D3.1 SEARCH DELIVERABLE

Deliverable 3.1: Interim report on EU-NC country mobility and relationship between migration, social capital & others

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SEARCH
SHARING KNOWLEDGE ASSETS: INTERREGIONALLY COHESIVE NEIGHBORHOODS

EUROPEAN COMMISSION
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SEVENTH FRAMEWORK PROGRAMME

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Sharing KnowledgE Assets: InteRregionally Cohesive NeigHborhoods (SEARCH) Project

Deliverable 3.1: Interim report on EU-NC country mobility and relationship between migration, social capital & others

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1. Introduction

As recognised in the Europe 2020 strategy, the European Union (EU) has a clear demographic challenge for the next decades. The EU will need to import foreign labour in response to gloomy demographic forecasts, in the context of ageing populations, low birth-rates, and prospects of a collapsing social security system, but it is also necessary to remain competitive in a global scenario and this means that we have to attract and retain the more skilled migrants. This also requires improving the current control over migration flows and this is one of the reasons why the European migration policy was integrated into the European Neighbourhood Policy (ENP) from the very beginning. The EU neighbouring countries are the main countries of origin and transit of legal and illegal migration towards Europe. Moreover, their geographical proximity, economic, cultural and historical links make them an important potential source of labour force.

The SEARCH project is aimed at analyze the impact of the European Neighbourhood Policy (ENP) on the integration of the neighbouring countries with the EU with respect to several areas, such as trade flows, people mobility, human capital, technological activities, innovation diffusion and institutional environment. Within the project, Work package 3 is aimed at specifically taking into account the role of labour migration and its economic and social consequences for both destination (EU) and origin (ENP) countries. The main aspects considered relate to intangible assets such human capital, technological diffusion and entrepreneurship.

This interim report summarizes the state of research related to tasks 3.1 and 3.2. Task 3.1 forms a baseline for the analysis of WP3, since its main purpose is to build a consistent database containing migration flows between EU and ENC and to estimate a gravity model capable of predicting past and future migration flows between these groups of countries. Task 3.2 specifically looks into the relationship between human capital and workers mobility from and to neighboring regions. In particular, it analyses the role of human capital within the context of the labour market integration of immigrants.

It consists of 9 working papers; the first working paper, WP3.1 compiles and describes a new database of bilateral migration flows between ENP countries and the EU and its potential determinants and it provides some benchmark models that could be used for policy analysis; WP3.2 looks at the effect of labour market institutions (in terms of as employment protection legislation, minimum wages, coverage of unemployment benefits and union power) on immigration flows; WP3.3 and WP3.5 inspect the relationship between international migration and urbanization; WP3.4 deals with factors influencing the destination choice of migrants from ENP to EU countries and then addresses the extent to which destination choices within the EU are complements and substitutes; WP3.6 defines the picture of international migration movements between the new states of the former Soviet Union along with its characteristics and influencing factors; WP3.7 analyses the role of human capital to explain wage differences between immigrant and natives while WP3.8 look at skill-match and in particular at the differences in the probability of having skill mismatch between immigrants from EU countries, immigrants from non-EU countries and natives; last, but not least, WP3.9 looks at the employment outcomes of native and migrants in Spain since the start of the crisis.

The objective of WP3.1 is twofold: first, to collect statistical information on migration flows and its potential determinants and second, to specify and estimate gravity models in order to provide benchmark scenarios for policy analysis. In particular, two datasets have been compiled: the MIG-SEARCH database and the MIGEU-SEARCH database. The MIG-SEARCH database includes data for nearly 200 countries for a long time period starting in 1960 and ending in 2010 and it provides information on bilateral migration flows and stocks and several variables related to the economic, social, political and cultural pull and push factors identified by the literature. The MIGEU-SEARCH database provides similar information only for the EU27 countries and a shorter period (2002-2007), but data are available at the yearly frequency. In fact, the MIGEU-SEARCH focuses on within Europe migration flows using annual data before and after the last accession to the EU. The descriptive analysis of these two datasets shows some interesting facts regarding population trends and migration flows in the EU and ENC. The main conclusion is that we expect a clear increase in migratory pressures from ECN to the EU in a near future. The rest of working papers in this work package will carry out

in-depth analysis about several policy dimensions using the same dataset and a similar methodology that will permit to improve the main conclusions from this benchmark model.

WP3.2 analyses the effect of labour market institutions as employment protection legislation, minimum wages, coverage of unemployment benefits and union power on immigration flows. It also studies the interaction of such institutions with migration policies and discusses the implications of the findings for the European Neighborhood Policy. The interpretation hypothesis is that migration decisions of individuals are also driven by some knowledge of the characteristics of the labour market of destination and by the interaction of such characteristics (labour institutions in particular) with migration policies. Moreover, the evidence that immigrants come in waves and tend to cluster in areas and occupations in which most of workers are from the same country (or even the same region), suggests that information on destination countries' characteristics is quite important in shaping migration decisions. Results show that stricter migration policies have a negative effect on migration flows, while GDP per capita of destination countries has a large and statistically significant positive effect on migration flows. On the other hand, there is not in general an important effect related to GDP in origin countries, but for migrants of the ENP group where this is stronger and negative. Further, employment protection and minimum wages have a positive effect on migration flows while higher union power (proxied by coverage of bargaining agreements) and coverage of unemployment benefits have less relevant effects on flows and the effect of labour institutions is higher in countries in which tightness of migration policies is lower.

WP3.3 deals with migration as a part of labour mobility, and in particular at regional migration. It describes the picture of migration flows paying special attention at international migration among neighbours which has recently become considerable, also for the European Neighbouring Countries. Moreover and in general if 3% of the world's population live outside their region of birth, in ENP countries + Russia that figure is above 7% and the reasons behind this movement are generally explained by the desire of people to advance and improve their economic potential by migrating. Also the paper explores the relevance of cities in this context, since in 2010 the ENP countries + Russia accounted for an urbanisation rate of 63%, although this figure has remained stable since the 1990's. Hence the paper investigates the relationship between migration and agglomeration. These analyses are carried out into a panel data framework, by using a panel of 197 countries over the period 1960-2010. Particular attention is devoted to ENP countries + Russia.

WP3.4 deals with two aspects related to migration. The first concerns factors influencing the destination choice of migrants from ENP to EU countries. Specifically, the question posed is what is the role played by social welfare conditions and policy towards illegal migrants in the

destinations? Would policy measures in these areas impact the flow of migrants into the EU? The second addresses the extent to which destination choices within the EU are complements and substitutes. This has policy ramifications with respect to the spillover of migration pressure points within the EU. A parochial policy which, for example, restricts migration in one country might deflect immigration to its neighbors. Also a policy which encourages immigration in one country might induce immigration to its neighbors. Immigration policy has to be designed globally rather than parochially. The study uses a spatial gravity model with spatial dependence in the bilateral flows between origins and destinations. This is relevant for policy because it underscores the futility of parochial policy targeting in the presence of spatial spillover. Traditionally, it has been assumed that only developments in the origins and destinations affect the magnitude of migration between them. In this study there are spillover effects between neighboring EU destinations and neighboring ENP origins. Results of the analysis are twofold. On the one hand the analysis finds out only weak evidence of the attractiveness of welfare generosity in EU destination countries as influencing migration from the ENP's and of the effectiveness of enforcement measures against illegal immigrants from the ENP's. Also the economic conditions of the ENP countries seems not to affect immigration to EU countries. On the other hand, the influence of neighboring countries seems to be quite relevant. Immigration to an EU country is strongly and positively influenced by immigration to its neighbors and vice-versa. Also, emigration from an ENP country to EU is strongly and positively influenced by emigration from its neighbors and vice-versa. The same applies to the volatility of immigration. According to previous arguments, these spatial spillovers mean that parochial immigration policies are destined to fail, and that immigration policy must be deigned globally. They also mean that EU policies which encourage immigration from specific ENP countries will induce immigration from these countries neighbors.

WP3.5 looks in deep at the relationship between urbanization and migration flows. In particular it analyzes the link between international migration, population growth and urbanization (particularly of small and medium cities) over the last 50 years all over the world and in ENC countries and Russia, using a panel of almost 200 countries over the 1960-2010 period. The idea is to compare the main trends in old subregions and compare them to the ENC countries performance. Looking at correlation between migration and population and urbanization, the analysis shows that population growth is positively correlated with immigration rates and negatively correlated –although never in a significant way- with emigration rates, as expected. Similarly, urbanization rates are positively correlated with both emigration and immigration rates with an important role for countries' effects, while international immigration is being directed to smaller cities than to bigger cities. Further, median and small agglomerations enjoy strong levels of development. As for the ENP countries the study stresses that while they have

experiences a large increase in the urbanization rate of small and medium cities, this would have been even larger in case that international emigration would not be as large as it is.

WP3.6 focuses on migration between the CIS countries and Russia. It provides an interesting case study in the context of the project. In particular, it aims at revealing a picture of international migration movements – both permanent and temporary - between the new states of the former Soviet Union during the years of their independence, evaluating the magnitude and dynamics of this phenomenon, the transformation of the types of migration under the influence of various factors, and showing how the main challenges associated with migration are reflected in the migration policy of the region. The features of migration situation in the region are presented in their historical perspective, based on a study of the main factors determining directions of flows, shape and scale of migration, as well as the analysis of all available types of statistics on migration in countries in the CIS. The study shows that the CIS remains to be the region of massive migration movements. As compared to the Soviet period, the volume of permanent-type of migration between the former Soviet republics has declined, but the temporary forms of migration, mostly associated with labor force have started their active development. The main sources of labor migration have become regions that in the Soviet period were characterized by low mobility of the indigenous population - Central Asia, Azerbaijan, and Moldova. In terms of policy, the analysis also shows that the interests of immigration policy in the CIS countries are directly related to the predominant function of the state: a donor country or a recipient of migrants. Despite the difference of interests, the understanding of the importance of migration, not limited by mere "economic sense" is growing in all countries.

The relative situation of immigrants in the labour market of the host country has played a central role in academic research and policy analysis. The key empirical findings of this literature are twofold: first, immigrants typically face a significant wage gap when arriving to the host country and, second, this gap tends to diminish the longer they remain in their host country. Recent contributions have argued that the wage disadvantage experienced by immigrants when they arrive in a new country can generally be attributed to the limited transferability of the human capital they have acquired in their home country, due to the lower quality of the educational system or to a different cultural background, among others. However, the main explanatory factor behind the rapid growth over time in immigrant wage levels is related to their accumulation of different types of human capital in the host country. WP As previously mentioned, WP3.7, WP3.8 and WP3.9 focuses on the analysis of the role of human capital to explain the labour market performance of immigrants within the EU labour markets.

In particular, WP3.7 quantifies immigrant-native wage gaps in the European Union countries putting special attention to the role of favourable or unfavourable policies supporting the labour market integration of recently arrived immigrants. Analysing data from MIPEX for the period 2007-2010, we identify that nearly all new EU member states (EU-12) have unfavourable policies while in the old EU member states (EU-15) there are two clear groups of countries: one formed by Austria, Belgium, Greece, Ireland, Italy, Luxemburg and the United Kingdom with less favourable policies and a second one formed by Germany, Denmark, Spain, Finland, France, Netherlands, Portugal and Sweden where policies are more favourable. Using cross-sectional microdata from the EU-SILC, we estimate separate Mincer equations for the three group of countries. Our results show that wage differentials between immigrant and natives are lower in those countries with more favourable policies, but this is the result of a better relative situation of medium-skilled workers and not of highly-qualified ones. In any case, the wage gap for immigrants in EU-15 countries is clearly lower than for those arriving at EU-12 countries. However, although our results suggests that these policies do have some effects on immigrants' labor market integration, it is not possible to disentangle which part of the effect is due to this particular measure, to other migration policy or even to 'non-migration policies'.

WP3.8 analyses the relationship between migration and human capital from a different perspective. In particular, it analyses whether there are differences in the probability of having skill mismatch (vertical and horizontal) between immigrants from EU countries, immigrants from non-EU countries and natives. It also focuses on the role of immigrants' process assimilation, i.e. in looking at whether immigrants manage to reduce the probability of having skill mismatch as years of residence in the host country increase. Using data from the Adult Education Survey (AES) and probabilistic models the analysis shows different results depending on the kind of skill mismatch analyzed. On the one hand, there are no significant differences in the probability of having horizontal mismatch between immigrants and natives once controlled for other observable characteristics. On the other hand, there are significant differences in case of vertical mismatch. Immigrants from EU countries have a 29% higher probability of being overeducated than natives, whereas the percentage corresponding to immigrants from non-EU countries is 46%. As for the process of assimilation the results show that, although immigrants from countries outside EU have a higher probability to be overeducated, their process of assimilation is faster than the one for immigrants from EU countries. Finally, the study ends up with a decomposition of the differences in the probability of being overeducated between natives and migrants into two components, in order to understand whether differences are due to differences in specific attributes or in returns to attributes. Results differ depending on the group of immigrants we study. As for differences between immigrants from EU and natives, 61% of these are explained by differences in

characteristics, while as for differences between immigrants from outside EU and natives, 81% of these are explained by differences in returns to characteristics, i.e., immigrants from non-EU countries are not remunerate at the same way than natives.

WP3.9 focuses on the relationship between employment outcomes and migration in Spain since the start of the crisis. Specifically, using the Labour Force Survey first shows that in terms of job losses immigrants have been clearly more affected than natives and then aims at addressing the question of whether the pattern of assimilation observed along the growth period remained after the impact of the crisis. In other words, the idea is to study if a native and an immigrant worker with similar characteristics showed the same chance to maintain or lose their jobs or if, on the contrary, immigrants suffered further the impact of the crisis on the labour market, implying a form of discrimination against this group. Moreover, the study analyses whether there are differences depending on the origin of immigrants, distinguishing between those from countries of the ENP (ENC) and the rest. The results confirm that for all immigrants from developing countries, differences in human capital and occupational and sectoral segregation cannot explain fully the gap. In other words, that there were differences in the probability of job loss between immigrants and natives of similar personal characteristics, working in analogous occupations and firms. The explanation for this fact can be found in the existence of some kind of discrimination against immigrant workers, so that companies tended first to dismiss immigrants workers rather than natives with similar characteristics. However, it can be argued as well that the differences could be due to the effect of unobservable characteristics, such as the imperfect transferability of human capital. In any case, it is worthwhile stressing that discrimination or unobserved characteristics (or both together) only contributed to the existence of a significant gap between natives and immigrants after the impact of the crisis, i.e. it does not appear that such mechanisms played any role in the expansionary period, characterized by the massive creation of new jobs, and not by their destruction. As for ENCs the study provides evidence that the impact of the crisis on job loss was greater for immigrants from the ENC. In this case however, it seems that the difference in education attainment, and occupational and sectoral distribution with respect to natives was even greater than that observed for non-ENC immigrants and that almost all of the gap in the rate of job loss can be attributed to differences in observed characteristics, thus ruling out discrimination against ENC immigrants. In any case, one could argue that what might be behind the results is a phenomenon of segregation, in which discrimination actually takes place through the real possibilities of occupying certain jobs.

Together, these nine working papers give an overview of the characteristics of migration flows between countries all over the world and specifically in the ENP countries as well as they point out which factors influence these flows. Further, the last three papers focus on differences in labour market outcomes between migrants and native workers, in order to depict a picture of the

integration of migrants in host countries. These results will be complemented during the realization of the project with the analysis of additional tasks related to remittances, the mobility of highly qualified human capital (inventors) and social capital.

WP3/01 SEARCH WORKING PAPER

Analysing Migration Flows From and To ENC Through the MIG-SEARCH databases

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Analysing migration flows from and to ENC through the MIG-SEARCH databases

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Abstract

The objective of this paper is twofold: first, to collect statistical information on migration flows from and to ENP countries and its potential determinants and second, to specify and estimate gravity models in order to provide benchmark scenarios for policy analysis. In particular, two datasets have been compiled: the MIG-SEARCH database and the MIGEU-SEARCH database. The MIG-SEARCH database includes data for nearly 200 countries for a long time period starting in 1960 and ending in 2010 and it provides information on bilateral migration flows and stocks and several variables related to the economic, social, political and cultural pull and push factors identified by the literature. The MIGEU-SEARCH database provides similar information only for the EU27 countries and a shorter period (2002-2007), but data are available at the yearly frequency. In fact, the MIGEU-SEARCH focuses on within Europe migration flows using annual data before and after the last accession to the EU.

The descriptive analysis of these two datasets shows some interesting facts regarding population trends and migration flows in the EU and ENC. The main conclusion is that we expect a clear increase in migratory pressures from ECN to the EU in a near future. The rest of working papers in this work package will carry out in-depth analysis about several policy dimensions using the same dataset and a similar methodology that will permit to improve the main conclusions from this benchmark model.

Keywords

Bilateral migration, gravity models

JEL Classification

F22, O15 R23

1. INTRODUCTION

The free movement of workers is one of the fundamental principles upon which the European Union was once founded and, somehow, it is also present as a future goal in the bilateral negotiations with most neighbouring countries. As recognised in the Europe 2020 strategy, the European Union (EU) has a clear demographic challenge for the next decades. The EU will need to import foreign labour in response to gloomy demographic forecasts, in the context of ageing populations, low birth-rates, and prospects of a collapsing social security system, but it is also necessary to remain competitive in a global scenario and this means that we have to attract and retain the more skilled migrants.

This also requires improving the current control over migration flows and this is one of the reasons why the European migration policy was integrated into the European Neighbourhood Policy (ENP) from the very beginning. The EU neighbouring countries are the main countries of origin and transit of legal and illegal migration towards Europe. Moreover, their geographical proximity, economic, cultural and historical links make them an important potential source of labour force. In fact, nearly all Action Plans, the main tool of the ENP, contained proposals for actions in areas such as border management and management of migration flows. The EU proposed actions in the field of migration, asylum, visa policies, trafficking and smuggling, illegal migration and police cooperation.

