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## Economic Policy Papers

### **Immigration in Cyprus: An Analysis of the Determinants**

***Panayiotis Gregoriou***  
Economics Research Centre,  
University of Cyprus

***Zenon Kontolemis***  
Economics Research Centre,  
University of Cyprus  
and  
Ministry of Finance

***Maria Matsi***  
Ministry of Finance

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# Immigration in Cyprus: An Analysis of the Determinants

Panayiotis Gregoriou, Zenon Kontolemis and Maria Matsi

## Executive Summary

*Understanding international migration trends is of great relevance for policy making. Migration affects the labour market, competitiveness, and growth of a country. It has social, as well as economic repercussions. This is especially true for a small, open economy like Cyprus. Thus, the ability of a country to correctly understand and predict migrant flows from other countries serves as a valuable tool for the design and implementation of economic and social policies. The purpose of this paper is to analyze the factors, economic and non-economic, that drive international migration flows towards Cyprus. For this purpose, we follow an econometric approach, using a newly constructed dataset of 52 “sending” countries, covering the period 1998-2006. Our results show that not only economic, but other factors as well, may influence a person’s decision to migrate. Income levels and income gaps appear to be a significant driving force of migration towards Cyprus. The same cannot be said, however, about labour market conditions. In addition, non economic factors such as a common spoken language between “sending” countries and Cyprus, the distance between them and “network effects” generated from the stock of migrants in Cyprus, are among the major factors influencing a person’s decision to migrate. Interestingly, however, we do not find a similar link between migration and political factors, nor between migration and climatic conditions.*



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# Η Μετανάστευση στην Κύπρο: Ανάλυση των Προσδιοριστικών Παραγόντων

Παναγιώτης Γρηγορίου, Ζήνων Κοντολαίμης και Μαρία Μάτση

## ΠΕΡΙΛΗΨΗ

*Η μελέτη αυτή ασχολείται με το θέμα της διεθνούς μετανάστευσης, με έμφαση στην Κύπρο. Η Κύπρος, παραδοσιακά υπήρξε πόλος έλξης για μετανάστες από ολόκληρο τον κόσμο. Αυτό αποδεικνύεται από τη συνεχή θετική καθαρή μετανάστευση (διαφορά μεταξύ μεταναστών προς Κύπρο και μεταναστών από Κύπρο) που έχει καταγραφεί από το 1983 μέχρι και σήμερα. Αξιοσημείωτη είναι η περίοδος πριν και μετά την ένταξη της Κύπρου στην Ευρωπαϊκή Ένωση κατά την οποία παρατηρήθηκαν άνευ προηγουμένου υψηλά επίπεδα μετανάστευσης προς την Κύπρο, με κορύφωση το 2004 όπου η καθαρή μετανάστευση ανήλθε στα 15,724 άτομα, ή 4.43% του εργατικού δυναμικού.*

*Μέσω εμπειρικής προσέγγισης επιχειρούμε να διερευνήσουμε οικονομικά τους καθοριστικούς παράγοντες των μεταναστευτικών κινήσεων προς την Κύπρο, χρησιμοποιώντας δεδομένα από 52 χώρες προέλευσης μεταναστών για την περίοδο 1998-2006. Τα αποτελέσματα μας δείχνουν ότι οι οικονομικοί παράγοντες, και συγκεκριμένα τόσο η διαφορά εισοδήματος ανάμεσα στη χώρα προέλευσης και τη χώρα μετανάστευσης όσο και τα επίπεδα εισοδήματος στη χώρα προέλευσης, είναι στατιστικά σημαντικοί παράγοντες που επηρεάζουν τη μετανάστευση. Αντίθετα, τα αποτελέσματα μας δεν δείχνουν κάποιο δυνατό σύνδεσμο μεταξύ του επιπέδου ανεργίας στην Κύπρο (ή της σχετικής ανεργίας της Κύπρου με την χώρα προέλευσης) και της μετανάστευσης. Πέρα όμως από τους οικονομικής φύσης παράγοντες, υπάρχουν και άλλοι, μη-οικονομικής φύσης που επιδρούν σημαντικά στις μεταναστευτικές κινήσεις. Συγκεκριμένα, βρίσκουμε ότι παράγοντες όπως είναι η απόσταση μεταξύ των δύο χωρών, η κοινή γλώσσα ομιλίας, και τα «αποθέματα» μεταναστών που κατοικούν ήδη στη χώρα προορισμού είναι καθοριστικοί παράγοντες της μετανάστευσης. Το ίδιο δεν μπορούμε να πούμε βάσει των αποτελεσμάτων μας και για άλλους παράγοντες τους οποίους λαμβάνουμε υπόψη, όπως για παράδειγμα οι διαφορές στις καιρικές συνθήκες μεταξύ των δύο χωρών, ή οι διαφορές στην πολιτική τους σταθερότητα. Αυτό το εύρημα δεν είναι αναμενόμενο, δεδομένης της δυνατής παρουσίας Άγγλων υπηκόων στην Κύπρο και επίσης της συνεχούς ροής ατόμων από το Ηνωμένο Βασίλειο στην Κύπρο.*

*Η μελέτη στο σύνολο της επιβεβαιώνει κάποια γενικώς γνωστά γεγονότα και υποθέσεις σε σχέση με τη μετανάστευση στην Κύπρο. Βάσει των ευρημάτων μας μία εύλογη πρόβλεψη θα ήταν ότι εφόσον το εισοδηματικό χάσμα μεταξύ της Κύπρου και των χωρών προέλευσης των μεταναστών, θα συνεχίσει να λειτουργεί προς όφελος της*

*Κύπρου, ειδικά σε σχέση με τις πολύ φτωχές χώρες, οι ροές μεταναστών από όλες αυτές τις περιοχές θα συνεχίσουν να αυξάνονται κατά τη διάρκεια των επόμενων 10-20 χρόνων. Αντίθετα όμως, οι μεταναστευτικές κινήσεις από πιο πλούσιες χώρες και ειδικά χώρες της Ευρωπαϊκής Ένωσης όπως η Ρουμανία και η Βουλγαρία, στο τέλος θα αδυνατήσουν. Ωστόσο, η εύρεση δυνατών δεσμών δικτύου (από τα «αποθέματα» μεταναστών στην Κύπρο), υπονοεί ότι η αλλαγή στη σύσταση των μεταναστών στην Κύπρο θα είναι πολύ βαθμιαία. Γενικά όμως, όσο η οικονομία συνεχίζει να επεκτείνεται, η μετανάστευση θα συνεχίσει να είναι μία κινητήρια δύναμη της οικονομικής ανάπτυξης.*



## 1. INTRODUCTION

Understanding international migration trends is of great relevance for policy making. Migration affects the labour market, competitiveness, and growth of a country. It has social, as well as economic repercussions. This is especially true for a small, open economy like Cyprus. Thus, the ability of a country to correctly understand and predict migrant flows from other countries serves as a valuable tool for the design and implementation of economic and social policies.

Migrant flows, in and out of a country, may generate both benefits, as well as costs. For a destination country, an unanticipated inflow of foreign workers, would – to some extent – eventually lead to an alteration in the composition and the size of the country's labour market and undoubtedly affect both the wages and the employment opportunities in that country. Domestic – mainly low-skilled – workers may be faced with increased competition generated from a growing number of low-skilled immigrant workers willing to work away from their home countries for considerably low wages. In addition, there are implications for the provision and in some cases the quality, of public goods. On the other hand, lower wages may lead to lower production costs, and ultimately to lower prices for domestic products and services. Indeed, there is ample evidence for both Cyprus (Christofides et al., 2007) and other countries (see for example Friedberg and Hunt, 1995; De New and Zimmermann, 1994; Borjas, 2003; Aydemir and Borjas, 2007; and references therein) that migration affects the wage and income distribution.

At the same time, “sending” countries gain remittances – money sent back home by migrants – which is a substantial source of income, and a key factor contributing to economic growth in these countries. According to World Bank estimates, countries' remittances may constitute up to one third of their GDP in some cases. In 2005, the total value of remittances was estimated to be over 230 billion US dollars<sup>1</sup>. However, this does not come without a cost. An important downside to migration – mostly common in developing countries – is a phenomenon commonly referred to as “brain drain”. Often, the talented or well-educated individuals in developing countries migrate in search of better work (or other) opportunities abroad. Consequently, these countries sustain a severe depletion of human capital and a loss of growth potential in the long run.

The above, present a short, non-exhaustive, summary of how migration may affect the “sending” and “receiving” countries. What must be noted, however, is that

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<sup>1</sup> Source: World Bank website for Payment Systems and Remittances.

international migrant flows can have important economic effects for both ends and, because of this, it is important for any country to analyse and foresee these flows.

This study focuses on three areas. Firstly, it presents the key stylized facts regarding migration trends in, and out of, Cyprus. Second, it reviews empirical studies analyzing the determinants of migration flows. These determinants are often used as a basis for predicting flows across countries. Thirdly, it empirically investigates the factors influencing migration, focusing on Cyprus as a case study.

Net migration flows have increased dramatically over the past two decades, both internationally but more importantly in Cyprus. Cyprus has experienced the classic two migration waves in its recent history. The first was associated with large-scale emigration of Cypriots abroad in the early twentieth century in search of jobs and better standards of living; and later between 1960 and 1975, especially following the Turkish invasion of the island in 1974, to countries such as the UK, the USA and Australia. In the past 20 years, however, these trends have been reversed and a strong wave of net inward migration took place, first before Cyprus's accession in the EU, owing to the gradual liberalization of the labour markets in the 1990s, and then subsequently following EU accession. The stylized facts presented in the paper show that not only relatively poorer countries, such as Sri Lanka, the Philippines, Bulgaria or Romania, are important sources of inward migration in Cyprus. Other, more prosperous countries, such as Greece, the UK and Russia, have also been important sources of inward migration for Cyprus in recent years. Therefore, while economic factors must play an important role in migration flows, other factors must also be present. The paper examines immigration flows, and focuses on these characteristics, economic and non-economic, which drive the dynamics of inward migration in Cyprus.

Several economic factors are assessed, including income gaps, unemployment conditions etc. The paper tests the significance of these factors and their importance in influencing migration trends. We find that the relative income levels between the sending and receiving country influence the decision to migrate, as does the income level of the sending country itself. The same cannot be said for labour market conditions nor for relative market conditions as we cannot find strong evidence to suggest that they influence immigration. Other factors, however, must also be assessed given the country-composition of the migrant population. What are these factors? This paper examines a long list of characteristics that can influence the decision to migrate, including political stability, the weather, the spoken language, the distance between the "candidate" country and sending countries, "network effects" or perhaps a common colonial background.

