factors, physical capital (K) and human capital (H), producing only one single homogeneous good, all at time t, which results in the following Cobb-Douglas production function with diminishing marginal productivity:

$$Y = AK^{\alpha}H^{1-\alpha} \tag{6.2}$$

where Y is output, A represents the level of technology, K is physical capital and H is the human capital stock. Capital's share in output is as usual represented by α.

6.3 Theoretical Prediction (1): Equal-Share Relationship

Assuming furthermore identical technologies and productivity, constant-elasticity-of-substitution (CES) between factors of production, absence of barriers to factor movement and trade flows, harmonization of economic and social policies, and absence of factor market imperfections, full integration would imply that all output uses the same ratio of K and H, resulting in equal output, human capital and physical capital shares for every country. This observation is called the 'equal-share relationship' (for an elaborate treatment, see [Bowen et al., 2010b]). If distribution was not according to equal-shares, redistribution of productive factors could increase output and enhance efficiency by equalizing the marginal returns to the factors of production.

This leads to the following equation for the equal-share relationship, and the first theoretical prediction regarding the distribution of output and productive factors in an IEA [Bowen et al., 2010b]:

$$\frac{Y_{nt}}{\sum_{l=1}^{N} Y_{lt}} = \frac{H_{nt}}{\sum_{l=1}^{N} H_{lt}} = \frac{K_{nt}}{\sum_{l=1}^{N} K_{lt}} \tag{6.3}$$

where $l = 1, ..., N$ is the number of members of the IEA.

An important observation regarding this equation is the convergence of output per (effective) worker (in this case per human capital) as the ratio of inputs to output equalizes. In case output per worker would be different between regions within an IEA, redistribution could improve efficiency by increasing average marginal product. As output per worker is an important component of per capita income levels, integrated areas are therefore expected to show income convergence ([Bowen et al., 2010a]). Income convergence (also on the basis of income per *human capital*) can indeed be observed for MENA, thereby suggesting that a more equal shares distribution of factors and output might exist within MENA, than could be expected on the basis of low intra-regional trade.

6.4 Theoretical Prediction (2): Zipf's Law

The Bowen et al. (2010b) method furthermore predicts - regarding the distribution of factors and production across members - that a power-law distribution that exhibits Zipf's law will show up. The derivation of this prediction is based on the relationship between the rank and the share of a variable that ultimately takes a power law distribution:

$$S_{njt} = \gamma_{jt}(R_{njt})^{\beta_{jt}} \tag{6.4}$$

where $n = 1, ..., N, j = Y, K, H$, S_{nj} is the share, and R_{nj} is the rank of member n, all at time t, and $\beta_{it} < 0$. This implies the following relationship among shares:

$$\frac{S_{1jt}}{S_{2jt}} = 2^{-\beta_{jt}}, \frac{S_{1jt}}{S_{3jt}} = 3^{-\beta_{jt}}, etc \tag{6.5}$$

Assuming that the distribution of shares follows Zipf's law, this implies that $\beta_Y = \beta_K = \beta_H = 1$.

6.5 Theoretical Prediction (3): Limiting Distribution of Shares

Concerning the distribution of output and shares of productive factors, the Bowen et al. (2010b) method predicts that - if shares behave according to Zipf's law - the distribution of shares is fixed, once the number of members of an IEA is known. These shares then follows a harmonic series, where the share of the second largest member is half that of the first, and that of the third largest 1/3 of the largest etc. The reasoning behind this observation is as follows (for an

elaborate treatment, see [Bowen et al., 2010b]):

Let V_{nj} be the level of variable $J(K, H, \text{or } Y)$ of member n, and δ_{njt} be the ratio of a members share compared to member 1, where n is the country and t is time. The total amount of a factor or output within the whole IEA is then:

$$(1 + \delta_{2jt} + \delta_{3jt} + ... + \delta_{Njt})V_{1jt} \tag{6.6}$$

which means that the shares per rank (S_{njt}), implying a harmonic series, are of the following form:

$$Rank1 : S_{1jt} = \frac{1}{1 + \delta_{2jt} + \delta_{3jt} + ... + \delta_{Njt}}; \tag{6.7}$$

$$RankN : S_{Njt} = \frac{\delta_{Njt}}{1 + \delta_{2jt} + \delta_{3jt} + ... + \delta_{Njt}}. \tag{6.8}$$