Taking this into account, one of the main objectives of the SEARCH project is to analyse which has been the impact of ENP on current migration flows and to identify potential migration scenarios and policy options.

The objective of this paper is not to carry out an extensive literature review of previous work (which has been carried out under Work Package 1 of the SEARCH project) but to provide a common methodological and data framework that will be extended in the rest of working papers under this Work Package. In particular, with this aim, in a first stage, statistical information on migration flows from and to countries included in the ENP (from now on ENC) and Russia and its potential determinants have been collected and described and, in a second stage, gravity models are specified and estimated in order to provide benchmark scenarios for policy analysis. As previously mentioned, the use of common databases and methodological approach in the rest of working papers in this work package will permit to carry out in-depth analysis about several policy dimensions that will permit to improve the main conclusions from this benchmark model.

The rest of the paper is structured as follows: first, in section 2, main trends in population and migration flows from and to ENC and Russia are shown; next, in section 3, the datasets elaborated within this task are clearly described; section 4 describes the benckmark gravity models and, last, section 5 concludes with some final remarks.

2. POPULATION AND MIGRATION TRENDS FROM AND TO ENC

In this section, data from the World Bank Data Catalog are used in order to provide a brief description of past trends in population growth and migration flows from and to European Neighbourhood Countries (ENC) plus Russia.

As it can be seen from table 1, the population of the European Neighbourhood Countries (ENC) plus Russia is nowadays above 400 million people. While in the sixties of last centuries, the population in the South ENC (Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Syria and Tunisia) was around sixty million people, a similar figure to the population in East-ENC (Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine), nowadays it is substantially higher: 204 million people vs. 75 million. The Russian population has also experienced a very important growth moving from 250 million people in 1960 to 420 million people in 2010. Population growth has been clearly higher in Russia and the South ENC than in the EU-27 that has increased its population from 400 million people in 1960 to 500 million people in 2010.

As shown in tables 2 and 3, there is a very high heterogeneity regarding migration trends in ENC countries during the last 50 years. While some countries such Israel during the whole period or Russia during the last thirty years have been net receivers of migration flows, other countries such as Belarus, Egypt or Tunisia have clearly lost population due to migration during the considered period. An additional interesting feature of migration from ENC countries is that it is highly concentrated in some destination countries due to geographical proximity or strong political, economic or colonialist linkages (see table 4). For instance, most migrants from Algeria or Tunisia go to France and most migrants from East ENC go to Russia. In fact, one interesting result is that European Union countries are not always the main destination of migrants from ENC: for instance, emigrants from Egypt choose as Saudi Arabia as first destination, those from Lebanon prefer to migrate to the United States or those from Syria go to Jordan, Kuwait or Saudi Arabia. Migration flows between ENC countries has been quite relevant in the more recent period. Nowadays, about 10% of total population in East ENC has been born abroad while this figure is around 5% in South ENC and Russia. In the EU-27, the stock of foreign born population is around 10%.

Table 1. Population trends in ENC + Russia

POPULATION		1960	1970	1980	1990	2000	2010
AM	Armenia	1,867,396	2,518,408	3,096,298	3,544,695	3,076,098	3,092,072
AZ	Azerbaijan	3,894,492	5,171,999	6,166,000	7,159,000	8,048,535	9,047,932
BY	Belarus	8,198,000	9,040,000	9,643,000	10,189,000	10,005,000	9,490,500
GE	Georgia	3,645,600	3,967,800	4,467,700	4,802,000	4,418,300	4,452,800
MD	Moldova	2,544,000	3,045,000	3,397,000	3,696,000	3,639,588	3,562,062
UA	Ukraine	42,783,010	47,316,501	50,043,550	51,892,000	49,175,848	45,870,700
Total ENC- East		**62,932,498**	**71,059,708**	**76,813,548**	**81,282,695**	**78,363,368**	**75,516,066**
DZ	Algeria	10,799,997	13,746,185	18,811,199	25,299,182	30,533,827	35,468,208
EG	Egypt	27,903,093	35,923,283	44,952,497	56,843,275	67,648,419	81,121,077
IL	Israel	2,114,020	2,974,000	3,878,000	4,660,000	6,289,000	7,624,600
JO	Jordan	844,000	1,508,000	2,181,000	3,170,000	4,797,500	6,047,000
LB	Lebanon	1,907,573	2,464,286	2,794,638	2,948,372	3,742,329	4,227,597
LY	Libya	1,349,004	1,994,000	3,063,000	4,334,459	5,231,189	6,355,112
MA	Morocco	11,625,999	15,309,995	19,566,920	24,781,105	28,793,236	31,951,412
SY	Syria	4,566,822	6,368,017	8,906,543	12,324,116	15,988,534	20,446,609
TN	Tunisia	4,220,701	5,127,000	6,384,000	8,154,400	9,563,500	10,549,100
Total ENC-South		**65,331,209**	**85,414,766**	**110,537,797**	**142,514,909**	**172,587,534**	**203,790,715**
Total ENC		**128,263,707**	**156,474,474**	**187,351,345**	**223,797,604**	**250,950,902**	**279,306,781**
RU	Russia	119,897,000	130,404,000	139,010,000	148,292,000	146,303,000	141,750,000
Total ENC + Russia		**248,160,707**	**286,878,474**	**326,361,345**	**372,089,604**	**397,253,902**	**421,056,781**

Note: Palestinian territory is not considered due to the lack of data

Table 2. Accumulated net migration by decades in ENC + Russia

ACCUMULATED NET MIGRATION		1960	1970	1980	1990	2000	2010
AM	Armenia	80,879	142,430	97,262	-114,499	-725,000	-175,000
AZ	Azerbaijan	35,979	-65,536	-85,359	-258,668	-243,237	106,528
BY	Belarus	-174,866	-220,098	-72,286	-21,799	*-25,905*	-30,010
GE	Georgia	87,231	-36,371	-143,479	-85,941	-934,105	-459,021
MD	Moldova	182,250	217,003	84,650	-89,430	-373,256	-491,748
UA	Ukraine	-285,919	594,986	247,971	27,378	-446,638	-212,835
Total ENC- East		**-74,446**	**632,414**	**128,759**	**-542,959**	**-2,748,141**	**-1,262,086**
DZ	Algeria	-433,115	-838,090	-147,566	13,306	-190,000	-280,000
EG	Egypt	-50,100	-289,800	-1,475,236	-1,348,419	-2,054,942	-717,702
IL	Israel	167,565	281,199	228,425	68,022	702,257	376,570
JO	Jordan	119,245	290,067	-110,464	199,855	213,210	109,022
LB	Lebanon	40,000	-15,000	-296,001	-440,002	230,000	87,500
LY	Libya	46,023	121,206	209,411	165,260	-40,600	-40,600
MA	Morocco	-12,967	-423,104	-614,593	-300,000	-950,000	-1,289,000
SY	Syria	-15,000	-32,000	-243,173	-233,502	-200,000	492,385
TN	Tunisia	-172,625	-368,048	-145,463	-49,196	-98,872	-100,599
Total ENC-South		**-310,974**	**-1,273,570**	**-2,594,660**	**-1,924,676**	**-2,388,947**	**-1,362,424**
Total ENC		**-385,420**	**-641,156**	**-2,465,901**	**-2,467,635**	**-5,137,088**	**-2,624,510**
RU	Russia	-973,612	-938,489	315,615	2,013,615	4,427,937	2,700,163
Total ENC + Russia		**-1,359,032**	**-1,579,645**	**-2,150,286**	**-454,020**	**-709,151**	**75,653**

Note: Palestinian territory is not considered due to the lack of data

Table 3. Immigrant stock as a percentage of population in ENC + Russia

IMMIGRANT STOCK (% POPULATION)		1960	1970	1980	1990	2000	2010
AM	Armenia				18.6%	18.7%	10.5%
AZ	Azerbaijan				5.0%	4.3%	2.9%
BY	Belarus				12.3%	11.2%	11.5%
GE	Georgia				7.0%	4.9%	3.8%
MD	Moldova				15.7%	13.0%	11.5%
UA	Ukraine				13.3%	11.2%	11.5%
Total ENC- East					**12.4%**	**10.5%**	**9.9%**
DZ	Algeria	4.0%	1.2%	1.0%	1.1%	0.8%	0.7%
EG	Egypt	0.8%	0.6%	0.4%	0.3%	0.3%	0.3%
IL	Israel	56.1%	47.4%	36.9%	35.0%	35.9%	38.6%
JO	Jordan	45.7%	35.3%	37.2%	36.2%	40.2%	49.2%
LB	Lebanon	7.9%	7.7%	8.6%	17.8%	18.5%	17.9%
LY	Libya	3.6%	6.1%	10.1%	10.6%	10.7%	10.7%
MA	Morocco	3.4%	0.8%	0.4%	0.2%	0.2%	0.2%
SY	Syria	6.0%	5.8%	5.6%	5.6%	5.8%	10.8%
TN	Tunisia	4.0%	1.0%	0.6%	0.5%	0.4%	0.3%
Total ENC-South		**5.0%**	**3.7%**	**3.4%**	**3.5%**	**4.0%**	**5.0%**
Total ENC					**6.7%**	**6.0%**	**6.3%**
RU	Russia				7.8%	8.1%	8.7%
Total ENC + Russia					**7.1%**	**6.8%**	**7.1%**

Note: Palestinian territory is not considered due to the lack of data

Table 4. Main destination countries of immigrants from ENC + Russia in 2010 as a percentage of total immigrant stocks

Source country	Main destination countries (% of total migrant stocks in 2010)
Algeria	France (75.5%), Spain (5.2%)
Armenia	Russian Federation (56.7%), United States (8.9%), Ukraine (6.1%), Azerbaijan (4.9%)
Azerbaijan	Russian Federation (60.5%), Armenia (11.5%), Ukraine (6.5%)
Belarus	Russian Federation (54.3%), Poland (6.4%), Ukraine (15.6%)
Egypt, Arab Rep.	Saudi Arabia (26.9%), Jordan (22.8%), Libya (10.6%), Kuwait (8.5%)
Georgia	Russian Federation (60.9%), Armenia (7.2%), Ukraine (6.8%), Greece (4.0%)
Israel	West Bank and Gaza (64.3%), United States (14.6%)
Jordan	West Bank and Gaza (50.3%), Saudi Arabia (23.5%)
Lebanon	United States (19.6%), Australia (14.4%), Canada (13.2%), Germany (9.3%), Saudi Arabia (8.8%), France (6.8%)
Libya	Israel (25.9%), United Kingdom (11.0%), Chad (10.1%), United States (9.8%), Jordan (7.3%), Egypt (6.6%)
Moldova	Russian Federation (36.9%), Ukraine (21.9%), Italy (11.6%), Romania (5.0%)
Morocco	France (27.9%), Spain (25.8%), Italy (15.8%), Israel (8.1%), Belgium (5.7%), Netherlands (5.5%)
Russian Federation	Ukraine (33.4%), Kazakhstan (20.2%), Israel (6.5%), Belarus (6.2%)
Syrian Arab Republic	Jordan (30.6%), Kuwait (13.0%), Saudi Arabia (11.8%), Unitd States (7.1%)
Tunisia	France (46.4%), Italy (18.7%), Libya (13.0%), Germany (5.7%)
Ukraine	Russian Federation (55.9%), Poland (5.1%), United States (5.1%)

Note: Palestinian territory is not considered due to the lack of data

The main conclusion from this descriptive analysis is that modelling migration flows from and to ENC requires the consideration of a wide selection of origins and destinations and not only bilateral flows from and to these countries to the European Union.

3. THE MIG SEARCH DATABASES

It is a difficult task to collect data on homogeneous international migration for a large number of countries (Fertig and Schmidt, 2000). There are problems of data availability and difficulties in getting comparable statistical information across countries. Annex 1 shows a summary picture of currently databases for the analysis of migration from and to a wide set of countries with a long enough time series perspective. The different databases are grouped depending on the institution in charge of collecting and disseminating the data. From our comparative analysis of these datasets, the most complete source seems to be World Bank Bilateral Migration Database 1960-2000 completed with the World Bank Bilateral Migration Matrix 2010. Data based primarily on the foreign-born concept are presented. Over one thousand census and population register records are combined to construct decennial matrices corresponding to the last five completed census rounds. The only problem with this dataset is that it provides information on stocks rather than on flows. However, as data on immigration stocks are based on national censuses, they will be probably of higher quality than those that report annual immigrant flows, as censuses deal with unambiguous net permanent moves. This justifies that the stocks of immigrants will be chosen as dependent variable for part of our empirical analysis analysis. Besides immigration stocks, an additional number of variables related to pull and push factors of migration (as shown in table 5) have been collected and will be used in the empirical analysis.

While the main aim of our analysis is to analyse the potential role of ENP, it is also interesting to analyse the effect the last EU enlargement on migration flows from these countries to the EU. As data for intra-EU flows is much more detailed than the one available for a wider sample of countries, two different datasets have been constructed: the MIG-SEARCH database and the MIGEU-SEARCH database.

Table 5. Migration pull and push factors

	Pull factors	Push factors
Economic and demographic	o Poverty o Unemployment o Low wages o High fertility rates o Lack of basic health and education	o Prospects of higher wages o Potential for improved standard of living o Personal or professional development
Political	o Conflict, insecurity, violence o Poor governance; o Corruption.	o Safety and security o Political freedom
Social and cultural	o Human rights abuses o Discrimination based on ethnicity, gender and religion	o Family reunification o Diaspora migration o Freedom from discrimination

Source: Adapted from Praussello (2011)

The MIG-SEARCH database includes data for nearly 200 countries for a long time period starting in 1960 and ending in 2010 and it provides information on bilateral migration stocks (accumulated flows by decades can, however, be calculated as difference between stocks) and several variables related to the economic, social, political and cultural pull and push factors identified by the literature as shown in table 5. As previously mentioned, bilateral migration data have been obtained from the World Bank Bilateral Migration Database 1960-2000 and the World Bank Bilateral Migration Matrix 2010, while the rest of explanatory variables have been collected from additional sources such as the World Bank Development Indicators, the CEPII Geodist dyadic dataset, the Quality of Government dataset and the Fraser Institute, among others. The current version of the dataset includes 193060 observations (from the 231672 potential observations: bilateral relations between 197 countries in 6 periods) and 83 variables.

The MIGEU-SEARCH database provides similar information only for the EU27 countries and a shorter period (2002-2007), but data are available at the yearly frequency. In fact, the MIGEU-SEARCH focuses on within Europe migration flows using annual data before and after the last accession to the EU. The source for bilateral migration flows in this second dataset is the EUROSTAT project “Migration Modelling for Statistical Analyses (Mimosa)”. Regarding explanatory variables, similar sources have been obtained although the available information is significantly lower as not all data are availab le at annual frequency. It currently includes 5580 observations (bilateral relationships between 31 countries and 6 time periods) and 51 variables.

Annex 2 provides a more detailed description of the contents of the two datasets. At this stage, the databases are only available to all researchers within the SEARCH project, but in the future, once the information has been verified and tested, access to them will be granted to all potentially interested researchers through the SEARCH Open Data catalogue. Both datasets are currently distributed as independent STATA data files, but other formats will be available on request.

4. A BENCHMARK GRAVITY MODEL FOR ENC

There are many theoretical hypotheses and models concerning the determinants of migration but, at the moment, there is no single coherent theory of international migration. Gravity models are based on Newton's gravity law and not generally derived from any particular theoretical economic modelling. However, they are widely used in the empirical analysis of trade, foreign direct investment and migration flows due to their relatively good forecasting performance. In particular, migration stocks or flows between two countries are supposed to increase with their size and decay with the distance between the two countries.. Usually, the most representative variables of the economic size of countries are GDP or population. Therefore, it is expected that migration be a positive function of population size of the host and home country and a negative function of distance (which controls for migration costs). As in this paper, usually gravity models are enlarged with other economic (i.e. differences in the level of development) and institutional variables (conflict, violence, ethnic or religious discrimination, among others) related to different pull and push factors (see, among others, Volger and Rotte, 2000; Hatton and Williamson, 2002; Gallardo-Sejas et al., 2006; Kim and Cohen, 2010).

Two different empirical exercises are carried out in this section: first, the MIG-SEARCH database is used to identify the long run migration trends and, second, the MIGEU-SEARCH database permits to quantify the impact of the last EU enlargement on migration flows to the rest of EU member states. The results shown here do not intend to provide detailed explanations of factors behind migration flows but just to illustrate the kind of analysis that will be further extended in other

Tables 6, 7 and 8 show the results of estimating the benchmark gravity model using the MIG-SEARCH database. Results in table 6 show the relevance of size and geographical distance, but also the network effects that have characterized recent migration trends. Three different econometric methods have been used in order to avoid the problem of "excess of zeros" when analysing bilateral migration trends. The first column shows the results when applying Ordinary Least Squares while the second column contains the results when estimating a Poisson and the

third column the ones obtained when estimating a negative binomial to account for potential over-dispersion. The comparison from these three columns show important differences in the size of the effect which prevents us to use these estimates to elaborate future scenarios for migration trends. However, the results in terms of the statistical significance of the potential explanatory variables are robust to the different model specification and estimation methods.

The results in table 7 show the relevance of different pull and push factors, but perhaps the most relevant results from our analysis are shown in table 8. The results from this table show that once these different pull and push factors are controlled, migration flows from ENC countries to the rest of the world are higher than they should be according to the model. When we concentrate on flows from ECN to the EU (second and third column of table 8), this "surplus" in migration is even higher. This result shows the strong ties between these countries and the EU and how the ENC could clearly increase migratory pressure from these countries in the future. However, no significant effect is found when we test the differential effect of having signed Action Plans in the late two thousands(in fact, the "surplus" migration effect seem to be associated to the decade of the nineties of the last century and probably related to the end of the USSR). In any case, this conclusion should be taken with cautious, as perhaps the considered time span is still too short to appreciate the effects of the ENP.