The remainder of this paper is organized as follows: the next section presents an overview of migration movements in and out of Cyprus for the last decade or so,

Section 3 reviews the literature dealing with migration forecasting, Section 4 describes the data used in this study and section 5 presents the empirical model employed and the results obtained. Section 6 concludes the paper.

## 2. MIGRATION IN CYPRUS: FACTS AND FIGURES

Without a doubt, international migration flows tend to be relatively unstable over the passage of time. The volume, the origin and the direction of migrant populations can vary significantly in the short and long run. In the case of Cyprus, net migration has been positive since the early 1980's. Net migration is defined as the difference between in-migration (or immigration – people from abroad who come to live in Cyprus) and out-migration (or emigration – people from Cyprus moving abroad) (CYSTAT, Demographic Report 2008). Table 1 presents the total migration movements in and out of Cyprus for the time period 2000-2008 as calculated by the Statistical Service of the Republic of Cyprus and the authors (years 2000 and 2001).<sup>2</sup> Table 1 also presents data for the net migration rate for the referred period. Net migration rate is net migration expressed as a rate per 1000 mid-year population (CYSTAT, Demographic Report 2008). Data for net migration for the period 1980-2008 is also plotted in Figure 1. It is evident from Figure 1 that Cyprus has experienced strong positive net migration flows since 1983. It is also worth noting the remarkable levels of net migration during the years 2003 to 2007. Especially in 1994, net migration reached an unprecedented 15,724 (4.43% of labour force). One would attribute a fair amount of this rise to Cyprus's entry in the European Union, in 2004.

**Table 1: Migration Movements 2002-2008**

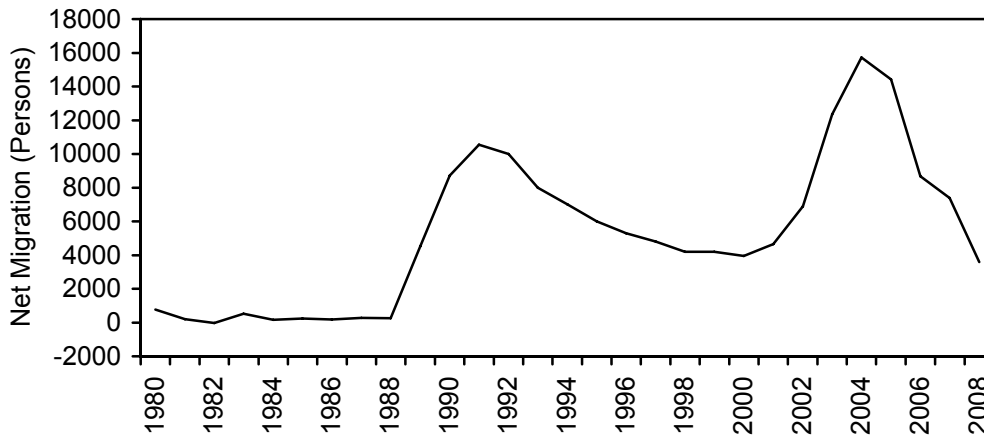
Year	Total Immigrants	Total Emigrants	Net Migration	Net Migration Rate
2000	12764	8804 <sup>1</sup>	+3960	+5,7
2001	17485	12835 <sup>1</sup>	+4650	+6,6
2002	14370	7485	+6885	+9,7
2003	16779	4437	+12342	+17,1
2004	22003	6279	+15724	+21,3
2005	24419	10003	+14416	+19,0
2006	15545	6874	+8671	+11,2
2007	19142	11752	+7390	+9,4
2008	14095	10500	+3595	+4,5

Note: <sup>1</sup> Authors' calculations.

Sources: Cyprus Statistical Service, Demographic Report 2008 and authors' calculations.

<sup>2</sup> Please note that for the years 2000 and 2001 the data for total emigrants presented in the table come from the author's calculations as such data is not available for the years before 2002.

**Figure 1: Net Migration in Cyprus for the time period 1980-2008**



Source: Cyprus Statistical Service, Demographic Report 2008.

Tables 2 and 3 present the top 10 “sending” countries to Cyprus from all over the world (Table 2) and the European Union (Table 3). As can be seen from Table 2, Greece, the United Kingdom, Sri Lanka and Russia, are traditionally among the top five “sending” countries. Among these, Greece has the strongest migration links to Cyprus and this fact can be attributed to the strong cultural and language bonds between the two countries. With regard to the EU member states presented in Table 3, in addition to the aforementioned Greece and the UK, the two other important “sending” countries throughout the years are Bulgaria and Romania.

**Table 2: Long-Term Immigration to Cyprus by Country of Residence**

2000		2003		2005		2008 <sup>1</sup>	
Country	Immigrants	Country	Immigrants	Country	Immigrants	Country	Immigrants
Greece	3130	Greece	4971	Un Kingdom	5235	Greece	1861
Un. Kingdom	2070	Un. Kingdom	2870	Greece	5015	Romania	1197
Russia	913	Russia	1908	Poland	1625	Philippines	1191
Sri Lanka	713	Sri Lanka	654	Sri Lanka	1278	Un. Kingdom	1170
USA	434	Philippines	515	Russia	1257	Bulgaria <sup>1</sup>	798
Bulgaria	418	Bulgaria	436	Slovak Rep	1124	Sri Lanka	554
Ukraine	354	S Africa	426	Philippines	918	Poland	504
China	306	Syria	366	Romania	614	Russia	339
Philippines	289	China	359	Germany	525	Germany	246
India	272	USA	292	USA	474	France	219

Note: <sup>1</sup> The data for 2008 should be viewed as provisional due to the fact that the corresponding survey for collecting the data for that year has a considerable amount of not-stated information (that is immigrants whose country of residence is not specified), specifically, 3179.

Source: Cyprus Statistical Service. Demographic Reports 2003 to 2008.

**Table 3: Long-Term Immigration to Cyprus from the EU (country of residence)**

2000		2003		2005		2008 <sup>1</sup>	
Country	Immigrants	Country	Immigrants	Country	Immigrants	Country	Immigrants
Greece	3130	Greece	4971	Un Kingdom	5235	Greece	1861
Un Kingdom	2070	Un Kingdom	2870	Greece	5015	Romania <sup>1</sup>	1197
Bulgaria	418	Bulgaria	436	Poland	1625	Un. Kingdom	1170
Romania	271	Romania	243	Slovak Rep	1124	Bulgaria <sup>1</sup>	798
Austria	157	Germany	195	Romania	614	Poland	504
Germany	115	Hungary	125	Germany	525	Germany	246
Czech Rep	103	Poland	123	Bulgaria	436	France	219
Poland	55	France	99	Hungary	354	Slovak Rep.	160
France	46	Czech Rep	79	Latvia	247	Estonia	98
Ireland	41	Netherlands	65	Czech Rep	229	Czech Rep	77

Note: <sup>1</sup> The data for 2008 should be viewed as provisional due to the fact that the corresponding survey for collecting the data for that year has a considerable amount of not-stated information (that is immigrants whose country of residence is not specified), specifically 3179.

Source: Cyprus Statistical Service. Demographic Reports 2003 to 2008.

Table 4 shows a breakdown of emigration movements from Cyprus for the years 2000, 2003, 2005 and 2008.<sup>3</sup> Emigration, according to the definition used by the Cyprus Statistical Service, includes individuals who have resided in Cyprus for at least a year and leave the country for a new destination. The highest emigration flows are towards Greece, Sri Lanka, and the Philippines, which is probably partly explained by the high immigration flows from these countries towards Cyprus in the past few years.

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<sup>3</sup> The data for 2000 do not come from the Statistical Service of the Republic of Cyprus. They are calculations of the authors based on the aggregate data available for emigration from Cyprus. The procedure which was followed was based on assigning weights to each country based on the detailed data available for the following years (from 2002 onwards there are data for emigration by country of destination) and then distributing the total number of emigrants for the year 2000 to our sample countries by applying the previously constructed weights.

**Table 4: Emigration from Cyprus by Country of Next Residence**

2000 <sup>1</sup>		2003		2005		2008 <sup>2</sup>	
Country	Emigrants	Country	Emigrants	Country	Emigrants	Country	Emigrants
Greece	1673	Sri Lanka	725	Sri Lanka	2821	Sri Lanka	3131
Sri Lanka	1064	Greece	604	Philippines	1582	Philippines	2101
Un. Kingdom	880	Ukraine	423	Greece	656	India	603
Philippines	616	Bulgaria	369	India	646	Greece	375
Bulgaria	528	Philippines	325	China	602	Romania <sup>1</sup>	352
Romania	484	Un. Kingdom	261	Bulgaria	559	Canada	345
Ukraine	440	Romania	239	Un. Kingdom	371	Un. Kingdom	311
China	282	India	161	Syria	271	China	224
Russia	267	Russia	131	Pakistan	251	Bangladesh	224
India	185	Syria	82	Romania	246	Russia	166

Note: <sup>1</sup> The data for the year 2000 represent the authors' calculations.

<sup>2</sup> The data for 2008 should be viewed as provisional due to the fact that the corresponding survey for collecting the data for that year has a considerable amount of not-stated information (that is emigrants whose country of next residence is not specified), specifically 932.

Sources: Cyprus Statistical Service Demographic Reports 2005 and 2008, and authors' calculations.

### **3. STUDIES ANALYSING INTERNATIONAL CROSS-COUNTRY FLOWS: A LITERATURE REVIEW**

Analyzing the determinants of migration and predicting future flows is a difficult task, involving a great degree of uncertainty. As Bijak (2006) explains, international migration is a multi-dimensional phenomenon, whose modeling and forecasting entails methods that relate to demography, economics, geography, statistics, sociology, political science and many other areas. That said, it is still important to analyze the determinants of migration flows and, in some cases, to try to predict international migration flows. Indeed, a great deal of effort has gone into this research area and also in improving existing forecasting methods for this purpose.

Academic researchers, as well as national offices and organizations, continuously attempt to produce reliable estimates of future migration flows. At present, there is a broad variety of approaches related to this topic.<sup>4</sup> A brief overview of some of the available methods used for purposes of forecasting international migration is presented in the following sub-section. One of these methods, namely the

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<sup>4</sup> For an extensive review of related, models, methods and survey techniques please see Bijak (2006).

econometric approach, is discussed in more detail in Sub-section 3.2, where a review of related studies and methodologies is presented.