For the broad MENA definition of 28 countries, this would result in a share for the largest country of:

$$S_{1jt} = \frac{1}{\sum_1^{28} \frac{1}{N}} = \frac{1}{1 + \frac{1}{2} + \frac{1}{3} + ... + \frac{1}{28}} = 0.255 \tag{6.9}$$

6.6 Symmetrical Kullback-Leibler Divergence

If the data confirm these three predictions, economic integration can be measured by calculating the differences between the theoretically predicted shares of output, labor and capital $\overline{S}_{nj}$, and the actually observed shares S_{nj}, which can easily be done by using the symmetric Kullback-Leibler divergence (for a theoretical derivation see [Bowen et al., 2010b]), which summarizes the difference between theoretical and actual shares for all factors, and thus measures how far away an IEA is from full integration.

$$SKLD\left(\overline{S} : S\right) = \frac{1}{3} \sum_{j=y,k,h} \left(\sum_{n=1}^{N} \left(\overline{S}_{nj} - S_{nj}\right) \ln\left(\frac{\overline{S}_{nj}}{S_{nj}}\right)\right) \tag{6.10}$$

The closer to full economic integration an area is, the lower the SKLD value. Evaluating the absolute value of integration requires benchmarks, which will - in this research - be the US and the EU (the US is generally thought to be the most integrated area in the world, the EU scores the highest integration levels on the Bowen et al. (2010a) measurement) as well as the world total (least integrated, based on [Bowen et al., 2010a]). Measuring the *development* of integration within an area can also be done by using the outcomes of this measure.

Before the final results of the SKLD-measure can be reliably compared and interpreted, the data needs to be checked on whether the three theoretical predictions hold. The equal-share relationship is tested by means of the Spearman-rank correlation coefficient, which measures whether the pair-wise rankings of output and factor shares are consistent (its value between 0 and 1). This coefficient measures a 'weak' form of pair-wise ranking as it measures the degree to which the ranks of pairs of values are monotone functions of each other. The closer they are related, the higher the value of the Spearman-rank correlation coefficient, and the more likely that the data confirms an equal-share relationship.

Furthermore, statistical tests will investigate whether the shares behave according to Zipf's law (theoretical prediction 2). This is done by means of taking natural logarithms of equation 6.4, giving:

$$\log(S_{nj}) = \theta_j + \beta_j \log(R_{mj}) + u_{mj} \tag{6.11}$$

Performing OLS regressions of the share of a variable on its rank, and a statistical test on whether the obtained values are significantly different from minus one, shows whether Zipf's law holds. However, previous performance of this test mention a downward bias of both β and the associated error term, and thus an additional test statistic will be obtained based on the unbiased values (for elaborate treatment of statistical problems, see [Bowen et al., 2010b]).

In order to check whether the - limited distribution of - shares indeed follow a harmonic series (theoretical prediction 3), the correlation coefficient between the natural logarithm of actual and theoretical shares will be calculated. The higher this coefficient, the more the actual shares follow a harmonic series.

6.7 Testing the Three Theoretical Predictions

6.7.1 Equal-Share Relationship

Whether the MENA data confirms the equal-share relationship is tested by examining whether there is 'conformity between pair-wise rankings of output and factor shares across members' [Bowen et al., 2010b] within MENA, by means of the Spearman Rank Correlation Coefficient.

Table 6.1: Spearman Rank Correlation Coefficients

	Year	Spearman Rank Correlations Between Shares of:		
		Y and K	Y and H	K and H
MENA 28[a]	1990	0.83	0.56	0.56
	1995	0.87	0.53	0.60
	2000	0.84	0.56	0.58
	2005	0.87	0.58	0.61
MENA 20[b]	1990	0.82	0.71	0.64
	1995	0.88	0.63	0.63
	2000	0.85	0.66	0.66
	2005	0.88	0.61	0.58
MENA 18[c]	1990	0.85	0.68	0.64
	1995	0.86	0.64	0.62
	2000	0.87	0.64	0.57
	2005	0.87	0.61	0.61
MENA 17[d]	1990	0.86	0.66	0.65
	1995	0.87	0.65	0.63
	2000	0.87	0.64	0.60
	2005	0.88	0.64	0.63

[a] Coefficients exceeding 0.48 (=critical level) are significantly different from zero at the 1% confidence level (source: Zar (1972)).
[b] Critical level = 0.57
[c] Critical level = 0.60
[d] Critical level = 0.62

Table 6.1 shows that all correlations are positive and significantly different from zero at the 1% level, except for the correlation between K and H, for MENA 18 (and 17) in 2000. This points towards problems related to the smallest samples and the interpretation of their $SKLD$-values.