Last, the analysis of the last EU enlargement using a similar econometric framework with the MIGEU-SEARCH database is shown in table 9. The results shown in this table show a clear positive and significant effect of the last EU enlargement that reinforces the previous conclusion about future migration flows from ENC to EU countries.

Table 6. Bilateral migration stocks and potential determinants – MIGSEARCH database (1)

	(1) OLS Coeff.	(2) Poisson Coeff.	(3) Negative Binomial Coeff.
Total Population - origin + destination	0.000***	0.000***	0.000***
Simple distance (most populated cities, km)	-0.251***	-0.176***	-0.058***
Contiguity (d)	114132.486***	5754.160***	11157.818***
GDP per capita differences - destination minus origin	0.091***	0.035***	0.008***
Immigrants stock - country of origin	0.001***	0.000***	0.000***
Immigrants stock - country of destination	0.005***	0.000***	0.000***
Common language (d)	1764.277**	490.746***	269.272***
Colonial relationship (d)	65390.287***	5679.241***	5134.814***
Common colonizer post 1945 (d)	3558.128***	801.603***	-50.236***
Observations	128021	128021	128021

Coefficients/Marginal effects
(d) for discrete change of dummy variable from 0 to 1
Fixed time effects also included in the model.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7. Bilateral migration stocks and potential determinants – MIGSEARCH database (2)

	(1) Coeff.	(2) Coeff.	(3) Coeff.	(4) Coeff.	(5) Coeff.	(6) Coeff.	(7) Coeff.
KOF Index of Globalization - origin	59.054***						
KOF Index of Globalization - destination	-30.313						
Democracy – origin		226.545***					
Democracy – destination		136.876**					
Index of Democratization –origin			113.784***				
Index of Democratization – destination			-2.725				
Freedom of Religion - origin				-1206.394***			
Freedom of Religion - destination				1072.408**			
Fraser Institute - Chain index - origin					186.351		
Fraser Institute - Chain index - destination					1240.043*		
Fraser Institute - Chain index 5 - origin						-611.809	
Fraser Institute - Chain index 5 -destination						1525.499***	
Fraser Institute - Chain index 5b - origin							-808.092*
Fraser Institute - Chain index 5b - destination							1309.950***
Observations	102064	99876	100444	89614	48054	47690	23023

OLS estimates.
All regressors shown in table 6 and fixed time effects also included in the model.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8. Bilateral migration stocks and potential determinants – MIGSEARCH database (3)

	(1) All countries Coeff.	(2) EU destination Coeff.	(3) EU destination Coeff.
Total Population - origin + destination	0.000***	0.000***	0.000***
Simple distance (most populated cities, km)	-0.236***	-0.896***	-0.893***
Contiguity	114170.488***	74133.430***	74330.175***
GDP per capita differences - destination minus origin	0.080***	0.057***	0.059***
Immigrants stock - country of origin	0.001***	0.001***	0.001***
Immigrants stock - country of destination	0.005***	0.005***	0.005***
Common language	1742.085*	2576.844	2517.212
Colonial relationship	65437.295***	35287.139***	35223.554***
Common colonizer post 1945	3564.445***	312.488	458.206
ENP_destination	-1521.104		
ENP_origin	3807.461***	7375.801***	
ENP1970_origin			28581.715
ENP1980_origin			17381.482
ENP1990_origin			15055.926**
ENP2000_origin			7761.058
ENP2010_origin			3459.775
Observations	128021	18200	18200

Marginal effects
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9. Bilateral migration flows and potential determinants – MIGEU-SEARCH database

	(1) Coeff.
Total Population - origin + destination	0.000***
simple distance between capitals (capitals, km)	-0.105
Contiguity	3333.237***
Unemployment rate differences - destination minus origin	-80.738***
Immigrants stock - country of origin	0.000
Immigrants stock - country of destination	0.000**
Common language	-503.551
Colonial relationship	7887.373***
Common colonizer	-570.111*
After accession to the EU	495.056**
Observations	4050

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5. FINAL REMARKS

The main conclusions from our analysis are the following:

- The descriptive analysis of population and migration trends in the ENC countries has permit they are a very heterogenous group, so no general conclusion can be obtained for all them. While some countries such Israel during the whole period or Russia during the last thirty years have been net receivers of migration flows, other countries such as Belarus, Egypt or Tunisia have clearly lost population due to migration during the considered period. An additional interesting feature of migration from ENC countries is that it is highly concentrated in some destination countries due to geographical proximity or strong political, economic or colonialist linkages but not limited to the European Union countries. Moreover, migration flows between ENC countries have been quite relevant in the recent past: an intensification of South-South migration due to the effect of ENP is more than probable. These results also limit the scope of partial analysis regarding future migration flows between ENC and the EU.

- Usual gravity controls including usual pull and push factors have the expected sign and are statistically significant. In particular, bilateral migration increases with population in origin and destination countries, but also with migration stocks, which can be interpreted as favourable evidence about the role of networks. Economic differences are also relevant. Geographic distance discourages migration while geographic contiguity, linguistic proximity or former colonial relationship have a positive and significant effect. We have also devoted particular attention to globalization trends, deregulation in labour markets and other institutional features such as democratization or freedom of religion. All this variables are relevant and explain part of the recent trends in migration flows.

- Regarding the particular situation of ENC, our results show that once these different pull and push factors are controlled, migration flows from ENC countries to the rest of the world are higher than they should be according to the model. When we concentrate on flows from ECN to the EU, this “surplus” in migration is even higher. This result shows the strong ties between these countries and the EU and how the ENC could clearly increase migratory pressure from these countries in the future. However, no significant effect is found when we test the differential effect of having signed Action Plans in the late two thousands, but perhaps the considered time span is still too short.

- Last, the analysis of the last EU enlargement using a similar econometric framework but the MIGEU-SEARCH database that permits the analysis of migration flows at the yearly frequency, shows a clear positive and significant effect that reinforces the previous conclusion about future migration flows from ENC to EU countries.

The use of common databases in the rest of working papers in this work package will permit to carry out in-depth analysis about several policy dimensions that will permit to improve the main conclusions from this benchmark model.

6. REFERENCES

Fertig, M., Schmidt, C. M. (2000), Aggregate-level migration studies as a tool for forecasting future migration streams, IZA Discussion Paper 183.

Gallardo-Sejas, H., Gil Pareja, S., Llorca-Vivero, R., Martínez-Serrano, J. A. (2006), Determinants of European immigration: a cross-country analysis, Applied Economics Letters, 13 (12), 769-773.

Hatton, T., Williamson, J. G. (2002), What fundamentals drive world migration?, NBER Working Paper no. 9159

Kim, K., Cohen, J. E. (2010), Determinants of International Migration Flows to and from Industrialized Countries: A Panel Data Approach Beyond Gravity, International Migration Research, 44 (4), 899–932.

Praussello, F. (2011), “The European Neighbourhood Policy and migration flows”, mimeo

Volger, M., Rotte, R. (2000) The effects of development on migration: theoretical issues and new empirical evidence, Journal of Population Economics, 13, 485–508.

ANNEX I. BRIEF DESCRIPTION OF DATA SOURCES FOR MIGRATION ANALYSIS

United Nations datasets

Data set	Countries covered	Time period considered	Description	
United Nations Global Migration Database v.0.3.6	More than 200 countries (including ENC)	The time period varies from country to country. It relies on different sources such as population censuses, population registers, nationally representative surveys and other official statistical sources.	Migration stocks by origin and by destination (when possible, disaggregated by gender and age group)	http://esa.un.org/unmigration/ (It currently requires previous registration).
United Nations World Population Prospects, the 2010 Revision	197 countries (including ENC)	5 year intervals since 1950 to 2010 (projections from 2010 to 2100)	Net number of migrants Net migration rate	http://esa.un.org/unpd/wpp/index.htm
United Nations Trends in International Migrant Stock: Migrants by Age and Sex, 2011	196 countries (including ENC)	Data for 1990, 2000 and 2010 with small variations as it is based on Population Census	Estimated number of international migrants at mid-year Total population at mid-year by age and sex International migrants as a percentage of the population Percentage distribution of international migrants by age and sex	http://esa.un.org/MigAge/
United Nations International migration flows to and from selected countries: The 2010 Revision	43 countries (including some ENC)	Annual data from 1960 to 2010, but for most country it starts after 2000	Number of immigrants and emigrants by country of residence, citizenship and country of birth.	http://esa.un.org/MigFlows/MigrationFlows.html (It is also available as a CD-ROM)

OECD datasets

Data set	Countries covered	Time period considered	Description	
OECD Database on immigrants in OECD and non-OECD countries (DIOC-E) 3.0	32 OECD and 68 non-OECD destination countries and 233 countries of origin (including some ENC countries)	2000	Bilateral flows to OECD countries and non-OECD countries	http://www.oecd.org/migration/dioc/extended
OECD Database on Immigrants in OECD countries (DIOC)	OECD countries	2000	Bilateral flows to OECD countries with very high detail on gender, age, education level, duration of the stay, labour force status, occupation and activity sector.	http://www.oecd.org/document/51/0,3746,en_2825_494574_40644339_1_1_1_1,00.html
OECD International Migration Data 2011	OECD countries and the Russian Federation	Annual data 2000-2009	Stocks and flows of immigrants and labour market outcomes of immigrants (2008-2010)	http://www.oecd.org/document/30/0,3746,en_2649_37415_48326878_1_1_1_37415,00.html

Eurostat datasets

Data set	Countries covered	Time period considered	Description	
Eurostat International Migration and Asylum	46 countries for international migration flows (it varies depending on the topic)	Annual data from 1998 to 2010, but again depending on the chosen topic	International Migration and Asylum (migr) Regional migration statistics (migr_r) Acquisition and loss of citizenship (migr_acqn) Asylum (migr_asy) Enforcement of Immigration Legislation (migr_eil) Active population and workers by citizenship (migr_lab) International migration flows (migr_flow) Population by citizenship and by country of birth (migr_stock) Residence permits (migr_res)	http://epp.eurostat.ec.europa.eu/portal/page/portal/population/data/database

ILO datasets

Data set	Countries covered	Time period considered	Description	
ILO LABORSTA	140 countries	Annual data from 1986 to 2008	Inflows and outflows by gender, employment status, occupation and economic sector.	http://laborsta.ilo.org/STP/guest

World Bank datasets

Data set	Countries covered	Time period considered	Description	
World Bank Bilateral Migration Database 1960-2000	226 countries	1960, 1970, 1980, 1990, 2000	Bilateral migration flows	http://data.worldbank.org/data-catalog/global-bilateral-migration-database
World Bank Bilateral Migration Matrix 2010		2010	Bilateral migration flows	http://go.worldbank.org/JITC7NYTT0
World Bank Panel Data on International Migration 1975-2000	6 OECD destination countries and 194 countries of origin (including some ENC countries)	5 year intervals since 1975 to 2000	Number of immigrants by educational attainment	http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:21866422~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html

Additional sources

Data set	Countries covered	Time period considered	Description	
Global Migrant Origin Database	226 countries	2000	Bilateral matrix of stocks	http://www.migrationdrc.org/research/typesofmigration/global_migrant_origin_database.html
Migration Modelling for Statistical Analyses (Mimosa) dataset	EU-27	Annual data for 2002-2007	matrix of flows by origin/destination, sex and age; immigration and emigration by citizenship and country of birth, sex and age; population by citizenship and country of birth, sex and age;	http://mimosa.gedap.be/
CARIM database on migration	17 Southern and Eastern Mediterranean (SEM) and Sub-Saharan Africa (SSA) countries and 19 destination countries	Annual data from 1990 to 2010 but the availability is quite different from country to country.	Demographic and economic module Legal module Socio-political module	http://www.carim.org
CARIM-East database on migration	7 Eastern European countries and 27 destination countries	Annual data from 1990 to 2010 but with very different availability from country to country	Demographic and economic module Legal module Socio-political module	http://www.carim-east.eu/

ANNEX II. THE MIG-SEARCH AND THE MIGEU-SEARCH DATABASES

Variable	Description
year	year
cname_o	Country Name Origin
cname_d	Country Name Destination
iso_o	Country of origin - iso3d code
iso_d	Country of destination - iso3d code
migstocks	Bilateral migration stocks
ur_o	Unemployment rate - country of origin
gdppc_o	GDP per capita - country of origin
migstock_o	Immigrants stock - country of origin
pop_o	Population - country of origin
ur_d	Unemployment rate - country of destination
gdppc_d	GDP per capita- country of destination
migstock_d	Immigrants stock - country of destination
pop_d	Population - country of destination
contig	1 for contiguity
comlang_off	1 for common official of primary language
comlang_ethno	1 if a language is spoken by at least 9% of the population in both countries
colony	1 for pairs ever in colonial relationship
comcol	1 for common colonizer post 1945
curcol	1 for pairs currently in colonial relationship
col45	1 for pairs in colonial relationship post 1945
smctry	1 if countries were or are the same country
dist	simple distance (most populated cities, km)
distcap	simple distance between capitals (capitals, km)
distw	weighted distance (pop-wt, km)
distwces	weighted distance (pop-wt, km) CES distances with theta=-1
DR_IG_d	KOF Index of Globalization - country of destination
DR_IG_o	KOF Index of Globalization - country of origin

Variable	Description
FI_CI1_GOVSIZE_d	Fraser Institute - Chain index 1 - country of destination
FI_CI2_LEGAL_d	Fraser Institute - Chain index 2 - country of destination
FI_CI3_SOUNDMONEY_d	Fraser Institute - Chain index 3 - country of destination
FI_CI4_TRADE_d	Fraser Institute - Chain index 4 - country of destination
FI_CI5_REG_d	Fraser Institute - Chain index 5 - country of destination
FI_CI_SUM_d	Fraser Institute - Chain index sum - country of destination
FI_CI5b_LABREF_d	Fraser Institute - Chain index 5b - country of destination
FI_CI1_GOVSIZE_o	Fraser Institute - Chain index 1 - country of origin
FI_CI2_LEGAL_o	Fraser Institute - Chain index 2 - country of origin
FI_CI3_SOUNDMONEY_o	Fraser Institute - Chain index 3 - country of origin
FI_CI4_TRADE_o	Fraser Institute - Chain index 4 - country of origin
FI_CI5_REG_o	Fraser Institute - Chain index 5 - country of origin
FI_CI_SUM_o	Fraser Institute - Chain index sum - country of origin
FI_CI5b_LABREF_o	Fraser Institute - Chain index 5b - country of origin
fh_ipolity2_d	Democracy (Freedom House/Imputed Polity)
icrg_qog_d	ICRG Indicator of Quality of Government
p_democ_d	Institutionalized Democracy
undp_hdi_d	Human Development Index
van_index_d	Index of Democratization
fh_ipolity2_o	Democracy (Freedom House/Imputed Polity)
icrg_qog_o	ICRG Indicator of Quality of Government
p_democ_o	Institutionalized Democracy
undp_hdi_o	Human Development Index
van_index_o	Index of Democratization
NEW_RELFRE_d	CIRI - Freedom of Religion - country of destination
NEW_RELFRE_o	CIRI - Freedom of Religion - country of origin
y1	year== 1960
y2	year== 1970
y3	year== 1980
y4	year== 1990
y5	year== 2000
y6	year== 2010
dgdppc	GDP per capita differences - destination minus origin
dur	Unemployment rate differences - destination minus origin
pop	Total Population - origin + destination

Data sources of these variables are shown in the following table.

CEPII Geodist dataset	225 countries		GeoDist 's provides several geographical variables, in particular bilateral distances measured using city-level data to assess the geographic distribution of population inside each nation. The a dyadic file includes a set of different distance and common dummy variables used in gravity equations to identify particular links between countries such as colonial past, common languages or contiguity.	http://www.cepii.fr/anglaisgraph/bdd/distances.htm
Quality of Government Dataset	207 countries	1946-2009	1.WII (What It Is) variables, that is, variables pertaining to the core features of QoG (such as corruption, bureaucratic quality, and democracy) 2.HTG (How To Get it) variables, that is, variables posited to promote the development of QoG (such as electoral rules, forms of government, federalism, legal & colonial origin, religion and social fractionalization); and 3.WYG (What You Get) variables, that is, variables pertaining to some of the posited consequences of QoG (such as economic and human development, international and domestic peace, environmental sustainability, gender equality, and satisfied, trusting & confident citizens).	http://www.qog.pol.gu.se/data/
Multiculturalism Policy Index	21 western democracies	1980, 2000 and 2010	Different indicators on multiculturalism policies	http://www.queensu.ca/mcp/index.html
Ethnic Power Relations dataset	155 countries	Annual data from 1946 to 2005	It identifies 733 politically relevant ethnic groups in 155 sovereign states from 1946 to 2005, provides group size estimates, codes the level of access to the executive branch by representatives of these groups in each year, and notes if an armed conflict was fought in the name of a particular ethnic group	http://www.epr.ucla.edu/

ANNEX III. EU Accession

Table 2: EU and euro area membership

(as at 1 January 2008)

Country	Application for membership ("candidate country")	Start of negotiations ("accession country")	Conclusion of negotiations ("acceding country")	EU Member State since	Euro area member since
Belgium	Founding member	Founding member	Founding member	1957	1999
Bulgaria	1995	1999	2005	2007	-
Czech Republic	1996	1998	2002	2004	-
Denmark	1967	1970	1972	1973	-
Germany	Founding member	Founding member	Founding member	1957	1999
Estonia	1995	1998	2002	2004	-
Ireland	1967	1970	1972	1973	1999
Greece	1975	1976	1979	1981	2001
Spain	1977	1979	1985	1986	1999
France	Founding member	Founding member	Founding member	1957	1999
Italy	Founding member	Founding member	Founding member	1957	1999
Cyprus	1990	1998	2002	2004	2008
Latvia	1995	1999	2002	2004	-
Lithuania	1995	1999	2002	2004	-
Luxembourg	Founding member	Founding member	Founding member	1957	1999
Hungary	1994	1998	2002	2004	-
Malta	1990	1999	2002	2004	2008
Netherlands	Founding member	Founding member	Founding member	1957	1999
Austria	1989	1993	1994	1995	1999
Poland	1994	1998	2002	2004	-
Portugal	1977	1978	1985	1986	1999
Romania	1995	1999	2005	2007	-
Slovenia	1996	1998	2002	2004	2007
Slovakia	1995	1999	2002	2004	-
Finland	1992	1993	1994	1995	1999
Sweden	1991	1993	1994	1995	-
United Kingdom	1967	1970	1972	1973	-

http://www.ecb.int/stats/payments/paym/html/data.en.html

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On the Potential Interaction Between Labour Market Institutions and Immigration Policies

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On the potential interaction between labour market institutions and immigration policies

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Abstract

In this paper we study the effect of labour market institutions as employment protection legislation, coverage of unemployment benefits, union power and minimum wages on aggregate migration flows for a sample of European countries during the period 1990-2005. We also analyse the interaction of such institutions with migration policies using a standard gravity model for panel data. We find that employment protection and minimum wages have positive effects on migration flows, and that this effect is stronger when migration policy is less tight, while we find less relevant effects for coverage of unemployment benefits and union power. We show that labour market institutions and migration policies have an important degree of complementary and/or substitutability that should be taken into consideration when designing policy interventions. Finally, we find that labour market institutions and migration policies have a different effect on flows depending on the country of origin of migrants and their skills. We discuss our findings in relation to the European Neighbourhood Policy.