### **3.1 Overview of Methods Used in Migration Forecasting**

Over the years, a plethora of approaches with regards to migration forecasting have been made. As a result, many different methods and models have emerged. This section provides a brief overview of some of these methods and models.<sup>5</sup>

To begin with, surveys can be a useful tool for projecting migration flows. That is, individuals may be asked to complete questionnaires, answering questions about their future intentions to migrate. This method has the advantage of capturing the individual characteristics of potential emigrants (like for example their age, sex, education level and so on). However, these types of surveys typically include a large margin for error as they capture the intentions of individuals, and these intentions are not always realized. In addition, the extraction of reliable results using surveys requires a careful construction of the questionnaire to be used. The inclusion of vague or unclear questions may easily lead to misleading or confusing answers, and therefore inconclusive results. In addition, a careful selection of the sample of people participating in the survey is necessary, in order to get answers which would reflect the views of the total population of a country.

Another method of projecting migration is the Delphi method. This is an interactive forecasting procedure, used for purposes of obtaining forecasts from a group of field experts. Specifically, a selected panel of experts is asked to complete questionnaires regarding future migration, in subsequent rounds. At the end of each round a summary of the answers given is provided to the experts, who are then asked to revise their previous answers, taking into consideration the replies of their fellow colleagues. As this procedure continues, the objective is to converge towards a final answer.

A quantitative approach to assess future migration is through the use of econometric models. As mentioned above, this paper focuses on the econometric approach, and an extensive analysis is provided in the following sub-section.

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<sup>5</sup> The information used in this section is to a large extent based on the overview of migration forecasting methods made by Bijak (2005). Also, extensive analysis of migration forecasting methods can be found in Bijak (2006).

In addition to econometric models, another category of approaches involves stochastic forecasts of migration time series. As Bijak (2005) explains, this approach is based on the analysis and extrapolation of time series, and it is usually done by applying various autoregressive integrated moving average (ARIMA) models (Box and Jenkins, 1976), usually within the framework of the sampling-theory statistics.

Another approach, involves mathematical models of migration. These models, according to Kupiszewski (2002) come from two different, approaches, namely geography and demography, and both employ mathematical tools for the purpose of population forecasting. The geographic approach focuses on the way migrants are distributed spatially, whereas demographic approaches are concerned about the distribution of migrants with regards to age and sex.

Lastly, a forecasting method with scarce applications in the case of migration is the Bayesian approach. As Bijak (2005) explains, this approach is based on the Bayes Theorem (Bayes, 1763; Laplace, 1812) and entails using sample information in order to transform *prior knowledge* of the matter under study into *posterior knowledge*. *Prior knowledge* refers only to the researcher's subjective opinion, whereas *posterior knowledge* is conditional upon the sample data.

This sub-section has provided a short overview of some of the existing methods for forecasting international migration. A more extensive analysis is beyond the scope of this paper. The following sub-section provides an overview of the econometric approach for migration forecasting.

### **3.2 Review of Studies Following the Econometric Approach**

Typically, the econometric procedure for forecasting international migration involves two steps. In a report prepared for the UK Home Office, Dustmann et. al (2003) explain that, in general, the first step involves the estimation of a relationship between a measure of migration and variables describing differences in economic conditions between home and destination countries<sup>6</sup>, as well as variables used as

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<sup>6</sup> Differences in income per capita between home and destination countries, as well as work opportunities in each country (usually proxied by their respective employment or unemployment rates) are the two principal economic factors influencing international migration.



proxies for the non-monetary costs of migrating<sup>7</sup>. From then on, the estimation results are used to predict future migration flows.

Even though the variables used (and of course model specifications) may vary from one study to another, the methodologies employed are often similar. As Dustmann et. al (2003) point out, the specific category of models addressing emigration from a group of sending countries to a single destination country, are usually constructed around a general base model.

A number of researchers have used as a benchmark for their analysis a model developed by Hatton (1995). This model suggests that an individual's decision to migrate depends on differences in expected utility streams between the home and destination country as well as the non-monetary costs of migration. Utility streams in turn, are assumed to depend on wages and employment opportunities at home and abroad respectively, whereas previous emigrant stocks are used as a proxy for the non-monetary costs of migrating. The equation Hatton (1995) estimates is a relationship between migration rates (the dependent variable), the levels and changes of variables of economic nature such as wages and employment rates (including relative values), and migrant stocks. A lagged dependent variable is also included in the estimation equation. This model was applied to annual time series data for emigration from the United Kingdom for the period 1870-1913. Hatton's estimates show that employment rates are the key determinant of short-run fluctuations in emigration, whereas relative wages mostly determine emigration levels in the long run.

Recent studies focusing on producing migration forecasts have built upon Hatton's (1995) work to specify their own models. One example is Fertig (2001) who adapts Hatton's (1995) time series model to a time-series-cross section framework in an attempt to analyze the determinants of immigration flows to Germany. Fertig's specification is very similar to Hatton's (1995); he uses the change in net migration rate as a dependent variable and similarly to Hatton (1995) he includes the levels and changes of the explanatory variables separately in the estimation equation. However, this model is extended to include two additional categories of variables.

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<sup>7</sup> The non-monetary costs of migration refer to the various types of social and psychological costs resulting from moving to a new and unfamiliar environment. Examples of such costs include the fear of moving to a foreign country, the difficulties in becoming a member of a new society, the emotional stress of being away from home etc.

The first category contains two dummy variables; one describing free movement within the EU and another describing the existence of guest worker treaties between Germany and origin countries. The second category of variables contains a set of country-specific intercepts which are intended for capturing country-specific fixed effects. Fertig (2001) uses Maximum Likelihood by Iterated GLS to estimate this model using a sample of 17 origin countries for the period 1960-1994. Subsequently, the long-run determinants of migration<sup>8</sup> are used to produce forecasts of the immigration flows from ten Central and Eastern European accession candidate countries (CEECs), for the period 1996-2015, under specific assumptions and scenarios. It should be noted here that the 10 CEEC countries were not included in the 17-country sample used in the estimation equation.

In a similar, context Bauer and Zimmermann (1999) address the issue of post-enlargement migration into the EU from the Central and Eastern accession countries. For this purpose they first estimate the determinants of migration arising from a planned enlargement in the EU, with reference to migration resulting from earlier enlargements. Thereafter, the estimated coefficients are used together with data from CEEC candidate countries to simulate future emigration rates from those countries to the EU<sup>9</sup>. Within this context they first use data from Greece, Spain and Portugal as a reference point in estimating the migration determinants. It can be argued, however, that the modeling approach applied by Bauer and Zimmermann (1999) was a simple one when compared to other studies. They estimate the following log-linear equation:

$$\ln\left(\frac{Emigration_{srt}}{Population_{st-1}}\right) = \beta_0 D_s + \beta_1 \ln\left(\frac{UnemploymentRate_{st-1}}{UnemploymentRate_{rt-1}}\right) + \beta_2 \ln\left(\frac{RealGDP_{st-1}}{RealGDP_{rt-1}}\right) + \varepsilon_{srt}$$

Here  $s$  defines the sending country and  $r$  refers to the receiving country whereas  $t$  refers to the year.  $D_s$  is a set of dummy variables indicating the sending country. Future migration is calculated as the population percentage of certain CEEC countries which will migrate to the EU countries.

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<sup>8</sup> The model distinguishes between short-run and long-run determinants of migration due to the inclusion of changes as well as levels of the explanatory variables.

<sup>9</sup> Bauer and Zimmermann (1999) use the estimated coefficients together with the relative unemployment rates and relative GDP per Capita between the CEECs and the current EU member countries to simulate potential emigration rates.

Brucker and Silverstovs (2006) follow a somewhat different direction, as they combine elements from various models in an attempt to compare the forecasting performance of a variety of panel data estimators. For this purpose they use migration data for Germany from 18 origin countries. Their baseline model takes the following form:

$$mst_{ht} = \alpha + (1 - \delta)mst_{h,t-1} + \beta_1 \ln(w_{ft} / w_{ht}) + \beta_2 \ln w_{ht} + \beta_3 \ln e_{ft} + \beta_4 \ln e_{ht} + X'_{ht} \gamma + Z'_h \lambda + u_{ht}$$

where  $f$  denotes Germany, (i.e. the foreign or destination country) and  $h$  denotes the origin/home country. Here, the dependent variable  $mst_{ht}$  is the share of migrants in percent of the home population. One element which makes their approach different from others is that unlike most studies, with regards to the dependent variable, they use migration stocks instead of flows. The explanatory variables include wages ( $w_{ft}$ ,  $w_{ht}$ ), employment rates ( $e_{ft}$ ,  $e_{ht}$ ), a set of institutional dummy variables (denoted by the vector  $X_{ht}$ ) similar to the ones used by Fertig (2001) and, lastly, a set of country-specific time-invariant variables (denoted by the vector  $Z_h$ ). The latter includes a dummy for geographical proximity, a dummy for common language and, finally, the logarithm of the distance between the sending and the receiving country. The inclusion of this latter category of variables follows the intuition that factors such as geography, history, language and culture have an effect on (the costs of) migration. The overall results of this study suggest that the simple fixed effects estimators provide a reliable tool for international migration forecasting, as they outperform other estimators.

Alvarez-Plata et. al (2003) also undertake the issue of potential migration to EU countries from the ten candidate CEECs. Their approach with regards to model specification is quite similar to the one made by Brucker and Silverstovs (2006) with, however, a few notable differences. Firstly, they incorporate a measure of the population of the destination country in their set of explanatory variables. Secondly, in contrast to Brucker and Silverstovs (2006), this model does not include any institutional variables regarding migration policies or restrictions. Still, it does make use of country specific dummy variables denoting language and geographical proximity. Moreover, their survey is carried out using two different datasets; the first considers Germany as the host country while the second one consists of 15 EU destination countries. This study performs a comparison of various estimators and, subsequently, it produces migration forecasts up to the year 2030. In the case of the

German sample, the forecasting performance of the estimators proved to be higher and this is mostly due to the availability of better quality data.

Another study focusing on issues of international migration is that of Mitchell and Pain (2003). The latter, investigate the various economic and demographic determinants of international migration inflows into the United Kingdom. Within this context, they attempt to provide a detailed econometric model with regards to migration inflows into the UK, which can thereafter be utilized for forecasting purposes. Three key characteristics of this study should be pointed out; Firstly, it follows a disaggregate approach, distinguishing between ten different groups of source countries, rather than using data for total inflows, secondly, it focuses on gross inward migration, rather than net migration and, lastly, it takes into account the economic conditions in the UK relative to the economic conditions of other possible destination countries.