For the two largest samples, the data in all cases seem to behave according to the equal-share relationship, where the correlation between Y and K show the highest values. This suggest that output per human capital (or effective labor) is equalized within MENA, and thus that income per human capital should tend to converge based on absolute beta-convergence.

6.7.2 Zipf's Law

Equation 6.11 is tested and table 6.2 till table 6.5 report separately beta-values for Y, K and H, and for the different country groupings.

Table 6.2: Tests for Zipf's Law - MENA 28

Variable	Year	OLS intercept	OLS slope	Bias Corrected Slope[a]	Z-Statistic testing slope = -1[b]	OLS adj. R2
Output Share	1990	-0.67 (0.27)	-1.39 (0.11)	-1.25	-0.86	0.86
	1995	-0.78 (0.23)	-1.33 (0.09)	-1.19	-0.54	0.89
	2000	-0.83 (0.23)	-1.29 (0.09)	-1.16	-0.45	0.88
	2005	-0.94 (0.19)	-1.23 (0.08)	-1.09	-0.29	0.91
Physical Capital Share	1990	0.91 (1.18)	-2.39 (0.46)	-2.25	-1.96	0.49
	1995	0.57 (0.96)	-2.16 (0.37)	-2.03	-1.77	0.55
	2000	0.48 (0.91)	-2.09 (0.36)	-1.96	-1.71	0.55
	2005	0.42 (0.90)	-2.05 (0.35)	-1.91	-1.67	0.55
Human Capital Share	1990	-0.86 (0.27)	-1.26 (0.11)	-1.12	-0.37	0.84
	1995	-0.93 (0.23)	-1.23 (0.09)	-1.10	-0.29	0.88
	2000	-0.88 (0.21)	-1.27 (0.08)	-1.13	-0.4	0.90
	2005	-0.90 (0.22)	-1.25 (0.08)	-1.11	-0.33	0.89

[a]Bias is based on the values of the biases used in Bowen et al. (2010b), and corrected for the number of observations.

[b]Computations based on [Bowen et al., 2010b]): $\frac{Bias\_Corrected\_Slope+1}{(-OLS\_Slope)\times\left(\frac{2}{M}\right)^{0.5}}$

Table 6.3: Tests for Zipf's Law - MENA 20

Variable	Year	OLS intercept	OLS slope	Bias Corrected Slope	Z-Statistic testing slope = -1	OLS adj. R2
Output Share	1990	-0.81 (0.28)	-1.30 (0.12)	-1.14	-0.34	0.85
	1995	-0.83 (0.28)	-1.29 (0.13)	-1.13	-0.32	0.85
	2000	-0.85 (0.31)	-1.27 (0.14)	-1.11	-0.28	0.82
	2005	-0.92 (0.26)	-1.23 (0.11)	-1.07	-0.18	0.86
Physical Capital Share	1990	-0.08 (1.05)	-1.96 (0.47)	-1.81	-1.3	0.47
	1995	-0.08 (0.98)	-1.83 (0.43)	-1.67	-1.16	0.47
	2000	-0.17 (0.95)	-1.75 (0.42)	-1.59	-1.07	0.46
	2005	-0.28 (0.94)	-1.72 (0.42)	-1.56	-1.03	0.46
Human Capital Share	1990	-0.58 (0.32)	-1.48 (0.14)	-1.32	-0.69	0.85
	1995	-0.67 (0.30)	-1.42 (0.13)	-1.26	-0.59	0.86
	2000	-0.62 (0.29)	-1.46 (0.13)	-1.30	-0.65	0.87
	2005	-0.69 (0.30)	-1.39 (0.13)	-1.24	-0.53	0.85

Inspection of these tables show the complication involved in the values for physical capital; reported errors are large, slopes seem to deviate from -1, and R^2 values are relatively low. Especially values for 1990 urge for caution when interpreting measures constructed with these values. All bias-corrected slopes, however, are not significantly different from -1 at the 5% level.