Keywords

Migration flows, labour market institutions, migration policies, gravity model

JEL Classification

J61, H53, F22, E25

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1. INTRODUCTION

Do labour market institutions influence mobility decisions of migrants? Is there any interaction between such institutions and migration policies set by governments? Is there any differential effect of these policies on migrants from different countries of origin and with different skills? In this paper we try to answer the above questions by focusing on the relation between migration policies, labour institutions and bilateral migration flows.

Our interpretation hypothesis is that migration decisions of individuals are also driven, among other factors, by some knowledge of the characteristics of the labour market and consequently by the interaction of such characteristics (labour institutions in particular) with migration policies of destination countries. Moreover, the evidence that immigrants come in waves and tend to cluster in areas and occupations in which most of workers are from the same country (or even the same region) suggests that information on destination countries' characteristics is quite important in shaping migration decisions.[1] Hence, we identify possible theoretical mechanisms that could drive the mobility choices of migrants and analyse different aspects of labour institutions to disentangle their relative effect and potential interactions on immigration flows. We test our theoretical predictions by evaluating the quantitative effect of employment protection legislation, coverage of union bargaining agreements, the generosity of unemployment benefits and the presence of the minimum wage on bilateral migration flows in a set of European countries during the period 1990-2005.

In imperfect labour markets, labour institutions may have a relevant role in terms of increasing efficiency and accomplish some redistributive goals (see Boeri and van Ours, 2008). Migration flows also have an effect on efficiency and redistribution (see Borjas, 2003). Based on this predictions, in this paper, we try to understand if such institutions have a role in shaping the patterns of migration flows. As long as firing restrictions, unemployment benefits, minimum wages and unions do have an effect on labour markets both in terms on quantities (employment/unemployment) and prices (wages), then they will have an effect on decision of migrants, as these institutions are going to change the relative benefits and costs of migrations. Moreover, they could interact with migration policies. In fact, influencing the size and the composition of migration flows, migration policies will have a direct effect in the labour market in terms of prices and quantities.

[1] See Patel and Vella (2012) for empirical evidence for the US. See also Pedersen et al (2008) and Beine et al (2011) for analyses of network effects and migrations.

The paper is related to different strands of literature. Firstly, it is related to the literature on migration flows and immigration policies.[2] Mayda (2010) studies the determinants of bilateral immigration flows focusing on supply and demand factors: in particular, she investigates the effect of economic, geographic, cultural and demographic factors using data on immigrant inflows for 14 OECD countries by country of origin between 1980 and 1995. She explicitly stresses the role of immigration policies as demand factor in shaping migration flows. The paper by Ortega and Peri (2012) extends the framework in Mayda (2010) by explicitly using an empirical model of utility-maximising migration choices allowing for unobserved individual heterogeneity between migrants and non-migrants. They focus in particular on the elasticity of flows with respect to income in destination country and on the tightness and timing of migration policies. However, neither paper analyses the role of labour market institutions on bilateral migration flows.

Our paper is also associated to the literature on the so called welfare migration hypothesis (see Giulietti and Wahba (2012) for a review and Boeri et al (2002) for a comprehensive picture of the issue). De Giorgi and Pellizzari (2009) study how the generosity of welfare, proxied by the net replacement rate of benefits over wages, affects the location decisions of migrants in 15 EU countries. Using unemployment benefits as a proxy for welfare generosity, Giulietti et al (2011) explicitly study the correlation between immigration inflows and unemployment benefit spending as a fraction of the gross domestic product for a sample of European countries. They also separate flows from EU and non-EU origins to take into account possible different eligibility criteria and different restrictions to labour mobility of these two groups of workers.[3] Finally, two very recent papers by D'Amuri and Peri (2011) and Sà (2011) analyse the relation between labour market institutions and immigration. The former analyses how immigration affects the specialization pattern of employment and jobs in countries with different degrees of flexibility in hiring and firing regulations. The latter studies the differential impact of EPL on natives and immigrants, and finds that stricter EPL is found to reduce employment and reduce hiring and firing rates for natives. By contrast, stricter EPL has a much smaller effect on immigrants. Finally, Angrist and Kugler (2003) consider the employment effect of immigration focusing in particular on institutional characteristics. In fact, one aim of labour institutions is that of protecting native workers against competition from immigrants, but they show that although such institutions reduce job loss in the short run they can have perverse effects on native employment in the long run.

[2] Many papers look at the determinants of migration decisions in one single country without focusing on variation in migration policies. See, among others, Clark et al. (2007) for the US and Hatton (2005) for the UK.
[3] Giulietti (2012) provides evidence that the minimum wage influences the location choices of low-skilled immigrants in the US.

Finally, our paper is related to the vast literature on labour market institutions and their interaction.[4] In fact, the study of the effect of labour market institutions on labour market outcomes as unemployment, worker turnover and wages is now well established. The theme is central both in the academic literature (see, among others, Boeri (2011), Blanchard and Wolfers (2000) and Bertola and Rogerson (1997)) and in the policy agenda (see OECD (1994, 1999)).[5] Using cross country data, Layard and Nickell (1999), and Belot and van Ours (2004) provide abundant evidence on the interaction of labour institutions and their effect of labour market outcomes, but neither of them analyses the effect of such interactions on immigration flows.

We contribute to the literature in two main directions. First, we provide a cross country analysis of the effects of labour market institutions on bilateral migration flows. In particular, we focus on the joint effect of employment protection legislation, union coverage, minimum wage and unemployment benefits and emphasize the interaction of such institutions with migration policies. Second we consider the effect of institutions on flows distinguishing by country of origin: this allows us to shed some light on the importance of the European Neighborhood Policy (ENP) and to discuss the effect of labour immigrations depending on the origin of immigrants and their skills.[6] Moreover, our empirical approach is based on a gravity model that takes into account the panel dimension of the data and allows us to overcome some econometric problems present in the previous literature.

We use data on bilateral migration flows for a set of 9 EU countries during the period 1990-2005 originally used by Ortega and Peri (2012) and derived from EU labour force data. As expected, we find that stricter migration policies have a negative effect on migration flows while GDP per capita of destination countries has a large and statistically significant positive effect on migration flows. Instead, we do not find a statistically significant effect for GDP in origin countries. We also find that employment protection and minimum wages have a positive effect on migration flows while higher union power (proxied by coverage of bargaining agreements) and coverage of unemployment benefits have positive but less relevant effects on flows. Moreover, we find that the positive effect of labour institutions on migration flows is higher in countries in which tightness of migration policies is lower. Finally, we find some interesting differences when we split the sample

[4] While surveying the relevant literature in this field is outside the scope of this paper, we refer to Boeri and van Ours (2008) for an exhaustive discussion and further references.
[5] What is more, in recent years, a growing literature has focused on the effect of such institutions on economic performance and the formation of patterns of comparative advantage (see Saint Paul (2002), Bassanini et al (2009) and Conti and Sulis (2010)).
[6] The ENP is a bilateral policy agreement between the EU and 16 countries from Easter Europe and North Africa, with the objective to create a zone of stability, security, political association, deeper economic integration, increased mobility and more people-to-people contacts. The set of countries in the ENP is composed by Morocco, Algeria, Tunisia, Libya, Egypt, Jordan, Lebanon, Syria, Israel, Palestinian Authority, Moldova, Ukraine, Belarus, Georgia, Armenia, Azerbaijan. In our analysis we distinguish between the first five countries in this list (North Africa) and the rest.

according to the country of origin of migrants: the positive effect of GDP of destination on flows is much stronger for EU immigrants, while the negative effect of GDP of origin country is stronger for countries in the ENP group. We also find that migration policies have a statistically significant effect on flows only through EPL for EU and ENP migrants. In particular, if we decompose ENP immigrants from North African countries and the rest (East European and Middle East countries), we note a strong negative effect of GDP of origin for the former group, while we obtain a no significant result for North African countries.

The rest of the paper is organized as follows. In section 2 we discuss the possible theoretical mechanism at work and identify the channels through which each institution can affect migration flows. In section 3 we present the data and discuss the methodology, while section 4 is dedicated to the presentation of results and robustness checks. Finally, we conclude in section 5.

2. THEORETICAL CONSIDERATIONS

In this section, we discuss the effects of labour market institutions and immigration policies on employment, wages and migration flows. The treatment heavily draws on Boeri and van Ours (2008); thus following their contribution, we separately discuss the expected effect of each institution in the labour market, then we provide some theoretical intuitions to understand the possible interaction between such institutions and between labour institutions and immigration policy. It is important to stress from the onset that in what follows we do not provide a comprehensive specification of a theoretical model of optimal migration decisions, but simply a series of insights and considerations used to interpret results obtained in the empirical application.

We begin our analysis by considering the effect of employment protection legislation (EPL henceforth). EPL comprises a set of interventions defined to regulate hiring and firing of workers. The main effect of EPL is that of increasing the costs of adjustment of the workforce when there are shocks in the labour market. By introducing costs in forms of taxes and transfers to be paid to workers in case of firing. EPL could have the effect of reducing employment as firms will decide the choose a stable employment path with resulting negative effects on profits. Such losses are due to the emergence of a wedge between wages and productivity (see Boeri and van Ours, 2008). In general, the main effect of EPL will be on flows. On the one hand, EPL will reduce firing as it imposes additional costs on firms; on the other hand, it will also reduce hiring as the expected costs of firing a worker when a negative shock occurs will be higher. As long as both hiring and firing are influenced by EPL, the effect on employment and unemployment will be ambiguous.

As long as EPL acts on the labour supply, there will be a wedge between the reservation wages of workers and labour supply, hence firms will pay workers less than the cost of labour. Based on the above considerations, migrants can have different preferences towards more or less regulated labour markets: higher EPL generates longer job durations but also lower probability of getting a job in case of job loss. Hence there is no clear prediction on the effect of EPL on migration flows.[7]

While EPL mostly influences quantities, other labour institutions influence prices. In fact, minimum wages, unemployment benefits and trade unions directly generate a direct wedge between the reservation wage of workers and their marginal productivity. The second labour market institutions we focus on is the coverage of unemployment benefits (UBs henceforth). The main scope of such institution is to protect individuals against labour market risk and it is often used as a measure of the generosity of the welfare state (see Layard, Nickell and Jackman (1991)).[8] Contrary to EPL, which is explicitly designed to protect employment, UBs sustain income when a worker doesn't have a job. Unemployment benefits have direct effects on reservation wages (by increasing the outside option of workers in bargaining), hence workers will command higher wages and consequently employment will be lower. Moreover, UBs make workers more choosy and reduce their search intensity, resulting in an increase in the average duration of unemployment spells. As long as unemployment benefits are conditional on active job search, they will induce more participation in the labour market. Moreover, higher benefits will increase taxation, which is needed to finance them. Finally, a positive effect of UBs is that of fostering human capital and increasing the quality of matches, with positive effects on growth (Boeri and van Ours (2008) discuss,).

To sum up, there will be both positive and negative effects of UBs. On the one hand, migrants will expect higher wages and good income support in case of job loss; on the other hand, they may expect higher average duration of unemployment and higher taxes. Moreover, when analyzing the likely effects of benefits coverage on immigration flows it is important to take into account both eligibility for benefits (based on employment history) and entitlement (relative to the duration of unemployment). In fact, usually transfers are proportional to the last earned wage. The standard

[7] In following sections, we will discuss in detail as EPL is expected to interact with other labour market institutions and migration policies.

[8] There are other measures of the generosity of the welfare system, as for example the replacement rate (the ratio that describes the monthly retirement benefit divided by the monthly labour earnings in the year prior to retirement), which is a measure of the generosity of the retirement system and describes the level of retirements referring to wages. Another measure is the duration of benefits for unemployed people. This measure can have different consequences in relation to other instruments give to unemployed people.

prediction, although weakly confirmed in the data, is that higher welfare will induce higher migration flows.

The national minimum wage (MW) is the third labour market institution we discuss (see Dolado et al (1996) for the effects of the minimum wage in different EU countries). The minimum wage mostly affects the bottom part of the wage distribution, while the employment effects of the minimum wage strongly differ according to the theoretical framework used for the analysis. While the competitive model predicts that higher minimum wage will have a negative effect on employment, the monopsony model predicts possible positive employment effects. In fact, in the latter case, there is a non-monotonic relationship between the minimum wage and employment: for sufficiently low levels of the minimum wage, an increase in the minimum wage is accompanied by an increase in employment, while above some threshold the traditional negative relationship holds (see Boeri and van Ours, 2008). In fact, in a market characterised by matching frictions, a higher minimum wage will increase the search effort of unemployed, and thus increases participation. On the other hand, there will be a negative labour demand effect, as the rents obtained by firms upon filling a vacancy will be lower. Still, the pool of unemployed will be higher and the higher will be the probability of filling the vacancy. As long as the second effects dominates, employment will be higher, even if more competition for jobs reduces the individual probability of finding a job.

Moreover, ad Boeri and van Ours (2008) discuss, in countries in which the informal sector is very important and in which there is a dual labour market, minimum wages may not have negative effects on employment. In fact, if there is high mobility across sectors, and the minimum wage is not binding in the informal sector, the MW will shift jobs from the formal to the informal sector, increasing the difference between formal and informal wages. This adjustment mechanism prevents employment losses.[9]

Based on the considerations above it is most likely that the minimum wage will have a positive effect on migration flows, as it will increase both wages (especially in the bottom part of the distribution) and possibly employment. Finally it could also have important spillover effects in the informal sector.

[9] Note also that a few studies surprisingly found an increase in wages also in the informal sector after a minimum wage hike. The interpretation is that fair remuneration considerations are relevant, it is possible that changes in the minimum wage in the formal (and covered) sector lead to corresponding increases in the average wage of the informal sector (Boeri and van Ours, 2008).

The last labour institution we discuss is related to the role of trade unions. As a measure of union power we use the coverage of union bargaining agreements, that is more appropriate than union density (see Booth (1995) for an exhaustive analysis of union behavior).[10] The first order prediction of models of union behavior is that the stronger the bargaining power of unions, the higher the wedge imposed by unions over the reservation wage and the lower the resulting employment level. Moreover, the effect of unions will be higher the lower the elasticity of labour demand. As this elasticity is increasing with the degree of competition in product markets, stronger competition in product markets reduces the wedge between labour supply and demand introduced by labour market institutions. In order to better understand the effect of unions in labour markets, two important points have to be made. First, when there is efficient contracting we do not necessarily observe lower employment. Second, not only membership affects the objectives of unions, but also the wage platforms of unions affect membership (Boeri and van Ours, 2008). This is because, unlike minimum wages, unions act over the entire wage distribution, interfering with the way in which markets reward differences in productivity across workers. As long as unions tend to pursue egalitarian wage policies, they reduce wage differentials by education and skill level. This explains why unions are generally not very successful in recruiting highly skilled workers.

Again, the effect of union power on migration flows is ambiguous, on the one hand unions increase wages (particularly in some sectors), with possible negative employment effects. On the other hand, migrants can be attracted by higher wages. Moreover, unions could have a negative effect on migration flows of more skilled individuals in particular.

Migration policies have the immediate effect of reducing labour supply, shifting the supply curve to the left. As long as migrants have lower reservation wages, this implies that the new equilibrium will have higher wages and lower employment, exactly as the effect of institutions that act on prices (see Boeri and van Ours (2008)). Hence migration policy interacts with minimum wages, unions and unemployment benefits. Moreover, migration decisions depend on the relative skill level of the workforce in origin and destination countries. As long as migration policies are redistributive policies, influencing wage inequality, they protect less skilled native workers from competition of migrants. Moreover, as Angrist and Kugler (2003) show, institutions as EPL reduce job loss in the short run, thus interacting with migration policies.

[10] Note we don't focus on the problems related to the centralization and coordination of wage bargaining, basically assuming they are strictly related to union power, as we don't discuss the effect of unions on this substitutability of capital and labour.

As Boeri and van Ours (2008) suggest, EPL and UBs transfer resources from employers to employees, while minimum wages and unions reduce the total surplus and redistribute it to workers. On the other hand, labour institutions also remedy labour market imperfections as monoposonistic power of firms. Migration policy do have a similar effect, because insulate native workers from competition of foreign workers, thus shifting labour supply and influencing equilibrium employment and wages. Thus it is fundamental to jointly study such policies.