For modeling purposes Mitchell and Pain (2003) incorporate elements from studies such as Hatton (1995), Rotte and Vogler (1998) and Clark et. al (2002). They define migration rate (their dependent variable) as the annual flows of migrants into the UK from each of their ten groups of source countries as a ratio of the total population in that group. The variables used for estimation purposes include the per capita income in the UK relative to the per capita income in the source group, the unemployment rate in the UK, the per capita income in the UK relative to the per capita income in other possible destination countries, the proportion of the population in the group of home countries aged between 15 and 29, the level of bilateral trade between the UK and the group of home countries and, lastly, a lagged variable for migrant stocks in the UK from the source groups. Additionally, they include a lagged dependent variable and allow for country specific effects such as geographical distance and language proximity. They find that factors such as network effects<sup>10</sup>, income differentials as well as the level of bilateral trade between the UK and source locations and the demographic structure of the population of the home countries are important determinants of migration inflows into the UK. Furthermore, they find that income differentials between the UK and other possible host countries also have a

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<sup>10</sup> These effects are referred to by the authors as “friends and family effects” and represent the effects that are generated from the existence of earlier migrants in a destination country, thus proxied by the existing migrant stocks.

significant positive effect. However, little evidence is found regarding the significance of unemployment rates.

### **3.3 Review of Key Points So Far**

Based on the various econometric approaches discussed above, some general principles can be drawn concerning modeling and forecasting international migration. This section provides an overall discussion about the main variables included in the models used in migration-oriented studies.

Having decided upon the choice of migration measure to be used as the dependent variable (which in most cases is the net migration or the immigration flows from a sending country to a destination country divided by the population of the sending country), the next step involves selecting the set of explanatory variables to be included in the estimation process.

Firstly, the two most commonly used variables in international migration models are those referring to differences in economic conditions between origin and destination countries, the so called “income gap”.<sup>11</sup> The first of these two variables refers to differences in real wages, and it is typically proxied by the differences in per capita income between sending and receiving countries. The second variable reflects differences in employment opportunities or, more generally, labour market conditions and it is proxied by the relative employment (or unemployment) rates. It is possible to include a third variable in the group of variables describing economic differences, namely, a variable describing the differences in income per capita between the country under study and other possible destination countries. This variable is used in the study of Mitchell and Pain (2003) discussed above, however it is not usually included in most of the studies in the related literature.

Secondly, it is important to consider the non-monetary costs a potential migrant will have to face. These may include any social or psychological costs that the migrant may endure after leaving his or her home country. The most common proxy for these types of costs is the stock of existing migrants from the home country in the destination country. This variable is often associated with the term “network effects”, meaning that the existence of previous immigrants in a destination country may make

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<sup>11</sup> It should be noted that some studies use differences, as well as the levels of economic variables. See for example Hatton (1995) and Fertig (2001).

the migration process easier for new migrants. One has to consider, however, that there is also a possibility that migrant stocks may have the opposite effect. This would be the case if, for example, the labour market in a destination country has absorbed more than enough migrants and has no further need for more. If that is the case, then, the incentives to migrate to that country may be reduced.

A third group of variables refer to country-specific (and time-invariant) characteristics. These characteristics are often captured by dummy variables that refer to a country's language and geographical proximity. Furthermore, the logarithm of the distance between sending and receiving countries is often included in some models; the idea here is that the closest the two countries are, the more likely it is that a person might migrate from one country to the other. It should be noted that some studies choose to include only country specific intercepts in order to capture country-specific fixed effects.

A fourth group of variables used in some of the studies discussed above refers to the existence of migration policies, agreements regarding free movement between counties, and guest worker treaties. Again, for this purpose, dummy variables are employed.

## **4. DATA AND SOURCES**

For the purpose of empirical estimation, several variables were included in our model. This section discusses, in detail, which these variables are, the ways in which they were incorporated into our econometric estimations, as well as the sources from which the data was collected. The data used for the panel consist of 52 countries covering the time period 1998-2006.<sup>12</sup> The immigration flow data by country of residence for Cyprus come from the Migration Survey of the Cyprus Statistical Service (CYSTAT). All the other variables come from a number of international sources.

### **4.1 Dependent Variable: Immigration Rate**

For our dependent variable we choose to use data for the flows of long-term immigrants to Cyprus (by country of residence), divided by the population of the "sending" countries. This is in similar fashion to the aforementioned migration rate variable used by Mitchell and Pain (2003). The immigration flow data come from the Migration Survey of the Cyprus Statistical Service (CYSTAT) and cover the years from

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<sup>12</sup> 76 countries were available in total but 24 of them were dropped due to the fact that regarding these countries, only a very small and negligible number of persons immigrate/emigrate to/from Cyprus.

1998 to 2006. One point that must be clarified is that in Migration Surveys from 2006 and thereafter, there has been a change in the method used to perform the surveys. Specifically, before 2006, the children of immigrants were allocated according to their parents' residency. Since 2006, this allocation does not apply and children enter in the "non-stated" category. Therefore, the number of individuals included in the "non-stated" category increased significantly, from almost zero in previous years. For this reason, we allocate the "not-stated" immigrants in 2006 among the various countries according to the country's average share in the total figure. The years of reference for the average shares are years 2005 and 2006. The population data come from the International Monetary Fund, International Financial Statistics database.

## **4.2 Independent Variables**

To begin with, several economic variables are considered. These, as discussed earlier, are used to capture the economic incentives behind the decision for a person to migrate. The intuition behind this, is that differences in the economic conditions between sending and receiving countries are amongst the major driving factors of cross country immigration. With this in mind, our model makes use of several such variables.

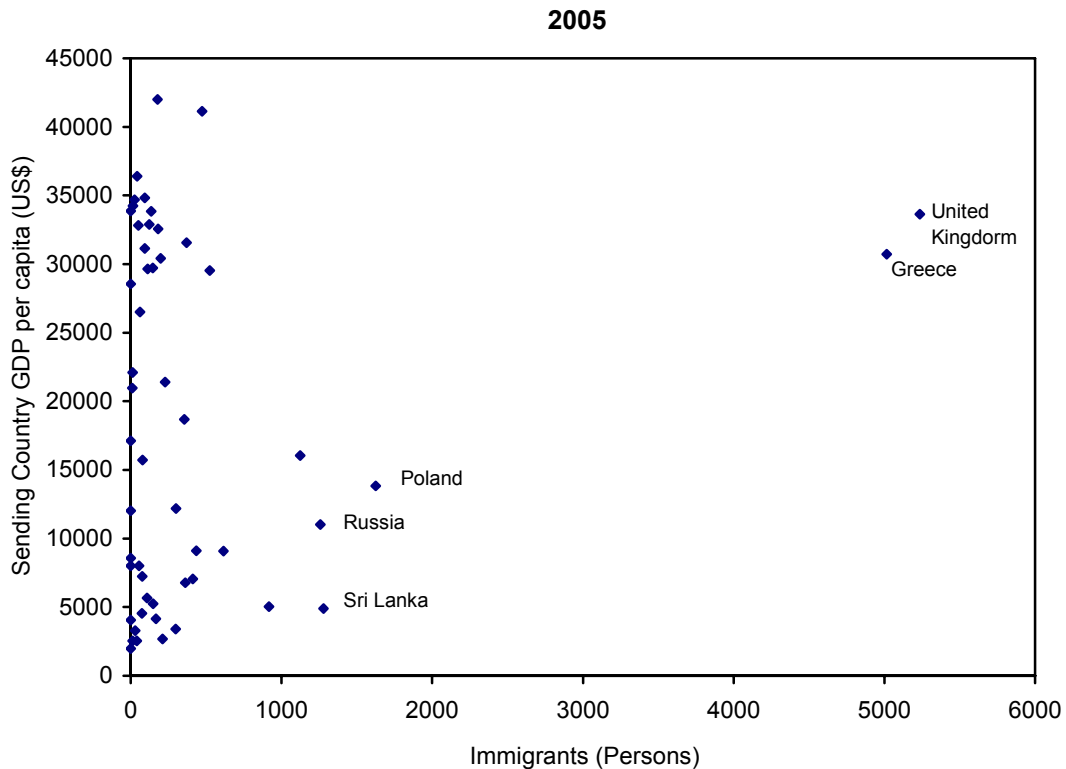
The PPP adjusted per capita GDP of the sending countries is used as a proxy for the sending country's income level. In addition, the relative GDP per capita (the ratio of the per capita GDP in Cyprus to the per capita GDP of the sending country) is also included in our model, to capture migration incentives resulting from income differentials between the home and destination country. We assume that a country's per capita GDP is a reflection of the general level of the wages in the country and thus we expect that a country with high income levels will generally attract (worker) migrants from lower-income countries.<sup>13</sup> Figure 2 plots the GDP per capita data with the data for long term immigrants in Cyprus for the year 2005. The plot does not show a very clear positive relationship, although one can draw some very tentative initial conclusions when considering the five countries with the highest immigration flows to Cyprus, as shown in the diagram. The UK and Greece stand out, and of course there may be other reasons too, but the fact that they enjoy relatively high per capita GDP levels and can afford the physical move is a relevant factor.

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<sup>13</sup> The data for these variables was collected from the International Monetary Fund, World Economic Outlook Database 2007.

Of course, it should be pointed out that any attempt to draw conclusions for the relationship of these two variables from this figure should be treated with caution, as there are additional variables affecting migration decisions. The econometric analysis which follows can throw a bit more light to this question.

**Figure 2: Immigration VS Sending Country GDP per capita**



Source: Authors' Calculations from aforementioned data sources.