Table 6.4: Tests for Zipf's Law - MENA 18

Variable	Year	OLS intercept	OLS slope	Bias Corrected Slope	Z-Statistic testing slope = -1	OLS adj. R2
Output Share	1990	-0.83 (0.27)	-1.29 (0.12)	-1.12	-0.29	0.86
	1995	-0.87 (0.27)	-1.26 (0.13)	-1.1	-0.23	0.85
	2000	-0.93 (0.25)	-1.21 (0.11)	-1.05	-0.13	0.87
	2005	-0.93 (-.26)	-1.21 (0.12)	-1.05	-0.13	0.86
Physical Capital Share	1990	0.17 (1.16)	-2.07 (0.53)	-1.9	-1.31	0.45
	1995	-0.03 (1.08)	-1.89 (0.50)	-1.73	-1.16	0.44
	2000	-0.16 (1.06)	-1.78 (0.49)	-1.62	-1.04	0.42
	2005	-0.24 (1.05)	-1.71 (0.48)	-1.55	-0.96	0.40
Human Capital Share	1990	-0.51 (0.35)	-1.54 (0.16)	-1.38	-0.73	0.84
	1995	-0.55 (0.33)	-1.53 (0.15)	-1.37	-0.70	0.85
	2000	-0.53 (0.33)	-1.53 (0.15)	-1.31	-0.72	0.86
	2005	-0.58 (0.34)	-1.48 (0.16)	-1.31	-0.64	0.84

Table 6.5: Tests for Zipf's Law - MENA 17

Variable	Year	OLS intercept	OLS slope	Bias Corrected Slope	Z-Statistic testing slope = -1	OLS adj. R2
Output Share	1990	-0.67 (0.28)	-1.34 (0.13)	-1.18	-0.39	0.86
	1995	-0.81 (0.28)	-1.31 (0.13)	-1.15	-0.34	0.86
	2000	-0.87 (0.25)	-1.26 (0.12)	-1.10	-0.24	0.88
	2005	-0.87 (0.27)	-1.26 (0.13)	-1.10	-0.24	0.86
Physical Capital Share	1990	0.26 (1.19)	-2.17 (0.52)	-2.01	-1.36	0.46
	1995	0.06 (1.11)	-1.99 (0.52)	-1.83	-1.22	0.45
	2000	-0.07 (1.08)	-1.86 (0.51)	-1.71	-1.11	0.43
	2005	-0.17 (1.08)	-1.79 (0.51)	-1.63	-1.03	0.42
Human capital Share	1990	-0.45 (0.37)	-1.59 (0.18)	-1.43	-0.80	0.84
	1995	-0.49 (0.35)	-1.57 (0.17)	-1.41	-0.76	0.85
	2000	-0.48 (0.35)	-1.58 (0.17)	-1.42	-0.78	0.85
	2005	-0.54 (0.37)	-1.51 (0.17)	-1.36	-0.69	0.83

6.7.3 Distribution of Factor Shares Follows Harmonic Series

Table 6.7 shows correlation coefficients between the natural logarithm of theoretical and actual shares, and thus tests to what extent the MENA data approaches the harmonic series of the theoretically expected share distribution.

For both output and human capital, correlation coefficients are high (around 0.9), and for all years and all country selections. Again, the correlation between the theoretical and actual physical capital shares are less convincing, still showing a correlation of around 0.7, but again calling for more careful interpretation.

In conclusion, the data for MENA countries seems to confirm the three theoretical predictions regarding the behavior of factor and output shares, where capital shares require the most careful interpretation, especially those for the former Soviet Republics.

6.8 Level and Development of Economic Integration

As labor migration is high in MENA, one would expect the outcomes of the Bowen et al. (2010a) method to be showing higher levels of integration than would be expected on the basis of intra-regional trade only. As chapter 5 has shown convergence of both income per capita as well as per