3. DATA AND METHODOLOGY

3.1. Data and descriptive evidence

We use an unbalanced panel dataset on bilateral migration flows between 225 origin countries all over the world and 9 European destination countries originally available for the period 1946 to 2008. We restrict our analysis to the period 1990-2005 as data on migration policies before 1990 are not available, and the quality of data after 2005 is not reliable and it is available for a very small set of countries. Tables 1 and 2 provide the list of 9 European countries used in the analysis and detailed information on available data and descriptive statistics on bilateral migration flows, migration policies and labour institutions. Data on bilateral migration flows come from Ortega and Peri (2012) and are originally derived from the European Labour Force Survey database.[11] As Tables 1 and 2 show, available data for Austria and Finland comprise very few observations, data for France are from 1998 onwards, while Italy has available data up to 2000. On the other hand, a complete set of data on migration policies from the Fondazione Rodolfo De Benedetti (FRdB) is available for the period 1990-2005. Data on labour market institutions are available from different sources for a much larger time period.

The index for strictness of migration policy varies between 0 and 6 and it is obtained as a weighted sum of indexes that describe different aspects of the strictness of migration policies in the EU. [12] We refer to Figure 2 for more details about the trend, while we refer to Tables 1 and 2 and other sections for more details about the distribution of the migration index.

[11] Ortega and Peri (2012) provide other data on migration flows based on other sources. In particular, they refer to Mayda (2010), International Migration Database (2007), and United Nations (2008). The definition of immigrant is consistent across all databases as they all use as primary sources the original data released by the statistical offices of each receiving country.

[12] It's an overall summary indicator for each country, averaging the values of the six sub-indexes (admission requirements; length of first stay; residence requirements; years to residence; administration involved; existence of a quota system).

Figures 1 and 2 report time series for immigration flows and immigration policies by country of destination. We observe that the trend of immigration differs across countries: with the relevant exception of Spain, and at a less extent the UK, most countries experience an overall stability in the migration flows. Countries as Italy and the Netherlands show a large drop in the migration flows in the mid and end of the nineties respectively. Data reported in Figure 2 on the dynamics of immigration policies shows that most countries have a stable path with no particular trend but possibly two exceptions: the strong reduction in the index for Italy at the end of the nineties (probably the effect of the Balkan wars), and an increasing trend for the UK. Finally note that if we jointly consider Figures 1 and 2, for example, we can note that the increase in flows in Spain it is partially related to a reduction of policies strictness in previous years, while it's exactly the opposite for the Netherlands. We have a similar result for Italy, where variations in the strictness of migration policies influence migration flows.

As previously mentioned, labour market data comes from different sources. The first source of data is the "Fondazione Rodolfo De Benedetti" that provides information about labour market institutions (see Aleksynska and Schindler (2011)). The data is obtained thanks to collaboration with the IMF, and it is available for the period 1980-2005, for 91 countries and includes data on minimum wages, coverage of unemployment benefits and employment protection legislation. We have integrated these data for EPL with information from the OECD (see more below). The latter database provides several variables and indexes of employment protection legislation over the period 1985 – 2009 for 40 countries.

We use four different variables for labour market institutions. The first one is Employment Protection Legislation (EPL) and it is derived from the OECD. The EPL index measures how relevant are hiring and firing along different dimensions. We use two different versions of the OECD index, the former is an overall index of EPL while the second is a weighted average of employment protection that takes into account differences between permanent, temporary contracts and collective dismissals (EPL_2). We use three other variables for labour market institutions. The first is a measure of unemployment benefits coverage, that is the percentage of unemployed workers covered by unemployment benefits and it is derived from the FRdB. Data for unions and the presence of the minimum wage are from Visser (2011). The former is the share of workers covered by collective bargaining agreements over total employment, while the second is a dummy for the minimum wage, and zero otherwise.

The third main source of data we use is from CEPII that makes available a "square" gravity dataset for all world pairs of countries, for the period 1948 to 2006. The main variables relating to trade

costs come from the CEPII distance datasets are: GDPs and populations, bilateral weighted distance, common (official) language, previous colonial relationships post 1945 and common border.

We merge these different sources of data and obtain a complete database for the period 1990 – 2005 counting 9 destination countries and 225 countries of origin for 12339 observations. The dataset has information on migration flows, migration policies, employment protection legislation, unemployment benefits, minimum wages, unions, GDP per capita and variables used in the gravity equation.

3.2. Methodology

We estimate the potential relation between migration policies, labour market institutions and bilateral migration flows using a gravity model (see Anderson and van Wincoop, 2003). Our baseline specification is:

$$\begin{aligned}\ln flows_{d,o,t} &= \alpha + \beta \ln gdp_{d,t-1} + \gamma \ln gdp_{o,t-1} + \delta ov\_index_{d,t} + labmktinst_{d,t} + \\ &+ year\_dummies + destination\_dummies + origin\_dummies + \\ &+ language + colony + contiguity + \varepsilon_{d,o,t}\end{aligned} \quad [1]$$

where d denotes destination country, o is the origin country and t denotes time. The variables gdp denote GDP per capita and are expressed in logs, lagged 1 year; we use 4 different labour market institutions, as described in previous section; ov_index is the migration policy index. Language, colony and contiguity are dummy variables equal to 1 if the condition is met and zero otherwise (see subsection above). The dependent variable is the natural logarithm of bilateral migration flows, where we imputed 1 when zero flows were available. All specifications control for destination and origin country dummies and time specific effects.

We use fixed effects panel data estimators with standard errors clustered at the pair (destination and origin) country level to take into account heteroskedasticity and allow for correlation over time of country pair observations. We also performed our estimations using a random effect estimator. However, the Hausman test comparing results from random and fixed effects estimators confirms that the fixed effect estimator is more efficient and gives consistent estimates for the

effects of interest. In fact, unobserved country specific effects could result in biased estimates for our variables of interest, hence the fixed effect estimator accounts for such unobserved specific effects which are time-invariant. We also include year effects, to control for common time shocks. As we will explain in detail below, our model specifications allow for interaction terms between labour market institutions and migration policies.

One possible important objection to our econometric specification is the possibility of endogeneity, and more precisely of reverse causality, for migration policies and bilateral migration flows. The issue is discussed in detail by Mayda (2010) and the treatment below follows her intuition. In fact, the more tight is the migration policy, the lower are migration flows, but the high value of the index could depend on previous year migration flows. To control for this problem, we relate current migration flows to lagged values of GDP of origin and destination countries. We don't use lagged values for migration policies index because it is plausible to assume that migration policies are predetermined, and so current migration flows can only influence future migration policies. Current flows can't influence current migration policies because adjustment in migration policies requires a time lag to be completed. In other words, current flows can't determine current policies, that depend on previous years migration flows, while current flows depend only on current migration policies and not on previous years policies.

According to the theoretical intuitions discussed above, we expect to find different effects for pull and push factors, as positive and negative attractors of migration flows. We expect to find a positive and significant role for GDP per capita of destination country, and a negative one for GDP of origin. On the other hand, we expect a negative coefficient for distance as it is more difficult to acquire information from countries that are far away. We include also common language, contiguity and colonial links. We expect positive effects for common language and previous colonial relations if people prefer to migrate to countries with common characteristics, institutions and stronger political ties between the two countries. About contiguity we can expect negative effects if people want to discover new areas and opportunities and prefer to migrate quite far from their origin home.

4. RESULTS

4.1. Results

In Table 3 we start by looking at basic results of our empirical specification. Our dependent variable is the natural logarithm of migration flows, while on the RHS we include a set of controls

for traditional gravity models (distance, common language, colonial origin and contiguity) and our main variables of interest, namely (lagged) GDP per capita of destination and origin countries, labour market institutions and migration policies. All regressions include destination and origin country fixed effects and time dummies. Standard errors are clustered at the country pair level.

In column 1, we start with a benchmark specification of equation (1), in which we control for basic variables mentioned above.[13] Our results indicate that the GDP per capita of the destination country positively affects migration flows: the estimated elasticity is equal to 1.7 indicating that 1% increase in GDP per capita at destination is associated to a 1.7% increase in migration flows.[14] As the theory predicts, the GDP per capita of the country of origin has a negative effect on migration flows, although in our case the effect is not statistically significant. Finally, note that coefficients for income per capita are quite stable across different specifications.

In column 2 of Table 3, following Mayda (2010) and Ortega and Peri (2012), we include among our regressors a measure of strictness of migration policy. Unsurprisingly, the coefficient is negative indicating that countries that have more tight migration policies experience a reduction in migration flows. The magnitude of the effect is substantial, an increase by 1 unit in the migration index reduces flows by about 84%. To give an idea of the size of this effect, we should take into account that the standard deviation of the index is equal to about 0.52, and the difference between the 75^{th} and 25^{th} percentile of the index distribution is equal to 0.44.

In column 3 we temporarily drop the index for strictness of migration polices and we include variables for labour market institutions. Interestingly, such variables have a positive and statistically significant effect on migration flows. Results indicate that one unit increase in the EPL index raises flows by about 28%, a positive (but smaller) effect is obtained for changes in union power (proxied by coverage of union bargaining agreements over employment) and extension of unemployment benefits, while we do not find any significant effect of the presence of a minimum wage.

In column 4 we reintroduce the index for the strictness of migration policy in the analysis. Interestingly, we observe some important changes with respect to results obtained in columns 2

[13] Time invariant coefficients are dropped as we are using a fixed effects estimator. As mentioned in previous section, we also run our regression using a random effect estimator that allows us to identify the effect of such variables and results are basically unchanged. We find that migration flows are strongly negatively related to distance and to contiguity, while they are positively correlated to previous colonial relationship and common language.

[14] Existing works confirm the robustness of gravity specification, as well as the role of GDP for destination countries. In particular, Mayda (2010) and Ortega and Peri (2012) obtain similar results. So, generally speaking, our results are in line with existing works.

and 3. First of all, we observe a persistent and negative effect of stricter migration policies on flows, now the estimated effect of an increase in one unit of the index is equal to about 91% decrease in terms of flows of migrants. The coefficient on EPL increases to from 0.278 to 0.395 and it is statistically significant, indicating there is a negative correlation between EPL and the migration index, this suggests that countries with more rigid labour markets tend to adopt less stringent migration policies. While we will return on these possible interaction in the rest of the paper, there are some other results in column 4 that need to be discussed. First, note that after controlling for migration policies, the presence of the minimum wage has a positive effect on migration flows, while greater availability of unemployment benefits turns out to be not significant in explaining flows.

Finally, in column 5 we run the same regression as in the previous column but just changing the index of EPL. In this case, we use an index that is constructed as a weighted average for different types of contracts, and that should take into account the increasing weight of temporary contracts in some countries, hence the ranking of countries derived using this index can differ from the previous one[15]. The reduced number of observations is related to the fact that the index if available from 1998 onwards. Interestingly, we observe that coverage of unemployment benefits has a larger effect on migration flows, as predicted by the welfare magnet hypothesis (see De Giorgi and Pellizzari, 2009 and Giulietti et al, 2011) and contrary to what we found in the previous columns. Moreover, EPL confirms its role of a pull factor, with a coefficient that is almost doubled. On the other hand, the strictness of migration policy has a much less severe effect on flows, indicating that there is an important degree of interaction between labour market institutions and between the latter institutions and immigration policies.

In order to better explore the interaction between labour market institutions, in Table 4 we conduct a sensitivity analysis dropping such variables one at the time. For ease of comparison, in column 1 we report the same results we reported in column 4 of Table 3. First note that the effect of migration policies is constantly negative and significant, with an effect on migration flows between -0.82 and -0.97. In column 2 we drop the indicator for EPL, we observe a small increase in the effect of union coverage and in the minimum wage, that suggests that EPL and those two variables are positively correlated. Note also that the effect on the coefficient of unemployment benefits coverage, although not significant, becomes positive, suggesting that there is some degree of substitutability between EPL and UBs. In fact, it is not very surprising that when dropping UBs in column 3, the coefficient on EPL goes back to its previous level. Notice also that the effects of

[15] As Dolado et al. (2012) show, when EPL is very strict, firms tend to use more temporary contracts.

union coverage and minimum wage are smaller than before, indicating again some possible interaction between labour market institutions. Finally, in columns 4 and 5 we drop the minimum wage and union coverage respectively, and we don't observe any particular effect, but possibly a slight increase in the effect of EPL on migration flows.

Previous results confirmed that there are possible interactions between labour institutions and migration policies, however, our econometric specification didn't take such interaction explicitly into account. In Table 5 we report regressions in which we interact migration policies with labour institutions, and analyse such effects one at the time. In column 1 we start by interacting migration policy with an indicator of EPL. Now, the coefficient on EPL measures the effect of firing restrictions on migration flows when the index of migration policies is set at zero, and thus it is not particularly interesting for the purposes of our paper (similarly the effect of migration policies turns positive and significant when EPL is zero). On the other hand, the estimated interaction term is negative and statistically significant. This suggests that the effect of EPL could reverse its sign for very high values of the migration index: our estimates imply that the effect of EPL on flows turns negative when the migration index is at 3.64, that corresponds the 99th percentile of the index distribution. For lower values of the migration index, the effect of EPL remains positive. However, it is interesting to compare the effect of EPL at various percentiles of the distribution. For instance, the effect of a reduction on EPL (say of one standard deviation), is quite different in a country at the 75th percentile of the distribution of the migration index (equal to 3.00) and a country at the 25th percentile (with an index equal to 2.36). In fact, such reduction decreases migration flows by about 23% in the country with less strict migration policies compared to a reduction of 14% in the country with more strict migration policies.

In column 2 we analyse the effect of interacting migration policies with coverage of unemployment benefits but we don't find any significant effect, but the negative effect of migration polices when there is no coverage of unemployment benefits. In the remaining columns, we interact migration policies with the presence of a minimum wage and the indicator of union power. While the interaction term for union power is not statistically significant, again we find a negative effect for the interaction term between minimum wage and migration policy. This suggests that the positive effect of the presence of the minimum wage can be partially balanced by an increase in the degree of migration regulation.

4.2. Discussion and interpretation

In this subsection, we provide a more exhaustive interpretation of the results discussed above. While it is important to stress that our aim here is not that of providing a fully specified model of migration decisions, we believe that the correlations proposed in the paper can help to give a better understanding of the patterns of migration flows. In particular, as stressed in the previous part of the paper, our interpretation hypothesis is that migration decisions of individuals are also driven by some knowledge of the characteristics of the labour market and by the interaction of such characteristics (labour institutions in particular) with migration policies. Moreover, the evidence that immigrants come in waves and tend to cluster in areas and occupations in which most of workers are from the same country (or even the same region), suggests that information on destination countries' characteristics is key to understand migration decisions.[16]

In our results, we have seen that EPL interacts with UBs, this is not big surprise as both institutions are thought to protect workers against labour market risk: while the former protects workers from demand shocks and possible firings, the latter has the objective of protecting workers after separation. Hence both institutions will have important effects on flows in the labour market that are perceived by both native and immigrant workers. Consider for example the case of a potential immigrant that has to decide to move to a country with very high EPL and lower coverage of unemployment benefits or to a country with low EPL and extended coverage of unemployment benefits. The choice will depend on the probability that the immigrant will assign to find a job in the country of destination. If unemployment is the most likely outcome, the immigrant will prefer high benefits and lower EPL (thus higher turnover), and viceversa in case of high possibilities of finding a job. However, as our analysis showed, although countries will offer different combinations of EPL and UBs, the stronger positive effect of EPL suggests that migrants prefer higher employment protection than higher unemployment benefits.

On the other hand, EPL interacts with unions. In fact, as long as unions affect wages, they reduce wage dispersion and decrease downward wage adjustment, generating persistent differentials across sectors of the economy. This will result in adjustment only via employment, thus generating high turnover. On the other hand, if firing restrictions are very strict, the only adjustment mechanism would be through wages, thus excluding the role of unions. In other words, EPL and unions are complementary institutions: if EPL is high, this will give more power to unions, this will be reflected in higher bargaining power, higher wages, but lower employment. Thus EPL influences employment through the effect on unions (see Boeri and van Ours, 2008).

[16] As in other parts of the paper, most of the theoretical insights we discuss here are put forth by Boeri and van Ours (2008).

We also showed that minimum wages do attract immigrants. On the one hand, they directly interact with EPL, as both institutions are thought as ways of protecting workers at the bottom end of the wage distribution. Thus we expect some partial substitutability between the two. Minimum wages interact with UBs as both are going to influence the size of the market inducing higher participation of workers (via higher job search) and influencing the bottom part of the wage distribution. Finally MWs are supposed to interact with unions, as in some countries unions are directly involved in setting the minimum wage. We can have, in fact, several forms of minimum wage. A national level MW, defined by the government, perhaps after consultations with trade unions and employers' associations; a national MW coming from the bargaining agreements and extended to all workers and an industry-level MW defined by industrial bargaining and extended to all workers in that industry.

Finally, immigration policies interact with all institutions as they have direct effect on labour supply. As Angrist and Kugler (1993) discuss, labour market institutions as EPL that should protect workers against competition from immigrants, turn out to be counter-productive when long run adjustment will be complete. In fact, immigration has a general negative effect on native employment, that is stronger in less flexible markets. This way, labour institutions can play a protective role for natives, but they could aggravate the negative impact of immigration on equilibrium native employment.

4.3. The role of European Neighborhood Policy (ENP)

The ENP is a bilateral policy agreement between the EU and 16 countries from East Europe, Middle East and North Africa, with the objective to create a zone of stability, security, political association, deeper economic integration, increased mobility and more people-to-people contacts.[17] We expect that migrants from these ENP countries are influenced by migration policies as well as by labour market institutions in a different way than other migrants. We also expect differences between different set of countries within the ENP agreement. On the one hand, North African migrants can have easier access to European markets given previous relationships (colonial, for example) that these countries had with destination countries. Migrants from North Africa may prefer to move to destinations where they can find same or similar language, traditions and practices. On the other hand East European and Middle East countries are relatively more

[17] North Africa includes Morocco, Algeria, Tunisia, Libya, Egypt. The rest inlcludes both countries from the Middle East as Jordan, Lebanon, Syria, Israel, Palestinian Authority, and from the East Europe as Moldova, Ukraine, Belarus, Georgia, Armenia, Azerbaijan.

similar in terms of production structure and other structural characteristics. Moreover, we expect some differences in terms of skills of migrants from the two groups.