To capture the employment opportunities in our sample countries, we use data for the respective levels of unemployment rates and the relative unemployment rates (ratio of unemployment rate in Cyprus to the unemployment rate of the sending country). The intuition behind using these variables is that people tend to migrate from one country to another in search of better working conditions. Based on this assumption, the lower unemployment levels in a certain country will work as a pole of attraction for job seekers from abroad.<sup>14</sup>

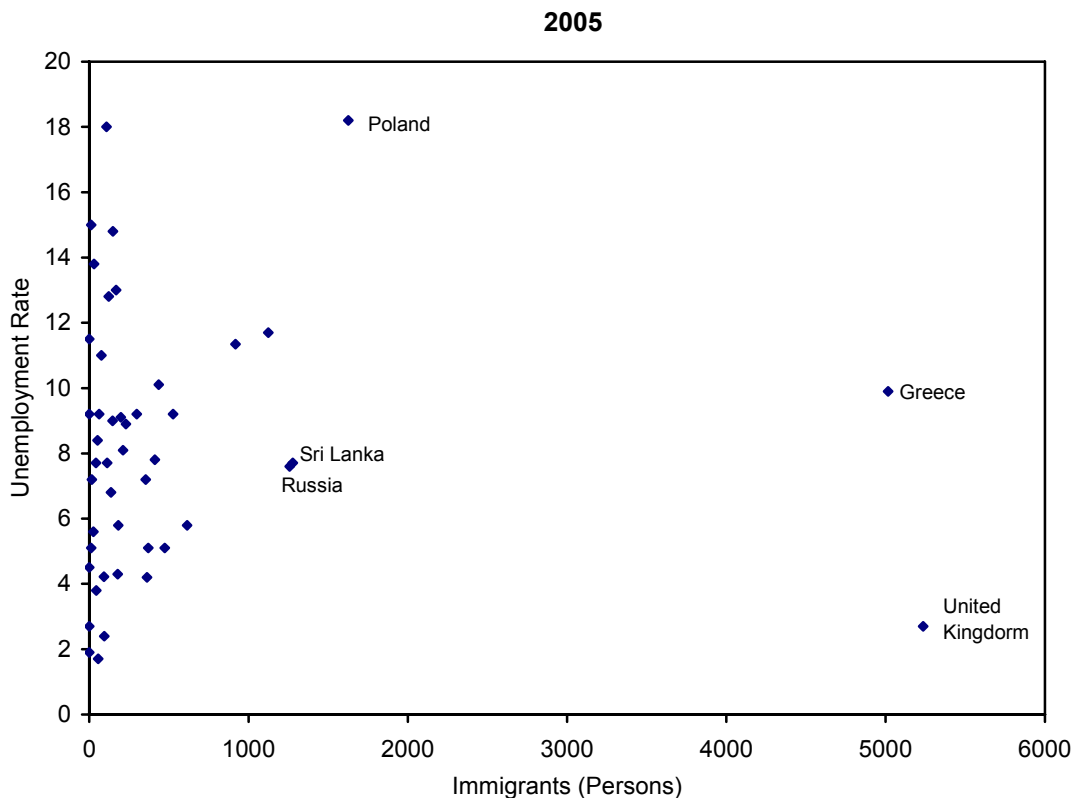
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<sup>14</sup> Due to the large number of countries in our sample, a single source of data for unemployment rates for all countries proved to be an impossible task. Therefore several sources were considered. The vast majority of the final data was collected from the International Monetary Fund, World Economic Outlook Database 2007. However, the unavailability of data for some country cases caused a problem which we had to solve by using data retrieved from the CIA World Factbook series.



We should also point out that we view the unemployment data with a degree of caution as we have reasons to question their reliability. Firstly, this data is based on the number of registered unemployed individuals in a country. However, it is often the case (mostly in poor countries) that many individuals do not register as unemployed as there are no benefits to receive, and thus the official unemployment rate is significantly lower than the actual one. Secondly, a number of immigrants come to Cyprus only because of pre-arranged employment contracts, thus the link between immigration and unemployment should not be so obvious in practice. Figure 3 plots the data for unemployment with the data for immigration, for the year 2005. The figure shows only a weak association, although this may be for the reasons stated earlier.

**Figure 3: Immigration VS Unemployment rate**



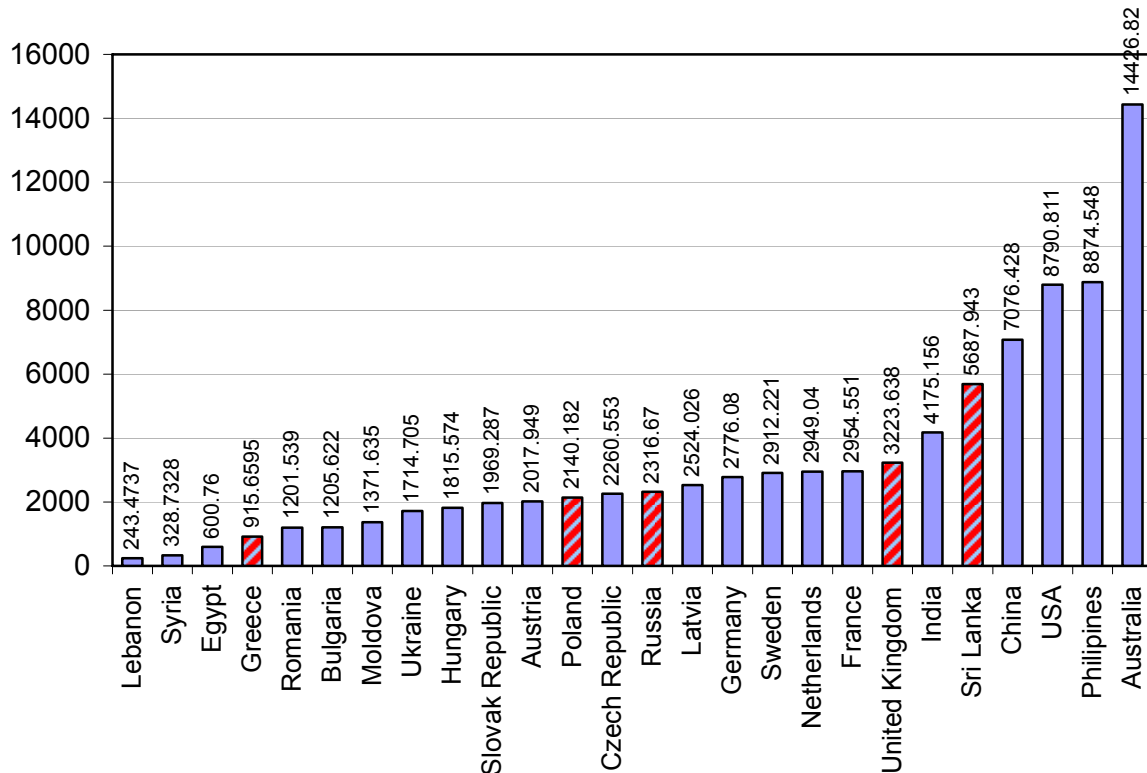
Note: Countries with unemployment rates over 25% are excluded from this Figure.  
 Source: Authors' Calculations from aforementioned data sources.

In addition to economic factors, there are many other reasons for a person to migrate. We attempt to capture these reasons with our non-economic variables.

One factor which we assume influences a person's decision to migrate, is the distance between the migrant's home country and the country to which he or she will migrate. For this purpose, we use data for the bilateral distances (in kilometers) between the sending countries and Cyprus. Traditionally, distance is a constraining factor for people

considering migrating, both for economic as well as sentimental reasons. That is, migrating to a country far away from one's homeland means that this person would suffer higher travel/moving costs and, also, will no longer be near his or her friends and relatives. Figure 4 shows the distances of selected countries from Cyprus (in KMs) and Figure 5 displays the distances of all of our (52) sample countries from Cyprus (in KMs).<sup>15</sup> In addition, Figure 6 plots the distance data with the immigration data for 2005.

**Figure 4: Selected Distances from Cyprus (in KMs)**

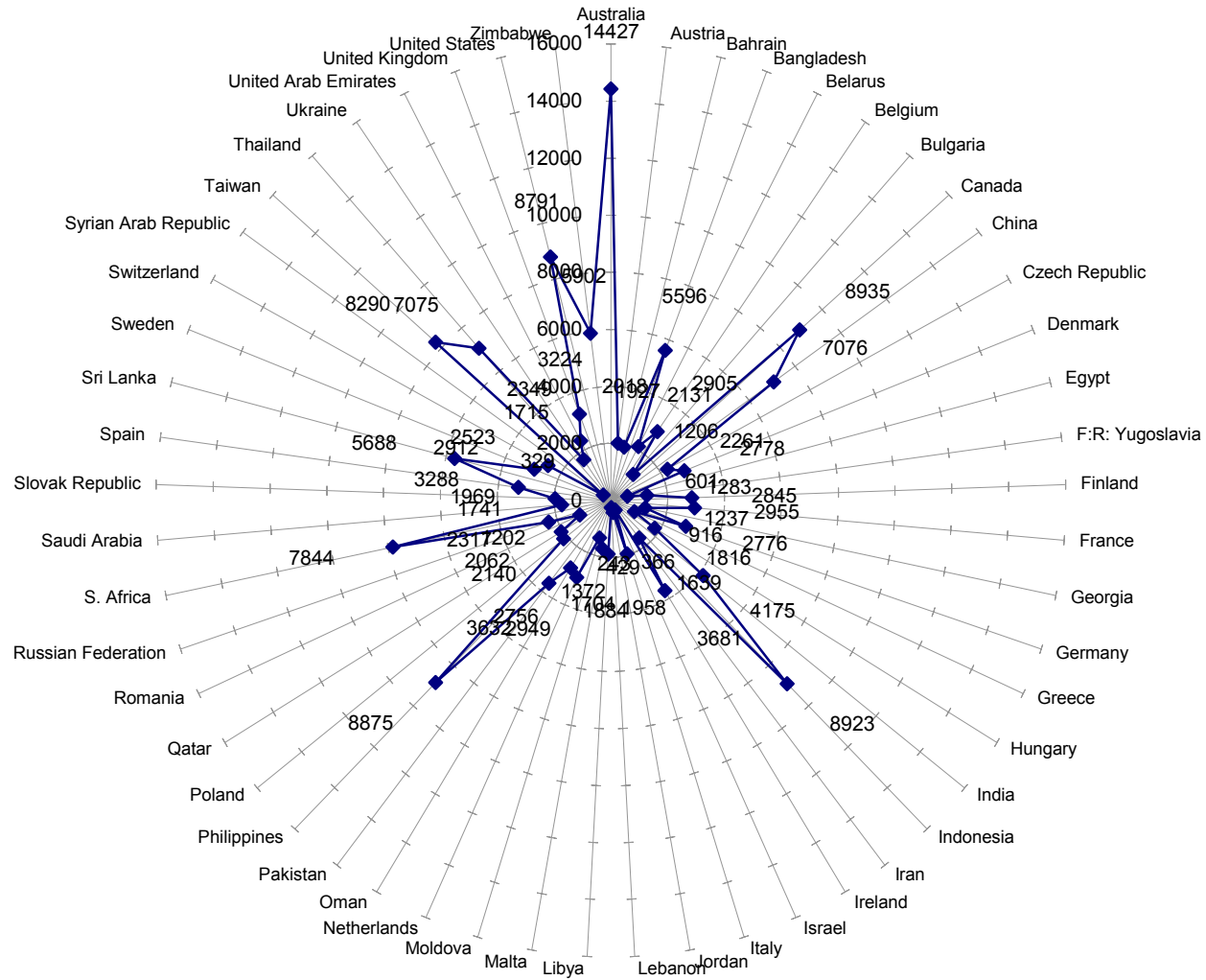


Note: The striped bars correspond to the countries with the highest immigration activity towards Cyprus.  
Source: Centre d'Etudes Prospectives et d'Informations Internationales (CEPII).