Table 6.6: Theoretical Shares

Group	Theoretical Shares (descending)				
MENA 28	0.2546	0.1273	0.0849	0.0637	0.0509
	0.0424	0.0364	0.0318	0.0283	0.0255
	0.0231	0.0212	0.0196	0.0182	0.0170
	0.0159	0.0150	0.0141	0.0134	0.0127
	0.0121	0.0116	0.0111	0.0106	0.0102
	0.0098	0.0094	0.0091		
MENA 20	0.2780	0.1390	0.0927	0.0659	0.0556
	0.0463	0.0397	0.0347	0.0309	0.0278
	0.0253	0.0232	0.0214	0.0199	0.0185
	0.0174	0.0164	0.0154	0.0139	
MENA 18	0.2861	0.1431	0.0954	0.0715	0.0572
	0.0477	0.0409	0.0358	0.0318	0.0286
	0.0260	0.0238	0.0220	0.0204	0.0191
	0.0179	0.0168	0.0159		
MENA 17	0.2907	0.1454	0.0969	0.0727	0.0581
	0.0485	0.0415	0.0363	0.0323	0.0291
	0.0264	0.0242	0.0224	0.0208	0.0194
	0.0182	0.0171			

Table 6.7: Correlations between Actual and Theoretical Shares

	Year	Correlation between Log of Actual and Theoretical Shares		
		Y	K	H
MENA 28	1990	0.93	0.71	0.92
	1995	0.95	0.75	0.95
	2000	0.94	0.75	0.94
	2005	0.95	0.75	0.95
MENA 20	1990	0.93	0.7	0.93
	1995	0.92	0.71	0.93
	2000	0.91	0.70	0.94
	2005	0.93	0.70	0.93
MENA 18	1990	0.93	0.69	0.92
	1995	0.93	0.69	0.93
	2000	0.94	0.67	0.93
	2005	0.93	0.66	0.92
MENA 17	1990	0.93	0.71	0.92
	1995	0.93	0.70	0.93
	2000	0.94	0.68	0.93
	2005	0.93	0.67	0.91

human capital during 1995-2005, this indicates that rewards to (human) capita(l) are becoming more 'equal', suggesting that - at least for the input factor 'labor' - marginal product varies less than without migration. Assuming an equal-share relationship, this would imply lower variability in both physical capital and output as well, signifying a more closely integrated area.

As long as trade in goods is low, but labor mobility relatively high, it is hard to predict the *exact* final level of economic integration within MENA. The level of economic integration, however, is