In Table 6, we try to shed some light on the above issues by estimating previous gravity equations on different set of countries. In column (1), we run our regressions using data for migrants from EU countries (considering EU 27). We use the same specification as in column (1) of Table 5, where we include the standard set of regressors and we interact migration policies with an indicator of EPL.[18] Again, the estimated interaction coefficient is negative and statistically significant. The effect of EPL could reverse its sign for high values of the migration index. However, the effect of migration policies turns out to be statistically not significant when it is not interacted with EPL. In other words, at least for the set of migrants from the EU, migration policies do not have an independent effect. In regressions not reported we also experimented some specifications without using the interaction term. Results indicate that stricter migration policies have stronger negative effects for migrants from the EU countries, while the effect is reduced for non EU origin countries. On the other hand, the baseline effect of EPL is overall constant across different specifications. Interestingly, the effect of GDP per capita in destination countries is much higher in column (1) than in column (2), suggesting that the potential attractiveness of GDP is relatively more important for workers with quite similar characteristics as those that belong to the EU area. The estimated elasticity is equal to 2.4 against 1.1. Again, previous results confirm that migration policies and labour institutions (EPL in this particular case) have an important degree of interaction.

In columns (3) and (4) we replicate the exercise dividing the sample in two groups of origin countries: the set of 16 European Neighborhood Policy countries and the rest. Note first that the effect of GDP per capita of destination country in column (3) is (quite surprisingly) strongly reduced with respect to results obtained in columns (1) and (2), with a coefficient equal to 0.77. On the other hand, the backwardness of origin country returns a negative coefficient and it is statistically significant (-0.77), suggesting that within the group of ENP countries, differences in income per capita in origin countries are quite important in explaining migration decisions. Again in column (3), migration policies do not have an independent effect on migration flows. Not surprisingly, results in column (4) for the rest of the countries outside the ENP group confirm previous findings.

Above results indicate that the effect of labour market institutions and migration policies differs depending on the set of countries of origin we are considering. However, even among migrants

[18] We also run the same regressions for other labour market institutions. Results are available upon request from the authors.

from ENP countries, there could be sizeable differences due to different skill contents of migrants from the two areas. In fact, using data from Ortega and Peri (2012), we see that about 33% of migrants from the East of Europe and Middle East are skilled ones, while this percentage drops to 23% for migrants from North Africa. To test this conjecture, we run separate regressions for immigrants from different areas among those from ENP countries. Results are reported in Table 7. It is important to remind from the onset that these regressions are based on a very small number of observations, at least when compared to our previous results. In the first two columns we run separate regressions in which we use our baseline specification but the interaction term between migration policies and EPL. Note that the attractive potential of GDP of the destination country is much stronger for immigrants from the East with a coefficient equal to 1.16 against 0.9 for immigrants from the North of Africa. What is more the negative effect of GDP of origin countries is statistically negative and significant only for the former group of immigrants, suggesting that migrants from East decide to migrate when their chances in origin countries are very low, while this is not true for migrants from North Africa.

Regressions reported in columns (1) and (2) of the Table also suggest important differences between the two groups of immigrants concerning the effect of migration policies and labour institutions. In fact, the negative effect of migration policies on flows is much stronger for migrants from the East, while it is statistically significant but reduced in size for migrants from the North of Africa. Similarly, the potentially attractive role of employment protection is higher for the former group of migrants, with a coefficient equal to 0.73 against 0.45.

Finally, in columns (3) and (4), we run separate regressions for the two set of countries including the interaction term between EPL and migration policies. Results turn out to be quite interesting and somewhat puzzling. On the one hand, the GDP of destination countries completely loses significance in explaining migration flows for both set of countries, while GDP of origin matters only for East migrants. Finally note that for both sets of countries, migration policies influence migration flows when interacted with EPL.

5. CONCLUSIONS

In this paper we analyse the relation between the strictness of migration policies, the pervasiveness of labour institutions and bilateral migration flows. In particular, we identify possible theoretical mechanisms that could drive the mobility choices of migrants and analyse different aspects of labour institutions trying to disentangle their relative effect and their potential interactions on immigration flows. We also shed some light on the role of the effectiveness of the

European Neighborhood Policy in attracting different types of immigrants depending on their skills and country of origin.

In particular we test our theoretical predictions by evaluating the quantitative effect of employment protection legislation, coverage of union bargaining agreements, the generosity of unemployment benefits and the presence of the minimum wage on bilateral migration flows in a set of European countries during the period 1990-2005. We find that employment protection and minimum wages have a positive effect on migration flows while higher union power (proxied by coverage of bargaining agreements) and coverage of unemployment benefits have less relevant effects on flows. We also find that the effect of labour institutions is higher in countries in which tightness of migration policies is lower. Finally, the negative effect of migration policies on flows is much stronger for migrants from the East of Europe and the Middle East, while it is statistically significant but reduced in size for migrants from the North of Africa. Similarly, the potentially attractive role of employment protection is higher for the former group of migrants.

While we do not provide fully specified model of migration decisions, we believe that the correlations proposed in the paper can help to give a better understanding of the patterns of migration flows. In particular, our interpretation hypothesis is that migration decisions of individuals are also driven by some knowledge of the characteristics of the labour market and by the interaction of such characteristics (labour institutions in particular) with migration policies. Moreover, the evidence that immigrants come in waves and tend to cluster in areas and occupations in which most of workers are from the same country (or even the same region), suggests that information on destination countries' characteristics is key to understand migration decisions.

Our paper has important policy implications and leaves new avenues open for further research. The first implication, already stressed in the literature, and confirmed by our analysis, is that labour market institutions show an important degree of complementarity/substitutability among them. The second important policy implication is that labour market institutions interact with migration policies. Finally, the last policy implication is that ENP has important effects on the type of flows of immigrants from different countries, and countries should coordinate their migration policies and design them in order to attract more skilled migrants. The latter point constitutes the first avenue for future research, while the second is to investigate the role played by product market regulation and by the shadow economy for immigration flows.

REFERENCES

Aleksynska M Schindler M (2011) Labour Market Regulation in Low-, Middle- and High-Income Countries: A New Panel Database, *IMF working paper 11/154*

Anderson JE van Wincoop E (2003) Gravity with gravitas: a solution to the border puzzle, *American Economic Review 93:170–192*

Angrist JD Kugler M (2003) Protective or counter-productive? Labour market institutions and the effect of immigration on EU natives, *The Economic Journal 113:F302–F331*

Bassanini A Nunziata L Venn D (2009) Job protection legislation and productivity growth in OECD countries, *Economic Policy 24:349-402*

Beine M Docquier F Ozden C (2011) Dissecting Network Externalities in International Migration, *Discussion Papers 2011-22 (IRES - Institute de Recherches Economiques et Sociales)*

Belot M van Ours J (2004) Does the Recent Success of Some OECD Countries in Lowering their Unemployment Rates Lie in the Clever Design of their Labour Market Reform? *Oxford Economic Papers 56: 621-642*

Bertola G Rogerson R (1997) Institutions and labour reallocation, *European Economic Review 41:1147–71*

Blanchard O Wolfers J (2000) The Role of Shocks and Institutions in the Rise of European Unemployment: The Aggregate Evidence, *Economic Journal 110:C1-33*

Boeri T (2011) *Institutional Reforms and dualism in European Labour Markets*, The Handbook of Labour Economics, Elsevier, edition 1, volume 4, number 5, June

Boeri T Hanson GH McCormick B (2002) *Immigration Policy and the Welfare System*, Oxford University Press

Boeri T van Ours J (2008) *The economics of imperfect labor markets*, Princeton University Press Princeton and Oxford, NJ and UK

Booth A (1996) *The Economics of Trade Unions*, Cambridge University Press

Borjas G (2003) The labor demand curve is downward sloping: reexamining the impact of immigration on the labor market, *The Quarterly Journal of Economics 118:1335-1374*

Clark X Hatton TJ Williamson JG (2007) Explaining US immigration, 1971–1998, *Review of Economics and Statistics 89:359–373*

Conti M Sulis G (2010) Human Capital, Employment Protection and Growth in Europe, *Working Paper CRENoS 2010-28*

D'Amuri F Peri G (2011) Immigration, jobs and employment protection: evidence from Europe, *NBER Working Paper 17139*

De Giorgi G Pellizzari M (2009) Welfare immigration in Europe, *Labour Economics 16:353–363*

Dolado JF Kramarz S Machin A Manning D Margolis C Teuling (1996) The economic impact of minimum wages in Europe, *Economic Policy 23:317–72*

Dolado J Ortigueira S Stucchi R (2012) Does dual employment protection affect TFP? Evidence from Spanish manufacturing firms, *CEPR Discussion Papers 8763*

Giulietti C Wahba J (2012) Welfare Migration, *IZA DP No. 6450*

Giulietti C Guzi M Kahanec M Zimmermann KF (2011) Unemployment Benefits and Immigration: Evidence from the EU, *IZA DP No. 6075*

Giulietti C (2010) Is the Minimum Wage a Pull Factor for Immigrants?, *IZA DP No. 5410*

Hatton TJ (2005) Explaining trends in UK immigration, *Journal of Population Economics 18:719–740*

Layard R Nickell S Jackman R (1991) *Unemployment: Macroeconomic Performance and the Labour Market*, Oxford University Press number 9780198284345, February

Mayda AM (2010) International migration: a panel data analysis of the determinants of bilateral flows, *Journal of Population Economics 23: 1249–1274*

Layard R Nickell S (1999) *Labor market institutions and economic performance*, in Ashenfelter O Card D (eds.) Handbook of Labor Economics, volume 3 chapter 46 pages 3029-3084 Elsevier

OECD (1994) The OECD Jobs Study, *OECD: Paris*

OECD (1999) Employment Outlook, *OECD: Paris*

Ortega F Peri G (2012) The Role of Income and Immigration Policies in Attracting International Migrants, *IZA DP No.* 6655

Patel K Vella F (2012) Immigrant Networks and their Implications for Occupational Choice and Wages, *Review of Economics and Statistics*, forthcoming

Pedersen PJ Pytlikova M Smith N (2008) Selection and Network Effects–Migration Flows into OECD Countries 1990-2000, *European Economic Review 52, 1160–1186*

Sà F (2011) Does employment protection help immigrants? Evidence from European labor markets, *Labour Economics 18:624–642*

Saint-Paul G (2002) Employment protection, international specialization, and innovation, *European Economic Review, 46:375-395*

Visser J (2011) *The ICTWSS Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts*, Version 3.0, Institute for Labour Studies, University of Amsterdam

TABLES AND FIGURES

Table 1. Descriptive statistics, main variables

Country	Variable	Obs	Mean	Std. Dev.	Min	Max
AUT	(ln) Migration Flows	96	7.89	0.84	5.98	9.62
	(ln) GDP per capita	1047	7.66	1.59	4.25	10.81
	EPL	1140	2.20	0.05	1.93	2.21
	Unempl. benefits	1140	91.96	1.18	89.00	94.00
	Minimum wage	1140	0	0	0	0
	Unions coverage	1140	98.20	0.29	98.00	99.00
	Migration Policies	1140	2.58	0.04	2.57	2.79
DEU	(ln) Migration Flows	2412	6.70	2.19	0.69	12.61
	(ln) GDP per capita	2672	7.57	1.58	4.14	11.29
	EPL	2950	2.60	0.45	2.09	3.21
	Unempl. benefits	2950	49.90	5.59	38.00	57.00
	Minimum wage	2950	0	0	0	0
	Unions coverage	2950	68.71	2.80	63.50	72.00
	Migration Policies	2950	2.75	0.17	2.36	2.86
DNK	(ln) Migration Flows	2147	4.24	1.88	0.69	9.69
	(ln) GDP per capita	2299	7.51	1.63	4.14	11.29
	EPL	2461	1.78	0.42	1.50	2.40
	Unempl. benefits	2461	84.44	0.93	83.00	86.00
	Minimum wage	2461	0	0	0	0
	Unions coverage	2461	83.62	0.49	83	84
	Migration Policies	2461	2.93	0.18	2.64	3.21
ESP	(ln) Migration Flows	1841	4.45	2.59	0.69	11.45
	(ln) GDP per capita	2431	7.58	1.59	4.14	11.29
	EPL	2609	3.19	0.37	2.93	3.82
	Unempl. benefits	2609	48.77	9.33	36	67
	Minimum wage	2609	1	0	1	1
	Unions coverage	2609	83.82	3.35	82.20	92.00
	Migration Policies	2609	3.34	0.26	2.93	3.68
FIN	(ln) Migration Flows	89	2.84	1.72	0.69	8.69
	(ln) GDP per capita	2557	7.54	1.59	4.14	11.29
	EPL	2781	2.10	0.08	2.02	2.33
	Unempl. benefits	2781	62.04	9.68	43.00	74.00
	Minimum wage	2781	0	0	0	0
	Unions coverage	2781	86.82	5.77	81	98
	Migration Policies	2781	2.38	0.19	2	2.79

Note: Country-year observation covering 9 countries, over the period 1990-2005. Mean and standard deviations are weighted. Migration flows and GDP per capita are in natural logarithm. EPL is an index, as Migration policies. Minimum wage is a dummy variable equal to 1 if minimum wage is present. Unempl. Benefits and Unions coverage are in percentage.

Table 2. Descriptive statistics, main variables

Country	Variable	Obs	Mean	Std. Dev.	Min	Max
FRA	(ln) Migration Flows	1516	3.75	2.55	0.69	10.26
	(ln) GDP per capita	2430	7.65	1.58	4.44	11.21
	EPL	2647	3.01	0.03	2.98	3.05
	Unempl. benefits	2647	72.69	8.54	58.00	84.00
	Minimum wage	2647	1	0	1	1
	Unions coverage	2647	91.55	0.83	90	92
	Migration Policies	2647	1.47	0.16	1.21	1.71
GBR	(ln) Migration Flows	1274	5.73	1.65	1.79	9.77
	(ln) GDP per capita	1654	7.96	1.60	4.52	11.29
	EPL	1759	0.65	0.06	0.60	0.75
	Unempl. benefits	1649	46.68	18.62	15.00	69.00
	Minimum wage	1759	0.61	0.49	0	1

WP3/03 SEARCH WORKING PAPER

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Vicente Royuela

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International migrations and agglomeration economies

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Abstract

Migration to more developed regions in the world has significantly increased over the last decades. Internationally, regional migration is a big part of labour mobility. Migration among neighbours is considerable, and that has been the case for the European Neighbouring Countries as well. If 3% of the world's population live outside their region of birth, in ENC countries + Russia that figure is above 7%. It is generally agreed that countries do not prosper without mobile people. Indeed, the ability of people to move seems to be a good gauge of their economic potential, and the willingness to migrate appears to be a measure of their desire for advancement. According to World Bank's data, in 1960 almost one third of the World Population lived in cities. In 2010 this figure is above 50% and is steadily growing 1% every three years. At that speed, in 2050 around two thirds of the world population would be living in cities. In 2010 the ENC countries + Russia accounted for an urbanisation rate of 63%, although this figure has remained stable since the 1990's. The question posed in this paper is if migration and agglomeration are two connected variables and how are they correlated. In this work we embrace these two major trends and we inspect the relationship between international migration and urbanisation in panel data framework in which we consider a gravitational model for panel of 197 countries over the period 1960-2010. Particular attention is devoted to ENC countries + Russia.

Keywords

international migration; gravitational model; agglomeration economies; urbanisation; urban concentration

JEL Classification

R00, R23, F22

1. INTRODUCTION

Today, the number of persons who live outside their country of birth is around three percent of the world population, about 200 million people. Despite the largest flows of people are between places in the same country, international migration still captures the greatest attention in the media, even though most of the international migrations are regional, as people mostly moves within world regional neighbourhoods. Of course, the majority of migrants end up in developed countries: immigrants represent more than 12% of population in OECD countries (Gheasi et al 2012).

Nowadays large international flows of people are from low income countries to wealthy countries, while in the industrial period in the XIXth century, industrialised countries were the main senders. The World Development Report (World Bank, 2009) relates that in the industrial period between 10 and 20 per cent of the population left Europe, and consequently the movement of people was not driven by a lack of economic growth or development in the sending countries (Great Britain, the first country to industrialize, was by far the largest sender). Nevertheless, this is not contradictory with the neoclassical theory. On the contrary, it is in line with the findings of Milanovic (2011): in the early 19th century just 30% of the total global inequality was due to differences in mean country incomes, while in the early 21st century that figure is over 80%. It was in the post-industrial period that began in the 1960s, when people began to move from lower income countries to wealthy countries, while between country inequality exceeded 80% of the total global inequality in 1950s.

Consequently, migration is mainly explained by the personal opportunities that the worker may face wherever he/she goes. From a micro perspective (Borjas, 1987) migrants estimate the costs and benefits of moving to alternative international locations and migrate

to where the expected discounted net returns are greatest over some time horizon. From a macro perspective, this is clearly related with the process of economic development, as assumed by a large literature (Lewis, 1954; Ranis and Fei, 1961; Harris and Todaro, 1976; Todaro, 1976). In some of these models migration occurs between lagged rural areas and developed urban areas, as the latter exhibit higher wages due to higher productivity, which comes from agglomeration economies. This is in line also with the model proposed by Simon Kuznets (1955) which, in turn, assumes that economic growth is likely to be associated with increasing urbanization. After all, labour mobility is the human side of the agglomeration story. As stressed in Castells and Royuela (2012), in 2010 above 50% of the World Population live in cities and this figure is steadily growing 1% every three years. At that speed, in 2050 around two thirds of the world population would be living in cities.