Figures 4-6 show that the countries with the greater number of immigrants to Cyprus are rather evenly spread along the distance distribution, thus a more careful analysis is needed to ascertain the effects of distance on migration. It is interesting, though, why Cyprus does not have more immigrants from neighboring, relatively poor countries such as Egypt, Lebanon and Syria.

<sup>15</sup> The data for the distance variable comes from the CEPII (Centre d'Etudes Prospectives et d'Informations Internationales) Research Centre distances database.

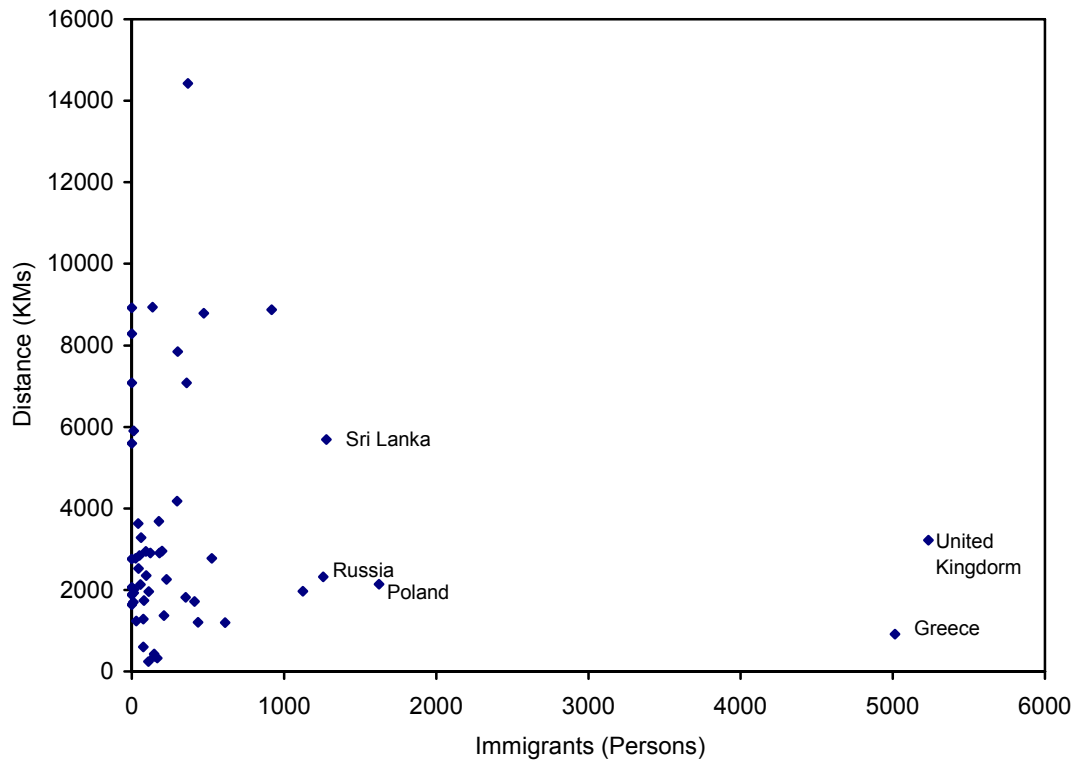
**Figure 5: Distances from Cyprus – All sample countries (in KMs)**



Source: Centre d'Etudes Prospectives et d'Informations Internationales (CEPII).

**Figure 6: Immigration VS Distance**

**2005**



Source: Authors' Calculations from aforementioned data sources.

From the same database, we also use data for another non-economic variable, and more specifically, a dummy variable, indicating whether there is a common spoken language between a migrant's home country and Cyprus. For the case of Cyprus, we consider Greek, Turkish and English to be spoken languages because English, although not one of Cyprus's official languages, is widely spoken in many areas where foreigners reside and work.

In addition to a common spoken language, there are other social factors that could affect the migration decision, for example a common colonizer or a colonial link.<sup>16</sup>

We also choose to use a variable that captures the differences in climatic conditions between sending and receiving countries.<sup>17</sup> It is somewhat difficult to predict the effect

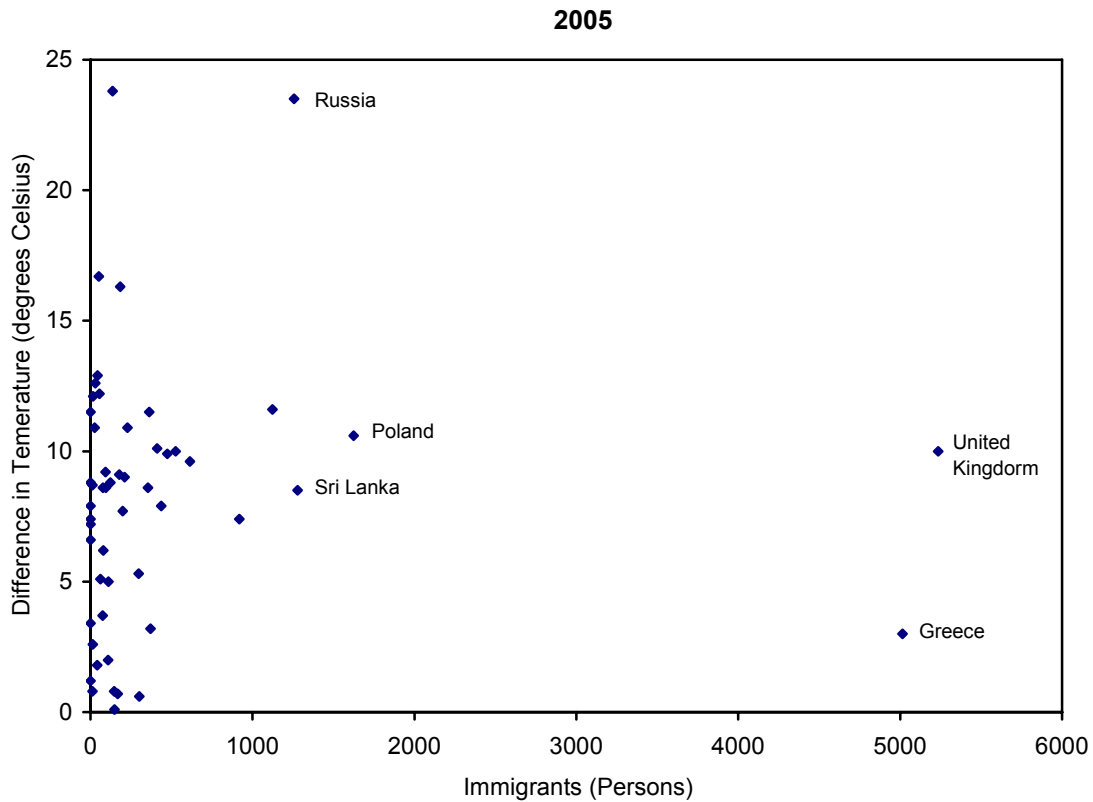
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<sup>16</sup> This information was retrieved from the same database we used for the distance variable.

<sup>17</sup> As a proxy for this we use data for the yearly (twelve month) average temperature of each country in our sample. More specifically, using the average temperature data we calculate the (absolute) differences in temperatures between Cyprus and the sending countries. The data for this variable comes from the Climatic Research Unit of the University of East Anglia.

of this variable on the decision to migrate, as the relationship between climate change and population displacement is not a linear one (IOM 2008). On the one hand, people used to a certain climate in their home country, may be better off migrating to a country with climatic conditions similar to the ones in their home country, and feel reluctant to migrate to a country with a very different climate. Alternatively, given that their country has relatively “bad” weather, they may prefer to migrate to a country with very different climatic conditions than the ones in their home country. Figure 7 plots this data against immigration data for 2005. The plot shows again some mild association that deserves a more thorough investigation.

**Figure 7: Immigration VS Differences in temperature**



Source: Authors' Calculations from aforementioned data sources.

Additionally, we attempt to capture the “friends and family effect” or “network effect”.<sup>18</sup> Ideally this would be done by introducing a variable measuring the year by year stock of immigrants in Cyprus from each sending country. Unfortunately, this sort of detailed

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<sup>18</sup> People are more likely to migrate to a country where other members of their family, friends or more generally people from their own country, already live in.

data does not exist for Cyprus. The only measure of migrant stocks in Cyprus comes from the 2001 Population Census, published by the Statistical Service of the republic of Cyprus. This publication provides data for foreign residents in Cyprus by citizenship for the year 2001. We use this data to create an index for the level of migrant stock from each sending country.<sup>19</sup>

To capture the effect of Cyprus's entry to the European Union in 2004, we use a variable taking the value of zero (0) before that year and the value of one (1) thereafter.

We also consider the possibility that it may be difficult to migrate from one continent to another. Thus, in addition to the distance variable, we also use a set of dummy variables indicating the continent to which each country in our sample belongs to.

To capture the effect of a country's size on the migration decision we use population data for each country. More specifically, we consider the population density in each country (population of the country divided by its area size) as a possible influence to the migration decision. This variable was calculated using population data from the International Monetary Fund, International Financial Statistics database and area size data from the aforementioned distances database.