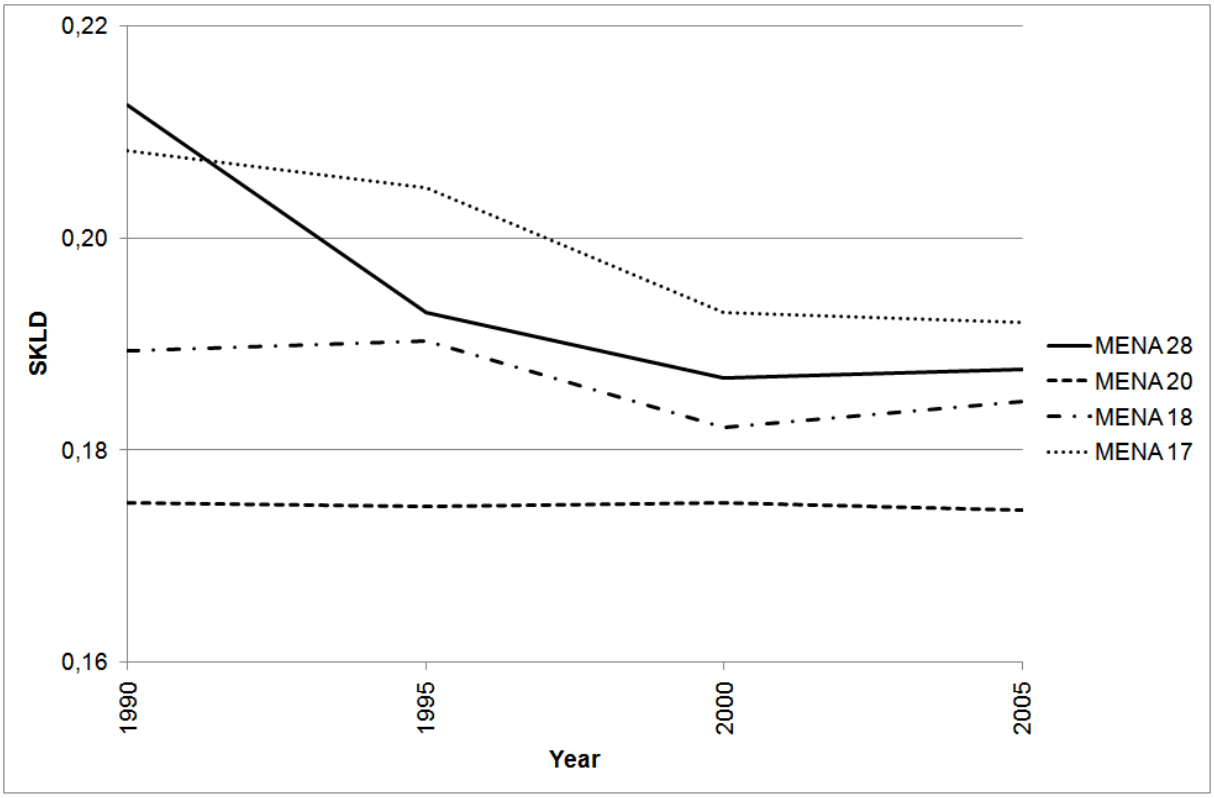


Figure 6.1: Symmetric Kullback-Leibler Divergence (SKLD)

expected to be increasing over time, as both intra-regional trade has increased during 1995-2005 (from 9% to 12%) and income convergence has taken place.
Expectations are therefore the following:

- Levels of economic integration are higher in MENA than would be expected on the basis of only intra-regional trade flows. This would mean that the SKLD values obtained for MENA are moving towards integrated areas (benchmark US and EU), and away from the world total in general (least integrated area).
- Countries in MENA are getting more integrated over time, as intra-regional trade is increasing and labor migration has resulted in income convergence during 1995-2005 and 2000-2005 in particular.

Figure 6.1 shows two interesting and important phenomena. First of all, the SKLD values for the ME are - as the occurrence of income convergence predicted - relatively low. The US and the EU, benchmarks for most integrated area, shows values of 0.099 and 0.125 while the total world average of SKLD-score varies around 9.1 (the benchmark of very little integration) [Bowen et al., 2010a]. This indicates clearly that the ME shows signs of economic integration, and more than would be expected on the basis of its very low intra-regional trade. Bowen et al. (2010a) also use the inverse of the SKLD-value as an integration indicator. Values for MENA in 2000 fluctuate then around 5, while the EU reports 10.10, the US has 8.0 and the world as a whole only 0.11. This means that MENA has about 50% and 62% of the level of economic integration of the EU and the US respectively.

The absolute value of the SKLD-measure shows interesting differences between the various country groupings; the MENA 20 selection results in the lowest values, but is relatively stable over time. The MENA 28 group has higher values, but its level of integration is increasing over time. Reflecting on the outcomes of convergence of income per (human) capita(l), this graph seems to

indicate that the former Soviet Republics are indeed catching up with their richer ME-neighbors. MENA 28 thus shows lower levels of integration, but is getting more integrated over time as the former Soviet Republics open up their border to ME-trade and possibly experience labor migration to the rest of MENA[1].

The role of Afghanistan, Iraq and Israel is complicated, and hard to interpret; excluding all of them lowers levels of integration, while excluding only Afghanistan and Iraq improves integration levels slightly compared to MENA 28. This could indicate, surprisingly, that Israel does belong to the IEA.

Summing up, the ME is indeed more integrated than on the basis of its intra-regional trade, and integration levels for the full set of countries (MENA 28) are indeed increasing over time, though noting that 1990 values should be interpreted carefully. Interesting to note is that MENA 20 is more economically integrated than the area with the former Soviet Republics (MENA 28), but MENA 28 is catching up, indicating that the former Soviet Republics are getting more integrated over time with the rest of MENA.

[1]Data on labor migration from the non-Arab states to non-GCC states is too limited to provide a basis for estimating these flows. However, there are clear signs of the existence of these flows. Large numbers of Afghans e.g. have found work in the construction industry in Iran.

Chapter 7

Conclusion

This research has analyzed the level of economic integration in MENA - an area that has shown high levels of integration in the distant past - for four different definitions of the Middle East and during 1990-2005 and sub-periods. Economic integration was measured by a new method [Bowen et al., 2010a], derived from predictions regarding the distribution of factor and output shares of a fully integrated area. Based on the high amount of labor migration in MENA, economic integration seems to be further advanced than would be expected solely on the basis of the limited amounts of intra-regional trade. Labor migration, after all, brings Gross *Domestic* Product - via the use of mobile human capital - in line with the domestically available stock of physical capital.