In this work I analyse together these two major trends: international migrations and the increase of cities all over the world. As the WDR (2009) stresses, "an important insights of the agglomeration literature – that human capital earns higher returns where it is plentiful – has been ignored by the literature of labour migration" (WDR, 2009, p. 158), and that novel understandings come from considering agglomeration economies and labour migration.

Next, section 2 describes the empirical background and the current trends in in international migrations and urbanisation. Section 3 presents the theoretical framework, section 4 presents the empirical model, and section 5 displays the estimation results. Finally, section 6 concludes with the main findings.

2. EMPIRICAL BACKGROUND

In this section I describe the main trends in migration and in urban agglomeration all over the world. Regarding migration, our data sources are the World Bank Bilateral Migration Database 1960-2000 and the World Bank Bilateral Migration Matrix 2010.[1] It includes 197 countries for the years 1960, 1970, 1980, 1990, 2000 and 2010, what accounts for

[1] These databases can be respectively accessed at http://data.worldbank.org/data-catalog/global-bilateral-migration-database and http://go.worldbank.org/JITC7NYTT0

231,672 potential observations.[2,3] The variables on population and urbanisation belong to the World Bank World Development Indicators.[4]

Table 1 shows the main demographics trends in the world regions. Population growth has slowed down over the last 40 years, although several World regions still have in 2010 annual growth rates over 2%, mainly in Africa and Western Asia and Melanesia. Interestingly these areas do not show particularly high rates of emigration. Finally immigration is particularly important in more developed areas, such as Europe, North America, and Oceania.

Table 1b focuses on the ENC countries. The more striking fact is that ENC-East countries and Russia display a demographic decline in the last two decades. In fact, Eastern Europe is the only subregion in the World with negative rates of population growth. On the contrary, ENC countries show high population growth rates, that caused that the population in these countries has tripled from 1960 (65 million) to 2010 (203 million). The emigration rates are particularly large in ENC-East countries (15% all over the years), while the immigration rate, being large as well, is much below and is decreasing over the years. In ENC-South we see as well higher emigration than immigration rates. Finally, Russia has reversed the sign of these rates, as since 2000 the immigration rate is larger than the emigration rate.

Tables 2 and 3 presents the destination of the migrants. Table 2 presents where do emigrants go, while table 3 shows where do immigrants come from. African people migrate more and more over the years outside of their continent, particularly to Europe, although also to Asia. By far the larger sender in relative terms is Northern Africa, as only 9% of emigrants stay in the African continent. By contrast, in 2010, 97% of immigrants at the African continent were Africans. There is a huge decline in the proportion of Europeans since 1960, what can be associated to the decolonization process.

Americans mostly stay in their continent, although that figure has strongly declined for southern Americans (in 2010 35% of emigrants were in Europe). Regarding the

[2] The list of countries displayed by continents and world subregions is displayed in annex 1.
[3] Özden et al. (2011) describes the 1960-2000 database and highlights the main migration trends in the world. Here I briefly expand that analysis to 2010 and enrich it with urbanisation figures.
[4] http://data.worldbank.org/data-catalog/world-development-indicators

immigrants, we see that the proportion of Americans among immigrants has doubled since 1960 (24%) until 2010 (54%). Asiatics have followed a similar pattern. Inversely, the weight of Europeans has strongly declined since 70% in 1960 to 16% in 2010.

Nowadays Asiatics emigrate to America and Europe (particularly the ones coming from Central Asia) much more than 50 years ago, as in 2010 just 51% of them stay in Asia, compared to the 86% in 1960. On the contrary, most immigrants in Asia are Asiatics, although Africans represent a higher community over time, particularly the Northern Africans.

Europeans prefer to stay in their continent, and that trend is increasing all over the years, while they emigrate less to America and more to Oceania. As a destination continent, Europeans represent just a half of total immigrants in Europe, particularly because the increase of the weights of the rest of continents, and particularly from South America and Western Asia.

Finally, emigrants from Oceania mostly prefer their continent, but large proportions go to America and, at a declining rate, to Europe. Immigrants at Oceania still come mostly from Europe, but the rest of the continents are largely increasing their weight.

Tables 2b and 3b display the dame figures for the ENC countries plus Russia. The ENC-East countries mainly stay in Europe, being the subregions of destination with more, and higher, importance the Eastern European countries that belong to the European Union in 2010. Interestingly, Southern European countries have vastly increase their importance as destination countries. The ENC-East countries mostly receive immigrants from other ENC-East countries and in the last years more and more from Central Asia, and less and less from Eastern European countries belonging to the European Union.

The ENC-South countries also emigrate mostly to Europe, although since 2000 the preferred subregion in the world in Western Asia. The immigrants come primarily from other ENC countries and related neighbours (Northern Africa, Western Asia and Eastern Europe-ENC).

Finally, Russians emigrate to the EU countries of Eastern Europe and to Central Asia. Besides, in 2010 there is a large proportion of Russian emigrants in Northern America. Regarding the immigrants in Russia are mostly from neighbouring countries: they come from Eastern European countries (ENC, not EU) and from Western and Central Asia (more and more in fact).

Regarding urbanisation, table 4 presents the picture of continents and world subregions. As was stressed above, urban world population has increased from 33% in 1960 to 51% in 2010 (16 percentage points). All regions in the world have increased their urbanisation rate by 20 points (but Oceania, that started already had a large rate in 1960). In 2010 in 15 world regions more than half of people live in cities, while in 8 regions the figure is below 50%.

Urban concentration has also risen in the last 50 years (6 percentage points), being more important in America, Oceania, and in several other subregions, such as Southern Africa and Western Asia. But the global urbanisation trend has a deeper source in small and median cities (below one million inhabitants), that has risen from 20% of total world population in 1960 to 32% in 2010. It means 12 percentage points, double of the increase in larger cities. In two regions, Central Asia and Northern Europe, large cities lost weight, while small and median cities were responsible for the entire increase in urbanisation rates. In fact, in Europe we can see that more than 80% of the increase in urbanisation rates was due to the enlargement of small and median cities.

Table 4b presents the urbanisation rates of ENC countries and Russia. As in other world regions, there is an increase in urbanisation rates in all countries, but the distribution between large and small and median cities is heterogeneous. In Armenia, Israel, Lebanon and Syria more than one third of total population live in large cities, while in Azerbaijan, Algeria and Jordan large cities have lost weight since 1960. As in other parts of the world, the increase in urban rates was mainly driven by small and median cities (curiously in Egypt, where Cairo has a huge importance, 90% of the increase in the urbanisation rate was due to smaller cities).

Table 1. World Demographic trends

	Population Growth - annual rates					Emigrants as % of local population						Immigrants as % of local population					
	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	1960	1970	1980	1990	2000	2010	1960	1970	1980	1990	2000	2010
Africa	**2.5%**	**2.7%**	**2.8%**	**2.5%**	**2.3%**	**2.9%**	**2.9%**	**2.9%**	**2.6%**	**2.5%**	**2.9%**	**2.9%**	**2.2%**	**2.0%**	**1.5%**	**1.5%**	**1.5%**
Central Africa	2.1%	2.6%	2.9%	2.8%	2.7%	2.0%	1.8%	2.2%	1.9%	1.8%	2.4%	2.6%	2.0%	1.5%	1.5%	1.1%	1.5%
Eastern Africa	2.8%	2.9%	3.0%	2.7%	2.6%	3.5%	2.8%	2.1%	1.8%	1.7%	2.2%	3.5%	2.7%	1.8%	1.3%	1.2%	1.2%
Northern Africa	2.6%	2.7%	2.6%	1.9%	1.7%	3.1%	3.9%	4.1%	4.1%	3.6%	4.5%	2.1%	1.0%	0.8%	0.7%	0.7%	0.7%
Southern Africa	2.4%	2.3%	2.5%	2.3%	1.3%	2.6%	2.2%	2.1%	2.4%	2.0%	2.5%	4.9%	4.2%	3.4%	3.5%	2.3%	3.5%
Western Africa	2.3%	2.7%	2.7%	2.6%	2.6%	2.4%	2.5%	2.9%	2.4%	2.6%	2.8%	2.3%	2.4%	2.8%	2.1%	2.2%	2.0%
America	**2.0%**	**1.8%**	**1.6%**	**1.5%**	**1.1%**	**1.3%**	**1.5%**	**2.0%**	**2.5%**	**3.4%**	**3.8%**	**4.7%**	**4.0%**	**4.2%**	**4.6%**	**5.5%**	**5.8%**
Caribbean	2.0%	1.6%	1.4%	1.2%	0.9%	7.0%	9.4%	11.2%	13.4%	15.4%	16.3%	2.5%	2.8%	2.6%	2.5%	2.6%	2.1%
Central America	3.0%	2.8%	2.1%	1.8%	1.4%	1.7%	2.0%	3.5%	5.6%	9.0%	10.0%	0.9%	0.6%	0.5%	0.6%	0.8%	0.9%
Northern America	1.3%	1.1%	1.0%	1.2%	0.9%	1.0%	1.1%	1.1%	1.0%	1.1%	1.0%	6.8%	6.6%	7.9%	9.8%	12.7%	13.7%
South America	2.6%	2.3%	2.1%	1.6%	1.2%	0.9%	0.9%	1.2%	1.5%	1.9%	2.5%	3.4%	2.4%	1.9%	1.4%	1.2%	1.1%
Asia	**2.3%**	**2.1%**	**1.9%**	**1.5%**	**1.1%**	**1.8%**	**1.5%**	**1.5%**	**1.5%**	**1.6%**	**1.7%**	**1.9%**	**1.6%**	**1.3%**	**1.3%**	**1.2%**	**1.2%**
Central Asia	3.1%	2.2%	2.0%	0.9%	1.1%	7.3%	8.3%	7.9%	10.2%	12.0%	10.7%	14.9%	16.3%	14.5%	13.3%	9.4%	7.4%
East Asia	2.0%	1.8%	1.4%	1.0%	0.5%	0.8%	0.6%	0.6%	0.6%	0.7%	0.8%	0.4%	0.3%	0.3%	0.3%	0.4%	0.3%
South Asia	2.4%	2.4%	2.4%	1.9%	1.5%	3.2%	2.4%	2.0%	1.7%	1.5%	1.6%	3.1%	2.2%	1.6%	1.1%	0.8%	0.6%
Southeast Asia	2.6%	2.4%	2.2%	1.6%	1.3%	0.6%	0.6%	0.9%	1.4%	1.8%	2.1%	1.8%	1.3%	0.7%	0.6%	0.9%	1.0%
Western Asia	2.7%	2.8%	2.7%	2.2%	2.3%	3.0%	4.2%	5.9%	6.0%	6.2%	5.5%	5.3%	5.7%	6.6%	8.7%	8.4%	9.4%
Europe	**0.8%**	**0.5%**	**0.4%**	**0.1%**	**0.2%**	**7.8%**	**8.0%**	**7.6%**	**7.7%**	**7.2%**	**7.4%**	**4.9%**	**5.8%**	**6.3%**	**7.2%**	**7.7%**	**9.2%**
Eastern Europe	0.9%	0.7%	0.5%	-0.2%	-0.3%	10.3%	10.2%	9.6%	10.2%	9.1%	9.1%	5.9%	6.2%	6.2%	7.0%	6.8%	6.8%
Northern Europe	0.7%	0.3%	0.2%	0.2%	0.5%	7.4%	8.3%	7.8%	7.8%	7.8%	7.3%	4.0%	5.9%	6.7%	7.6%	8.3%	10.7%
Southern Europe	0.8%	0.8%	0.3%	0.1%	0.8%	7.9%	9.3%	8.3%	7.6%	7.5%	8.5%	0.8%	1.3%	1.9%	2.9%	4.5%	9.9%
Western Europe	0.9%	0.3%	0.3%	0.4%	0.3%	3.7%	3.4%	3.5%	3.5%	3.7%	3.9%	6.7%	8.4%	9.7%	10.4%	11.2%	11.5%
Oceania	**2.0%**	**1.7%**	**1.6%**	**1.4%**	**1.7%**	**1.8%**	**2.0%**	**2.7%**	**3.3%**	**4.3%**	**4.1%**	**13.3%**	**15.3%**	**15.0%**	**15.5%**	**15.5%**	**17.9%**
Australia and New Zealand	1.9%	1.5%	1.4%	1.2%	1.5%	2.0%	2.1%	2.6%	3.2%	4.1%	3.9%	15.9%	18.4%	18.5%	19.6%	20.0%	23.8%
Melanesia	2.4%	2.7%	2.4%	2.4%	2.3%	0.6%	0.8%	1.4%	2.0%	2.7%	2.9%	2.2%	2.7%	1.9%	1.4%	1.2%	0.9%
Micronesia	2.7%	2.1%	3.7%	1.9%	0.4%	6.9%	4.8%	10.8%	8.5%	14.7%	12.5%	8.0%	6.5%	6.2%	12.8%	16.8%	16.5%
Polynesia	3.0%	1.7%	1.2%	1.2%	0.9%	4.1%	5.2%	17.5%	20.0%	26.7%	25.9%	2.1%	3.2%	5.5%	6.5%	6.7%	5.5%
World	**2.0%**	**1.9%**	**1.7%**	**1.4%**	**1.2%**	**3.0%**	**2.8%**	**2.7%**	**2.6%**	**2.7%**	**2.8%**	**3.0%**	**2.8%**	**2.7%**	**2.6%**	**2.7%**	**2.8%**

Table 1b. ENC countries demographic trends

		Population Growth - annual rates					Emigrants as % of local population						Inmigrants as % of local population					
		1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	1960	1970	1980	1990	2000	2010	1960	1970	1980	1990	2000	2010
AM	Armenia	3.0%	2.1%	1.4%	-1.4%	0.1%	20.9%	16.9%	13.8%	13.2%	27.7%	25.7%	12.0%	14.8%	12.8%	7.5%	9.5%	10.3%
AZ	Azerbaijan	2.9%	1.8%	1.5%	1.2%	1.2%	10.3%	10.9%	12.0%	14.2%	18.7%	14.2%	9.7%	8.1%	6.3%	5.6%	3.2%	1.2%
BY	Belarus	1.0%	0.6%	0.6%	-0.2%	-0.5%	23.8%	25.3%	24.1%	24.8%	17.5%	16.9%	13.0%	12.5%	13.4%	16.0%	11.4%	11.4%
GE	Georgia	0.9%	1.2%	0.7%	-0.8%	0.1%	1.9%	10.8%	12.7%	17.9%	25.8%	21.6%	9.4%	8.7%	7.3%	7.3%	5.0%	3.7%
MD	Moldova	1.8%	1.1%	0.8%	-0.2%	-0.2%	16.2%	14.9%	13.0%	16.1%	17.7%	19.9%	12.8%	13.8%	14.4%	15.8%	13.1%	10.8%
UA	Ukraine	1.0%	0.6%	0.4%	-0.5%	-0.7%	14.6%	13.4%	12.7%	13.8%	12.0%	13.1%	9.4%	11.5%	12.2%	13.3%	10.6%	10.8%
Total ENC- East		**1.2%**	**0.8%**	**0.6%**	**-0.4%**	**-0.4%**	**15.1%**	**14.8%**	**14.1%**	**15.6%**	**15.1%**	**15.0%**	**10.1%**	**11.4%**	**11.7%**	**12.5%**	**9.7%**	**9.3%**
DZ	Algeria	2.4%	3.2%	3.0%	1.9%	1.5%	7.9%	12.3%	8.5%	6.2%	4.4%	3.4%	4.0%	1.2%	0.7%	0.4%	0.3%	
EG	Egypt	2.6%	2.3%	2.4%	1.8%	1.8%	0.5%	1.0%	2.2%	3.3%	3.2%	4.2%	0.7%	0.5%	0.3%	0.2%	0.2%	0.2%
IL	Israel	3.5%	2.7%	1.9%	3.0%	1.9%	2.3%	2.8%	3.7%	4.4%	3.7%	3.6%	56.0%	47.3%	36.8%	34.8%	35.5%	35.7%
JO	Jordan	6.0%	3.8%	3.8%	4.2%	2.3%	6.2%	15.7%	22.7%	25.4%	17.3%		0.8%	1.2%	3.0%	4.8%	5.2%	
LB	Lebanon	2.6%	1.3%	0.5%	2.4%	1.2%	7.1%	7.6%	15.5%	20.0%	17.7%	15.1%	0.6%	0.5%	0.3%	6.8%	8.1%	
LY	Libya	4.0%	4.4%	3.5%	1.9%	2.0%	3.9%	3.6%	2.2%	1.5%	2.1%	1.7%	3.5%	5.6%	9.3%	9.7%	9.6%	8.1%
MA	Morocco	2.8%	2.5%	2.4%	1.5%	1.0%	5.7%	5.3%	6.2%	6.5%	5.5%	9.4%	3.4%	0.8%	0.4%	0.2%	0.2%	
SY	Syria	3.4%	3.4%	3.3%	2.6%	2.5%	2.7%	2.6%	3.3%	3.7%	3.5%	4.2%	1.1%	3.2%	0.5%	0.5%	0.5%	
TN	Tunisia	2.0%	2.2%	2.5%	1.6%	1.0%	5.5%	6.8%	8.0%	6.9%	5.9%	6.0%	3.9%	1.0%	0.6%	0.5%	0.4%	0.2%
Total ENC-South		**2.7%**	**2.6%**	**2.6%**	**1.9%**	**1.7%**	**3.5%**	**4.6%**	**5.2%**	**5.4%**	**4.7%**	**5.2%**	**3.8%**	**2.7%**	**2.0%**	**1.9%**	**2.1%**	**2.7%**
Total ENC		**2.0%**	**1.8%**	**1.8%**	**1.2%**	**1.1%**	**9.2%**	**9.3%**	**8.9%**	**9.1%**	**7.9%**	**7.8%**	**6.9%**	**6.6%**	**6.0%**	**5.8%**	**4.5%**	**4.5%**
RU	Russia	0.8%	0.6%	0.6%	-0.1%	-0.3%	7.0%	8.1%	8.4%	8.9%	7.1%	7.1%	5.1%	5.6%	5.9%	7.1%	8.2%	8.3%
Total ENC + Russia		**1.5%**	**1.3%**	**1.3%**	**0.7%**	**0.6%**	**8.1%**	**8.7%**	**8.7%**	**9.0%**	**7.6%**	**7.6%**	**6.0%**	**6.2%**	**6.0%**	**6.3%**	**5.9%**	**5.8%**