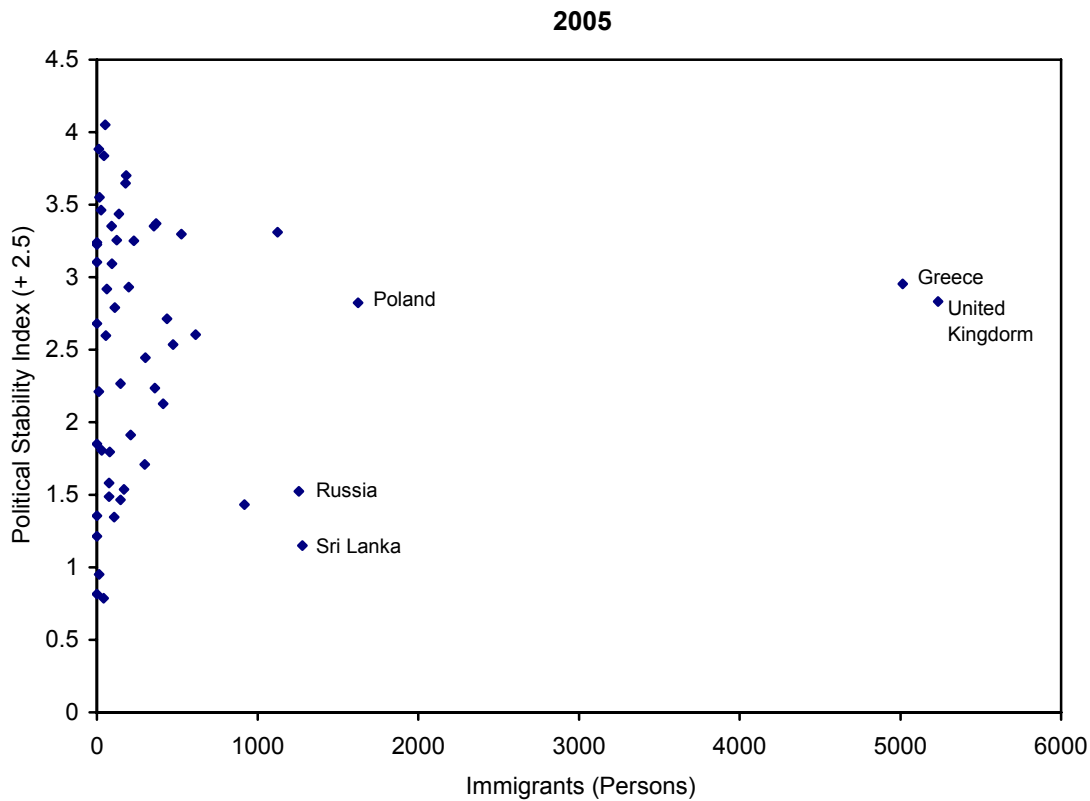
Lastly, we consider the effect of the differences in political conditions between sending and receiving countries as a factor influencing migrants. For example, migrants might prefer to move to areas with more political stability, lower crime rates or generally more just social conditions. For this purpose, we employ data from the 2006 World Governance Indicators, calculated by the World Bank Institute (WBI). The latter, are aggregate indicators of six dimensions of governance, measured in units ranging from -2.5 to 2.5. Higher (lower) values correspond to better (worse) governance outcomes. For simplifying purposes in our model, we slightly modify this by adding 2.5 to the original data so that the values in our sample range from 0 to 5. In addition, because this is a two-year interval dataset, we calculate the values for the missing years as the averages of the years that preceded and followed them. The variables we considered from this dataset are the ones for Political Stability, Voice and Accountability, and the Rule of Law (although only the former is included in our final model). In each case, we

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<sup>19</sup> This index is a variable ranging from 1 to 5, depending on the number of foreign residents in Cyprus in the year 2001. 1 is assigned to numbers ranging from 0 to 9. 2 is assigned to numbers ranging from 10 to 99. 3 is assigned to numbers ranging from 100 to 999. 4 is assigned to numbers ranging from 1000 to 9999. 5 is assigned to numbers ranging from 10000 to 99999.

calculate the difference of each country's score from Cyprus's score. Figure 8 plots the data for political stability with our immigration data for 2005.

**Figure 8: Immigration VS Political Stability (+2.5)**



Source: Authors' Calculations from aforementioned data sources.

## 5. EMPIRICAL MODEL AND RESULTS

### 5.1 Methodology

The empirical model used in this study follows the econometric approach mentioned earlier, and it is mainly based on the models proposed by Mitchell and Pain (2003) and Brucker and Silverstovs (2006). The first step involves the estimation of a relationship between the immigration rate (our measure of migration) and variables describing differences in economic conditions between the sending country (Home,  $s$ ) and the destination/receiving country (Cyprus,  $r$ ). As a second step, we include non-economic variables that are used as proxies for the non-monetary costs of migrating.

The dependent variable ( $Y_t$ ), is the share of immigrants to the sending country's population. We have also experimented with other explanatory variables, like, for example, immigration flows, and the results we obtained were similar. Regarding the choice of the appropriate explanatory variables (economic and non-economic), the

approach used is specific to general. We start from a specific (baseline) model which only includes the economic variables and we gradually move to more general (extended) models that also include other non-economic variables.

The baseline model in matrix format takes the following log-linear form:

$$Y_t = \beta_0 + \beta_1 X_t + e_{srt} \quad (1)$$

Where  $X_t$  is a 1x4 row vector which summarizes the economic explanatory variables.

$X_t =$  (LN of per capita GDP (PCGDP), LN of relative per Capita GDP (RPCGDP), LN of unemployment Rate (UR), LN of relative unemployment rate (RUR))

$$\left( \frac{\text{immigration}_{srt}}{\text{population}_{st}} \right) = \beta_0 + \beta_1 \ln PCGDP_{st} + \beta_2 \ln \left( \frac{PCGDP_{rt}}{PCGDP_{st}} \right) + \beta_3 \ln UR_{rt} + \beta_4 \ln \left( \frac{UR_{rt}}{UR_{st}} \right) + \varepsilon_{srt} \quad (2)$$

$s$  refers to the sending country (Home) and  $r$  to the receiving country (Cyprus) whereas  $t$  refers to the year.

The general models build on the baseline model, equations (1) and (2), by adding two more vectors for non-economic explanatory variables. The non-economic explanatory time variant variables can be summarized as the row vector  $Z_t$  and the country specific time-invariant variables by  $W_s$ .

$$Y_t = \beta_0 + \beta_1 X_t + \beta_2 W_s + \beta_3 Z_t + \varepsilon_{srt} \quad (3)$$

Where

$X_t =$  (LN of per capita GDP (PCGDP), LN of relative per Capita GDP (RPCGDP), LN of unemployment rate (UR), LN of relative unemployment rate (RUR))

$W_s =$  ( EU entry (EU), distance (DIS), migrant stock index (MSI), common official language (COML), difference in temperature (DTEMP), continent (CONT), common colony (COMCOL))

$Z_t =$  (population density (PD<sub>st</sub>), political stability (PS<sub>st</sub>))



## 5.2 Results

The results from a Generalized Least Squares (GLS) estimation of equations 2 and 3 are presented in detail in Table 5.<sup>20</sup>

We start with the baseline model, which includes only the four variables of economic nature, the ones that capture the economic and the working conditions between the sending and receiving country. With regard to the former, the sending country GDP per capita is statistically significant and positive. This would agree with the assumption that a higher overall income level in a country, would make it easier for its residents to acquire the means to migrate, and, thus, the positive correlation between this variable and migration. On the other hand, the relative GDP per capita variable is not statistically significant. As regards the working conditions, the unemployment rate of the receiving country has a positive instead of a negative sign as expected but it is not statistically significant. The relative unemployment rate variable has the expected negative sign and is statistically significant. However, the fit of this model is rather low and this implies that there are other factors, possibly of non-economic nature, that can explain the rest of the incentives for migration.

We now proceed to the extended models by adding, in a cumulative way, the non-economic variables (from matrices  $W_s$  and  $Z_r$ ) one at a time, in order to reach a more general model which better explains migration.

In the majority of the extended models, GDP per capita and relative GDP per capita are positive and significant (at 10%). The receiving country's unemployment rate and the relative unemployment rates are always negative but not statistically significant in the extended models (except one).

The first variable we add is the EU entry dummy. The EU enlargement, and more specifically the accession of Cyprus in the EU, should have increased immigration in Cyprus from other poorer EU countries. This dummy has a positive sign, as expected, in all the extended models but is not statistically significant in any of them.

The second variable we add is the distance between the migrant's home country and Cyprus. The distance variable has a negative sign in all models (and is statistically significant in all but the last two) which indicates that the incentives for migration are weaker when the distance is bigger, which is consistent with our prior assumptions.

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<sup>20</sup> Based on a Hausmann test for fixed-random effects, random effects were used.

Traditionally, distance is a constraining factor for people considering to migrate, both for economical as well as for sentimental reasons. That is, migrating to a country far away from one's homeland means that this person would suffer higher travel/moving costs and, also, will no longer be near his or her friends and relatives.

The next variable we add is the migration stock index which captures the "friends and family effect", or "network effect". People are more likely to migrate to a country where other members of their family, friends or more generally people from their own country, already live in. This variable has a positive sign and it is significant in all extended models supporting the effect mentioned above.

The fourth additional variable is the common official language. This variable is always positive and statistically significant, as expected. A common spoken language among the sending and receiving country positively affects migration towards the receiving country.

The fifth variable is the difference in temperature. As discussed earlier in this paper the effects climate changes may have on migration could be either reinforcing or discouraging. In our results, the difference in temperature variable has a negative sign, which agrees with the assumption that high differences in temperature between sending and receiving countries discourage migration from one country to the other, but it is not statistically significant in any of the models.

The next variable we consider is the population density, in order to capture the effect of a country's size on the migration decision. Population density is considered to be a possible influence to the migration decision. The population density variable is positive but not statistically significant in any of the models.

The seventh variable is the political stability variable which we use to examine the differences in political conditions between sending and receiving countries as a possible factor influencing migrants. We assume that it may be more preferred by migrants to move to areas with more overall political stability, lower crime rates and generally more just social conditions. This variable is always positive but not statistically significant.

The last two variables are the four continent dummies and the common colony dummy.<sup>21</sup> The continent dummies generally have a negative sign and they are not

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<sup>21</sup> One of the social factors that could affect the migration decision is a colonial link between the sending and receiving country. In Cyprus this link is with the UK.

statistically significant. The common colony dummy in the last model (the most extended one) is significant and has a positive sign.

The  $R^2$  ranges from 0.01% (basic model) to 74% (most extended model). This means that the above-mentioned variables explain 74% of the variation of  $Y_t$ , the incentives for migration.

The highlighted column in Table 5 shows our preferred specification. As before, the economic variables are statistically significant and have a positive sign. However, the unemployment variables are insignificant, as in all our other specifications. With regard to the non-economic variables we find that the stock of migrants and the common spoken language variables have a positive and significant effect on migration, whereas a significant negative relation is found between migration and distance. Interestingly, we find no significant link between weather or political factors with migration.

### **5.3 Sensitivity Analysis**

Our analysis of the stylized facts and the econometric estimation has revealed the importance of Greece and the UK in the results. In addition, one may also want to evaluate the results without the year 2006, given the aforementioned problems with the data for that year. Therefore, as a sensitivity test we present results without the year 2006, without Greece and without Greece & United Kingdom in Tables 6, 7 and 8, respectively.

Results without Greece alone and without both Greece and the UK (Tables 6 and 7) are poorer in the sense that we can no longer take into account the common official language variable which is a variable with big explanatory power. This can be seen by their very low  $R^2$ . Results without the year "2006" (Table 8) are very similar in signs but now more coefficients (in general) including the GDP figures are statistically significant.