Labor migration has also influenced the *development* of income differences within MENA over time. Both sigma- and beta-convergence were measured, in this case showing similar results: convergence of both per capita as well as per human capital income seems to take place, but - roughly speaking - mainly during the period 1995-2005, with beta-values slightly below the academic benchmark of 2% income convergence per year. Conditioning on structural characteristics of the MENA countries showed that political instability explained part of the income convergence in the region.

A result of these high levels of labor migration is the observation that levels of integration are closer to the benchmark EU and USA (most fully integrated areas) than they are to the world total. This observation holds for all the four different country groupings, although integration levels are highest for MENA 20, i.e. without the former Soviet Republics. Keeping in mind that 1990 values should be carefully interpreted, it seems that integration levels are increasing. Only MENA 20 shows relatively stable levels of economic integration over time.

The data used to measure economic integration largely confirms the three theoretical predictions resulting from the theoretical background of this method. The equal-share relationship - that predicts that output and factor shares of members of an integrated area equalize - holds best for the combination of output and physical capital shares. Furthermore, testing whether the shares and their ranks follow a limiting distribution, based on Zipf's law, showed that is largely the case. Correlations between actual and theoretical shares also show that the third prediction largely holds. Data on physical capital shares, however, should be carefully interpreted, as these shares deviated most - and for earlier years sometimes too much - from their predicted levels.

Thus, the Middle East is more closely resembles an Integrated Economic Area than would be expected on the basis of its low intra-regional trade, mainly as a result of the high amount of labor migration within the region.

Chapter 8

Discussion

The overall results of this research; MENA being more integrated than expected on the basis of intra-regional trade, and income convergence taking place during 1995-2005 seem the most robust. Comparisons over time or between sub-groups of countries are - due to smaller samples, possible measurement errors and the political instability of the region - more complicated.

Based on the most robust findings, we can analyze the prospects for economic integration in MENA in the future, which requires information on future levels of labor migration, as well as intra-regional trade. Future prospects for intra-regional trade are more positive than for labor migration; recent years have seen a quick increase in the number of Regional Trade Agreements, which could be a stimulus to intra-regional trade. Data on intra-regional trade already showed that the percentage intra-regional trade of total trade of MENA countries is increasing over time. Keeping up the level of labor migration, or even increasing it, seems much more of a challenge; competition from Asian countries - which provide cheap and hard-working labor - as well as increasing levels of unemployment in GCC countries itself [Girgis, 2002] have already started to limit employment opportunities for Arabs in the region. Intra-regional trade will have to increase more substantially, however, if it is to compensate for the decrease in labor migration.

Thus, if the MENA governments want to reap the fruits of economic integration in the future, they will have to put more effort into economic cooperation, and put their political differences aside. The recent past, however, has shown that political cooperation between MENA governments is more of a challenge than a guarantee[1]; full scale war, independence struggles, and the complicating role of oil in the region, demand unprecedented dedication towards economic integration. Enthusiasm and commitment is definitely there. When I spoke to Javad Ali (Assistant Director International Relations) of the Economic Cooperation Organization in Tehran, Iran, - during my internship at the Royal Netherlands Embassy - I was impressed by the devotion of the ECO committee members towards economic integration and their knowledge on the topic. But I also became much aware of the problems they are dealing with: governments, especially during economic downturns and political instability, are reluctant to make concessions in the field of trade liberalization and the simplification of visa procedures. However, there are also successes: infrastructure - a bare necessity for intra-regional trade - has been improved recently with the opening of a direct cargo train connection between Pakistan and Turkey. Furthermore, ECOs current approach is in line with the ASEAN model of the 1980s and 1990s - based on unilateral trade liberalization on a multilateral basis - which has proven successful especially for middle income countries with similar recourse endowments [Pomfret, 1997].

These small successes, nonetheless, are not enough to substantially increase the level of economic

[1]For a fascinating eye-witness account of the political tensions within MENA I can strongly recommend Fisk (2005).

integration within MENA, nor is signing RTAs a guarantee for boosting intra-regional trade. In short, MENA governments have to start acting and stop focusing on their political differences if the region wants to keep up - or even increase - its level of economic integration, which is necessary if it wants to attain higher growth rates and not become further marginalized in the world trading system [Alonso-Gamo et al., 1997].