**Table 5: Estimation Results**

	Basic Model	Extended Models								
Ln GDP per capita (s)	4.74***	3.57	3.52	3.45	3.41***	3.41***	3.42***	3.64***	3.59***	3.60***
Ln relative GDP per capita (r/s)	4.04	2.87	2.82	2.50	3.35***	3.33***	3.34***	3.84***	3.75***	3.75***
Ln Unemployment rate (r)	0.20	-0.54	-0.66	-0.85	-1.05	-1.06	-1.08	-0.98	-0.88	-0.87
Ln relative unemployment rate (r/s)	-0.67**	-0.67**	-0.55	-0.36	-0.07	-0.06	-0.05	-0.13	-0.24	-0.25
EU entry		0.51	0.51	0.50	0.54	0.54	0.55	0.61	0.58	0.59
Distance			-0.0003*	-0.0002*	-0.0001*	-0.0001*	-0.0001*	-0.0001**	-0.0001	-0.0001
Migrant Stock Index				2.31*	0.53*	0.55*	0.54*	0.61*	0.51*	0.61*
Common Official Language					31.53*	31.43*	31.47*	33.34*	31.24*	31.19*
Difference in Temperature						-0.02	-0.01	-0.02	-0.04	-0.03
Population Density							0.001	0.0005	0.0005	0.0004
Political Stability + 2.5								0.43	0.22	0.24
Europe Dummy									-0.39	0.67
Africa Dummy									-1.15	-1.05
Asia Dummy									-0.06	-0.26
Oceania Dummy									-0.76	0.64
Common Colony										1.09*
Constant	-46.37***	-33.72	-31.92	-37.74	-33.28	-33.16	-33.25	-37.17***	-36***	-37.02
R <sup>2</sup> [overall]	0.014	0.015	0.048	0.175	0.726	0.726	0.727*	0.728	0.732	0.737

Note: \*, \*\* and \*\*\* denotes statistical significance at 1%, 5% and 10% respectively.

**Table 6: Estimation Results “no Greece”**

	Basic Model	Extended Models							
Ln GDP per capita (s)	3.49*	2.32	2.31	2.29	2.29	2.30	2.51	2.44	2.45
Ln relative GDP per capita (r/s)	3.51*	2.35	2.33	2.23	2.21	2.22	2.69	2.58	2.58***
Ln Unemployment rate (r)	0.18	-0.56	-0.60	-0.63	-0.65	-0.67	-0.57	-0.48	-0.47
Ln relative unemployment rate (r/s)	-0.15	-0.15	-0.10	-0.08	-0.06	-0.05	-0.13	-0.24	-0.25
EU entry		0.51	0.51	0.50	0.50	0.52	0.57	0.54	0.54
Distance			-0.0001*	-0.0002*	-0.0001*	-0.0001*	-0.0001*	-0.0001***	-0.0001
Migrant Stock Index				0.53*	0.55*	0.54*	0.60*	0.50*	0.59*
Common Official Language					-	-	-	-	-
Difference in Temperature					-0.01	-0.01	-0.02	-0.04	-0.03
Population Density						0.001***	0.001***	0.0005	0.0004
Political Stability + 2.5							0.39***	0.17	0.19
Europe Dummy								0.39	0.68
Africa Dummy								-1.17	-1.07
Asia Dummy								-0.09	-0.28
Oceania Dummy								0.79	0.67
Common Colony									1.09*
Constant	-34.47	-21.90	-21.13	-22.47	-22.33	-22.43	-26.11	-24.74	-25.73
R <sup>2</sup> [overall]	0.026	0.028	0.062	0.094	0.094	0.097	0.103	0.124	0.148

Note: (i) \*, \*\* and \*\*\* denotes statistical significance at 1%, 5% and 10% respectively.

(ii) Common Official Language was dropped due to collinearity.

**Table 7: Results with “no Greece and UK”**

	Basic Model	Extended Models							
Ln GDP per capita (s)	3.38*	2.16	2.15	2.13	2.14	2.15	2.36	2.31	2.32
Ln relative GDP per capita (r/s)	3.46*	2.25	2.22	2.15	2.16	2.18	2.66***	2.61***	2.59***
Ln Unemployment rate (r)	0.26	-0.51	-0.56	-0.59	-0.58	-0.60	-0.51	-0.38	-0.38
Ln relative unemployment rate (r/s)	-0.26***	-0.26***	-0.21	-0.18	-0.18	-0.18	-0.26***	-0.40***	-0.40**
EU entry		0.53	0.53	0.53	0.53	0.54	0.59	0.57	0.57
Distance			-0.0001*	-0.0001*	-0.0001*	-0.0001*	-0.0001*	-0.0001*	-0.0001***
Migrant Stock Index				0.29**	0.28***	0.27***	0.34	0.18	0.29***
Common Official Language				-	-	-	-	-	-
Difference in Temperature					0.005	0.005	-0.005***	-0.01	-0.01
Population Density						0.0006***	0.0005***	0.0005	0.0005
Political Stability + 2.5							0.40***	0.19	0.21
Europe Dummy								-0.009	0.27
Africa Dummy								-1.57**	-1.46***
Asia Dummy								-0.34	-0.50
Oceania Dummy								1.32	1.18
Common Colony									0.98*
Constant	-33.69*	-20.55	-19.80	-20.43	-20.49	-20.60	-24.35	-22.78	-23.69
R <sup>2</sup> [overall]	0.033	0.035	0.068	0.077	0.077	0.080	0.087	0.114	0.136

Note: (i) \*, \*\* and \*\*\* denotes statistical significance at 1%, 5% and 10% respectively.

(ii) Common Official Language was dropped due to collinearity.

**Table 8: Results by excluding 2006 from the sample**

	Basic Model	Extended Models								
Ln GDP per capita (s)	7.59**	5.80	5.77	5.72	5.69*	5.68*	5.69*	5.92*	5.82*	5.84*
Ln relative GDP per capita (r/s)	6.84**	5.05	5.02	4.70	5.61*	5.57*	5.59*	6.11*	5.97*	5.98*
Ln Unemployment rate (r)	0.05	-1.25	-1.36	-1.57	-1.79	-1.82	-1.85	-1.72	-1.65	-1.64
Ln relative unemployment rate (r/s)	-0.70***	-0.69***	-0.58	-0.38	-0.06	-0.03	-0.02	-0.13	-0.20	-0.21
EU entry		0.88	0.88	0.88	0.92	0.92	0.93	0.99*	0.96***	0.96***
Distance			-0.0004*	-0.0002*	-0.0001*	-0.0001*	-0.0001*	-0.0001*	-0.0001	-0.0001
Migrant Stock Index				2.44*	0.54*	0.58*	0.57*	0.64*	0.53*	0.62*
Common Official Language					33.58*	33.41*	33.46*	33.31*	33.21*	33.16*
Difference in Temperature						-0.02	-0.02	-0.03	-0.05	-0.04
Population Density							0.0006	0.0005	0.0005	0.0005
Political Stability + 2.5								0.46***	0.21	0.24
Europe Dummy									0.28	0.54
Africa Dummy									-1.25	-1.15
Asia Dummy									-0.27	-0.45
Oceania Dummy									0.69	0.58
Common Colony										1.02*
Constant	-74.92*	-55.34	-53.63	-60.10	-55.299*	-55.097*	-55.22*	-59.35*	-57.36*	-58.37*
R <sup>2</sup> [overall]	0.019	0.019	0.054	0.186	0.769	0.769	0.770	0.772	0.775	0.779

Note: \*, \*\* and \*\*\* denotes statistical significance at 1%, 5% and 10% respectively.

## **CONCLUDING REMARKS**

This study has addressed the topic of international migration, with Cyprus as a case study. Cyprus has traditionally been an attracting pole for immigrants from many countries all over the world. This is evident from the positive net-migration figures documented in Cyprus from 1983 onwards. Especially following its accession in the European Union, Cyprus has experienced unprecedented levels of positive net migration, peaking at 15,724 in 2004 (4.43% of labour force). Greece, the United Kingdom, Sri Lanka and Russia, are traditionally among the top five sending countries of immigrants to Cyprus. Focusing on the European Union alone, in addition to the aforementioned Greece and the United Kingdom, Bulgaria and Romania are among the top EU member sending countries.

Thus, not only relatively poorer countries, such as Sri Lanka, the Philippines, Bulgaria or Romania, are important sources of inward migration in Cyprus. Other more prosperous countries such as Greece, the UK or Russia, have also been important sources of inward migration for Cyprus in recent years. Therefore, while economic factors must play an important role in the observed trends, other factors must also be present. This paper examines immigration flows, and focuses on these characteristics, economic and non-economic, which drive the dynamics of inward migration in Cyprus.

Several economic factors are assessed, including income gaps, unemployment conditions etc. The paper finds that these factors are important and certainly influence migration trends. The analysis shows that the relative income gap is an important element of the decision to migrate. Hence, Cyprus, being a relatively prosperous EU member state, is an attracting pole for foreign migration. However, the results also show that income levels in the sending country per se are also important, since the costs of relocating are not insignificant. Labour market conditions, or relative conditions to be more precise, are not found to be very significant, therefore contradicting the hypothesis that people tend to migrate from one country to another in search of better working conditions. However, the most likely explanation of this is the poor quality of the registered unemployment data in many countries, as well as the fact that the official figures in most cases tend to underestimate unemployment levels due to the absence of any meaningful social protection in many of these countries.

Other non-economic factors, however, are assessed given the country-composition of the migration population. What are these factors? This paper examines a long list of characteristics that can influence the decision to migrate, including political stability, the weather, and the language spoken, the distance between the “candidate” country, “network effects” or perhaps a common colonial background. The results confirm the



significance of some of these factors, in particular the common language, the distance and “network effects”.

Interestingly the paper finds no evidence that political factors are a key determinant of immigration flows to Cyprus. Specifically, differences in the degree of political stability are not found to be a significant determinant of migration. In addition, there is no statistical evidence that weather conditions are important, something which is puzzling given the strong presence of UK nationals and the continued inflows from the UK to Cyprus.

Overall, the study confirms some generally-known stylized facts and hypotheses regarding migration in Cyprus. Based on this finding one safe prediction is that, since the income gap will continue to work in favor of Cyprus, especially relatively to very poor countries, immigration flows from these areas will continue to expand in the next 10-20 years. However, flows from the more prosperous countries, especially in the EU such as Romania and Bulgaria, will gradually taper off. The finding of strong network effects, however, also suggests that changes in the composition of immigrants in Cyprus will be very gradual. Overall, however, as the economy continues to expand immigration will continue to be a major engine of growth.

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