Appendix A

Data Selection

The data in this research is constructed according to Bowen et al. (2010a), in order to be able to compare the outcomes of research on MENA with that of other IEA's.

All data on output, human capital and physical capital is selected for the years 1990-2005, with a five year interval, resulting in 4 data points. Values for the years 1990-1993 for the former Soviet Union need to be interpreted with the utmost caution as the break-up of the former Soviet Union has resulted in large fluctuations of values between years.

Many countries within MENA do not regularly produce reliable statistics. All data used should therefore be treated as an indication of a certain trend of level, and not as an absolute or fixed value. For a thorough overview of constructing human and physical capita data see Loening (2005).

Output
Output is measured for all countries by Real GDP per capita, in constant 2005 USD, and is obtained from Penn World Tables 6.3. These values are multiplied by population (also from Penn World 6.3) in order to obtain total Real GDP levels per country.

Human Capital
The measure for human capital is the number of people enrolled in secondary education, obtained from the World Development Indicators (WDI) Online Database from the World Bank. Unfortunately, not all years were available for all countries. For countries that missed a single year, the closest nearby year was used. For countries missing more than one value, values were obtained by interpolation. Values for Tajikistan are obtained from Turkmenistan, as no data is available for Tajikistan.

Physical Capital
Reliable data on physical capital is by far the most difficult to obtain, and the question arises immediately whether it is possible to get hold of this data for a not well documented area as MENA. Outcomes of research based on estimations of the physical capital stock per country should therefore be treated with the utmost caution.

Physical capital stocks are calculated in three steps: From PWT 6.2, data on investment share of $RGDP(k_{nt}), RGDP$ per laborer ($rgdpl_{nt}$) and total population (pop_{nt}) are obtained, making it possible to calculate real investment per year (I_{nt}) as follows:

$$I_{nt} = rgdpl_{nt} * k_{nt} * pop_{nt} \tag{A.1}$$

The second step of the procedure consists of calculating depreciation rates: where available,

depreciation rates are obtained from PWT 5.6 for the year 1990. Countries missing depreciation rates were matched with countries similar in economic endowments, according to following groupings: Morocco's depreciation rate is used for Algeria, Tunisia and Libya. Iran's rate is used for Iraq and Pakistan. Israel's value is used for Kuwait, Qatar and the UAE. Syria's depreciation rate counts for those of Jordan, Yemen, Oman, Lebanon and Saudi Arabia. The rate of Poland is used for the former Soviet Union countries plus Afghanistan.

The third step implies using the Permanent Inventory Method (PIM-rule) to ultimately calculate the physical capital stock per country, using the assumption $K_{n0} = I_{n0}$:

$$K_{nt} = K_{nt-1} * (1 - \delta) + I_{nt} \tag{A.2}$$

Values used for K_{n0} are taken as far back in time as available (none further back than 1960), in order to obtain values of the capital stock between 1990 and 2005 as accurately as possible. Otherwise, the most historical value was used.

Several former Soviet Union countries lack all data used for calculating the physical capital stock. Their 1990 values of physical capital per worker are obtained by matching to similar countries (Kazakhstan to Iran, and Azerbaijan to Turkey), this value is multiplied by their respective populations, from where on their own data on investment etc is used to calculate the development of their total physical capital stock. The same procedure has been applied to Lebanon and Yemen, who are matched to Jordan and Syria respectively.

In order to prevent creating an equal-share relationship during data construction, only one country could be matched to an other country during this part of the data construction.

Per Capita National Income

Data used for the measurement of beta- and sigma-convergence consist of income per national (thus per owner of the nationality of a specific country). This GNI per national can be found in the World Bank Development Indicators database, under the heading of GNI PPP. Missing GNI PPP values for Libya and Qatar were calculated based on their total GNI PPP divided per the number of nationals of the country. No GNI-data is available for Afghanistan and Iraq; GDP PPP per national is used instead.

Political Instability, Government Expenditures and Openness

Data on government expenditures and openness were obtained from the World Bank World Development Indicators, measured as percentage of GDP comprising of government expenditures, and total trade as a percentage of GDP. The dummy of political instability was given to countries that experienced severe economic crisis due to full-scare war or regaining independence.

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