Note: Palestinian territory is not considered due to the lack of data

Table 2. Migrants as a proportion of total migrants from origin (sum of rows = 100%)

Origin \ Destination	Africa			America			Asia			Europe			Oceania		
	1960	1980	2010	1960	1980	2010	1960	1980	2010	1960	1980	2010	1960	1980	2010
Africa	**77%**	**58%**	**50%**	**1%**	**3%**	**6%**	**5%**	**9%**	**14%**	**17%**	**30%**	**29%**	**0.4%**	**0.8%**	**1.4%**
Central Africa	89%	66%	54%	1%	3%	4%	0.4%	1.0%	1.1%	9%	30%	41%	0.0%	0.0%	0.1%
Eastern Africa	97%	81%	70%	0%	3%	8%	0.7%	2.2%	3.9%	2%	14%	17%	0.2%	1.0%	1.6%
Northern Africa	27%	12%	9%	1%	3%	5%	17%	22%	37%	54%	62%	48%	0.8%	0.8%	0.8%
Southern Africa	82%	78%	56%	2%	6%	9%	2.1%	1.3%	0.4%	12%	11%	21%	2.0%	4.7%	12.5%
Western Africa	97%	89%	76%	0%	2%	6%	0.4%	1.1%	0.3%	3%	7%	17%	0.0%	0.0%	0.2%
America	**0.7%**	**1.0%**	**0.0%**	**83%**	**86%**	**82%**	**1.6%**	**1.0%**	**2.1%**	**14%**	**11%**	**15%**	**0.5%**	**0.9%**	**0.8%**
Caribbean	0.1%	0.1%	0.0%	84%	91%	90%	0%	0%	0%	15%	9%	10%	0.0%	0.0%	0.1%
Central America	0.2%	0.1%	0.0%	98%	99%	99%	0%	0%	0%	1%	1%	1%	0.0%	0.0%	0.1%
Northern America	1.6%	3.5%	0.4%	74%	67%	62%	4%	4%	8%	19%	23%	25%	1.2%	2.6%	4.7%
South America	0.3%	0.7%	0.0%	86%	85%	59%	0%	1%	5%	13%	13%	35%	0.1%	1.2%	1.0%
Asia	**0.8%**	**0.9%**	**0.3%**	**4%**	**10%**	**20%**	**86%**	**69%**	**51%**	**9%**	**19%**	**26%**	**0.4%**	**1.1%**	**3.1%**
Central Asia	0.1%	0.1%	0.0%	2%	1%	1%	23%	27%	17%	74%	72%	82%	0.1%	0.0%	0.0%
East Asia	0.3%	0.3%	0.2%	9%	22%	39%	89%	73%	45%	1%	3%	10%	0.4%	1.0%	5.5%
South Asia	0.7%	0.6%	0.3%	0%	3%	13%	97%	91%	73%	2%	5%	11%	0.2%	0.4%	1.7%
Southeast Asia	0.3%	0.3%	0.1%	12%	38%	35%	61%	42%	47%	25%	16%	12%	1.8%	4.8%	6.2%
Western Asia	3.9%	3.0%	0.8%	21%	9%	10%	49%	37%	30%	25%	49%	58%	1.1%	1.7%	2.0%
Europe	**3.1%**	**1.9%**	**0.5%**	**29%**	**21%**	**16%**	**11%**	**13%**	**13%**	**53%**	**59%**	**65%**	**3.9%**	**4.7%**	**5.2%**
Eastern Europe	0.1%	0.1%	0.0%	10%	6%	9%	18%	23%	21%	71%	71%	70%	0.5%	0.5%	0.7%
Northern Europe	5.3%	5.5%	0.6%	53%	35%	26%	1.3%	1.8%	4.3%	24%	37%	47%	17%	20%	22%
Southern Europe	4.5%	1.7%	0.8%	61%	40%	23%	4.0%	1.9%	1.5%	26%	51%	69%	4%	6%	5%
Western Europe	12%	6.6%	1.5%	43%	40%	23%	1.3%	3.2%	9.7%	39%	45%	61%	5%	5%	5%
Oceania	**2.7%**	**2.1%**	**0.4%**	**17%**	**17%**	**18%**	**4.5%**	**2.6%**	**4.1%**	**33%**	**23%**	**19%**	**43%**	**55%**	**59%**
Australia and NZ	3.0%	2.6%	0.5%	16%	14%	13%	4.8%	3.2%	5.3%	37%	27%	25%	40%	54%	56%
Melanesia	0.5%	1.2%	0.0%	11%	17%	29%	1.9%	0.9%	0.4%	9%	11%	3.6%	78%	69%	67%
Micronesia	0.1%	1.0%	0.0%	56%	30%	64%	5.1%	4.9%	10%	2%	36%	4.0%	37%	28%	22%
Polynesia	0.3%	0.1%	0.0%	21%	33%	23%	1.4%	0.1%	0.1%	9%	8.6%	0.8%	69%	58%	76%
World	**8.6%**	**7.7%**	**7.6%**	**21.6%**	**22.0%**	**28.5%**	**35.1%**	**29.9%**	**25.0%**	**32.4%**	**37.4%**	**35.5%**	**2.3%**	**2.9%**	**3.5%**

Table 3. Migrants as a proportion of total migrants at destination (sum of columns = 100%)

Origin \ Destination	Africa			America			Asia			Europe			Oceania			World		
	1960	1980	2010	1960	1980	2010	1960	1980	2010	1960	1980	2010	1960	1980	2010	1960	1980	2010
Africa	**78%**	**84%**	**97%**	**0.3%**	**1.4%**	**3.3%**	**1.3%**	**3.3%**	**8.0%**	**4.5%**	**8.8%**	**12%**	**1.5%**	**2.9%**	**5.9%**	**8.7%**	**11%**	**15%**
Central Africa	3.9%	4.2%	5.5%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.4%	0.9%	0.0%	0.0%	0.0%	0.4%	0.5%	0.8%
Eastern Africa	35%	27%	34%	0.0%	0.3%	1.1%	0.1%	0.2%	0.6%	0.2%	1.0%	1.8%	0.2%	0.8%	1.7%	3.1%	2.6%	3.7%
Northern Africa	7.2%	6.1%	6.1%	0.1%	0.5%	0.8%	1%	3%	7%	3.8%	6.6%	6.7%	0.8%	1.1%	1.1%	2.3%	4.0%	4.9%
Southern Africa	5.4%	5.7%	5.7%	0.1%	0.1%	0.3%	0.0%	0.0%	0.0%	0.2%	0.2%	0.5%	0.5%	0.9%	2.8%	0.6%	0.6%	0.8%
Western Africa	26%	41%	45%	0.1%	0.4%	1.0%	0.0%	0.1%	0.0%	0.2%	0.7%	2.1%	0.0%	0.1%	0.2%	2.3%	3.5%	4.5%
America	**0.5%**	**1.4%**	**0.1%**	**24%**	**41%**	**54%**	**0.3%**	**0.4%**	**1.6%**	**2.7%**	**3.1%**	**7.7%**	**1.3%**	**3.3%**	**4.2%**	**6.2%**	**11%**	**19%**
Caribbean	0.0%	0.0%	0.0%	6.0%	11%	11%	0.0%	0.0%	0.0%	0.7%	0.7%	1.0%	0.0%	0.0%	0.1%	1.5%	2.8%	3.5%
Central America	0.0%	0.0%	0.0%	4.5%	12%	29%	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	0.0%	0.0%	0.3%	1.0%	2.8%	8.2%
Northern America	0.4%	1.1%	0.1%	7.8%	7.3%	3.9%	0.3%	0.3%	0.6%	1.3%	1.5%	1.3%	1.2%	2.1%	2.4%	2.3%	2.4%	1.8%
South America	0.1%	0.2%	0.0%	5.5%	10%	11%	0.0%	0.0%	1.0%	0.6%	0.9%	5.1%	0.1%	1.1%	1.4%	1.4%	2.6%	5.1%
Asia	**3.0%**	**3.7%**	**1.5%**	**6.0%**	**15%**	**26%**	**82%**	**76%**	**76%**	**9.1%**	**17%**	**27%**	**5.3%**	**11.8%**	**33%**	**33%**	**33%**	**37%**
Central Asia	0.0%	0.0%	0.0%	0.2%	0.1%	0.1%	1%	3%	2%	4.5%	5.4%	8.1%	0.0%	0.0%	0.0%	2.0%	2.8%	3.5%
East Asia	0.3%	0.2%	0.2%	2.7%	5.8%	8.9%	18%	14%	12%	0.3%	0.5%	1.8%	1.3%	1.9%	10%	6.9%	5.8%	6%
South Asia	1.7%	1.1%	0.6%	0.2%	2.3%	6.7%	57%	48%	42%	1.5%	2.1%	4.5%	1.7%	2.3%	7.1%	21%	16%	14.2%
Southeast Asia	0.1%	0.1%	0.1%	0.8%	4.7%	8.1%	3%	4%	12%	1.1%	1.2%	2.2%	1.1%	4.4%	12%	1.5%	2.7%	7%
Western Asia	1.0%	2.2%	0.7%	2.1%	2.2%	2.3%	3%	7%	8%	1.7%	7.5%	11%	1.1%	3.2%	3.9%	2.1%	5.7%	6.7%
Europe	**18%**	**11%**	**1.8%**	**70%**	**42%**	**16%**	**17%**	**20%**	**14%**	**83%**	**71%**	**53%**	**86%**	**72%**	**43%**	**51%**	**45%**	**28%**
Eastern Europe	0.3%	0.4%	0.0%	13%	6%	4%	15%	19%	12%	63%	46%	28%	6.3%	3.9%	2.8%	29%	24%	14%
Northern Europe	4.2%	4.3%	0.3%	16%	10%	3%	0.2%	0.4%	0.7%	4.9%	6.0%	5.1%	49%	42%	25%	7%	6%	4%
Southern Europe	5.0%	2.0%	0.7%	27%	17%	5%	1.1%	0.6%	0.4%	8%	12%	13%	18%	17%	10%	10%	9%	7%
Western Europe	9%	4.4%	0.8%	13%	9%	3%	0.2%	0.5%	1.5%	7.5%	6.3%	6.9%	13%	9.1%	5.7%	6%	5.2%	4.0%
Oceania	**0.1%**	**0.1%**	**0.0%**	**0.2%**	**0.4%**	**0.5%**	**0.0%**	**0.0%**	**0.1%**	**0.3%**	**0.3%**	**0.4%**	**5.8%**	**10%**	**13%**	**0.3%**	**1%**	**1%**
Australia and NZ	0.1%	0.1%	0.0%	0.2%	0.2%	0.2%	0.0%	0.0%	0.1%	0.3%	0.3%	0.4%	4.7%	7.1%	8.9%	0.3%	0.4%	0.6%
Melanesia	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	1.3%	2.6%	0.0%	0.1%	0.1%
Micronesia	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%
Polynesia	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	1.2%	1.7%	0.0%	0.1%	0.1%
World	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 2b. Migrants as a proportion of total emigrants from ENC countries + Russia (as origin)

	ENC- East				ENC-South				Russia			
	1960	**1980**	**2000**	**2010**	**1960**	**1980**	**2000**	**2010**	**1960**	**1980**	**2000**	**2010**
Africa	**0.1%**	**0.1%**	**0.1%**	**0.0%**	**21.1%**	**9.4%**	**8.1%**	**5.8%**	**0.1%**	**0.1%**	**0.2%**	**0.0%**
Central Africa	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
Eastern Africa	0.0%	0.1%	0.0%	0.0%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Northern Africa	0.0%	0.0%	0.0%	0.0%	19.7%	7.8%	7.1%	5.4%	0.0%	0.1%	0.2%	0.0%
Southern Africa	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Western Africa	0.0%	0.0%	0.0%	0.0%	0.9%	1.3%	0.7%	0.2%	0.0%	0.0%	0.0%	0.0%
America	**7.4%**	**3.6%**	**6.5%**	**5.3%**	**8.3%**	**7.3%**	**10.4%**	**9.6%**	**2.1%**	**0.9%**	**0.9%**	**5.1%**
Caribbean	0.0%	0.0%	0.0%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Central America	0.0%	0.0%	0.0%	0.0%	0.2%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Northern America	7.1%	3.5%	6.3%	5.2%	3.3%	5.7%	9.5%	9.0%	1.4%	0.5%	0.7%	4.9%
South America	0.3%	0.1%	0.1%	0.0%	4.6%	1.4%	0.8%	0.5%	0.7%	0.3%	0.1%	0.1%
Asia	**13.0%**	**18.2%**	**16.7%**	**10.6%**	**19.7%**	**29.4%**	**39.6%**	**36.7%**	**37.2%**	**38.9%**	**37.5%**	**39.0%**
Central Asia	6.9%	10.7%	8.3%	3.6%	0.0%	0.0%	0.0%	0.0%	30.8%	33.8%	30.4%	29.5%
East Asia	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%
South Asia	0.0%	0.0%	0.0%	0.0%	0.3%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Southeast Asia	0.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Western Asia	6.0%	7.5%	8.2%	7.0%	19.0%	29.2%	39.1%	36.6%	6.4%	5.1%	7.1%	9.4%
Europe	**79.3%**	**77.9%**	**76.6%**	**83.9%**	**49.6%**	**52.2%**	**40.3%**	**46.3%**	**60.6%**	**60.1%**	**61.2%**	**55.6%**
Eastern Europe - ENC	19.1%	10.6%	5.0%	4.9%	0.2%	0.2%	0.3%	0.2%	4.1%	1.7%	1.2%	0.8%
Eastern Europe - EU	57.8%	63.8%	66.4%	69.6%	0.0%	0.0%	0.1%	0.0%	44.6%	48.7%	42.1%	44.7%
Northern Europe	2.0%	3.3%	2.4%	1.7%	2.1%	1.5%	2.6%	2.2%	6.7%	6.8%	5.5%	4.8%
Southern Europe	0.0%	0.1%	1.0%	4.5%	2.1%	2.8%	9.3%	15.6%	0.1%	0.1%	0.5%	1.3%
Western Europe	0.3%	0.2%	1.9%	3.2%	45.2%	47.7%	28.0%	28.3%	5.1%	2.8%	11.9%	3.9%
Oceania	**0.2%**	**0.2%**	**0.2%**	**0.2%**	**1.2%**	**1.6%**	**1.6%**	**1.6%**	**0.0%**	**0.0%**	**0.2%**	**0.2%**
Australia and New Zealand	0.2%	0.2%	0.2%	0.2%	1.2%	1.6%	1.6%	1.6%	0.0%	0.0%	0.2%	0.2%
Melanesia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Micronesia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Polynesia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total general	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 3b. Migrants as a proportion of total immigrants from ENC countries + Russia (as destination)

	ENC- East				ENC-South				Russia			
	1960	**1980**	**2000**	**2010**	**1960**	**1980**	**2000**	**2010**	**1960**	**1980**	**2000**	**2010**
Africa	**0.0%**	**0.0%**	**0.1%**	**0.0%**	**29.8%**	**33.8%**	**29.0%**	**34.7%**	**0.0%**	**0.0%**	**0.1%**	**0.0%**
Central Africa	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Eastern Africa	0.0%	0.0%	0.0%	0.0%	0.2%	0.4%	2.1%	2.3%	0.0%	0.0%	0.0%	0.0%
Northern Africa	0.0%	0.0%	0.0%	0.0%	29.6%	32.0%	26.4%	32.4%	0.0%	0.0%	0.0%	0.0%
Southern Africa	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Western Africa	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%
America	**0.0%**	**0.0%**	**0.5%**	**0.0%**	**0.5%**	**0.6%**	**4.4%**	**1.4%**	**0.0%**	**0.0%**	**0.4%**	**0.0%**
Caribbean	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
Central America	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%
Northern America	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%	2.6%	0.5%	0.0%	0.0%	0.0%	0.0%
South America	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%	1.8%	0.9%	0.0%	0.0%	0.1%	0.0%
Asia	**6.1%**	**10.7%**	**17.4%**	**16.9%**	**16.6%**	**27.7%**	**35.4%**	**34.3%**	**24.0%**	**32.1%**	**54.0%**	**56.3%**
Central Asia	0.0%	3.4%	9.3%	8.5%	1.1%	2.4%	6.4%	4.5%	21.1%	24.7%	37.6%	39.3%
East Asia	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.4%	1.4%	0.0%	0.0%	0.0%	0.0%
South Asia	0.0%	0.0%	0.3%	0.3%	2.7%	5.2%	6.6%	5.9%	0.0%	0.0%	0.1%	0.0%
Southeast Asia	0.0%	0.0%	0.1%	0.0%	0.1%	0.3%	1.4%	2.4%	0.0%	0.0%	0.1%	0.0%
Western Asia	6.1%	7.3%	7.6%	8.1%	12.6%	19.8%	20.6%	20.1%	2.8%	7.4%	16.3%	17.0%
Europe	**93.9%**	**89.3%**	**82.1%**	**83.1%**	**53.0%**	**37.8%**	**30.9%**	**29.5%**	**76.0%**	**67.9%**	**45.5%**	**43.7%**
Eastern Europe - ENC	79.3%	80.9%	73.5%	78.9%	3.1%	6.9%	14.9%	19.0%	74.1%	62.7%	39.6%	41.5%
Eastern Europe - EU	14.2%	7.6%	6.9%	4.0%	17.8%	19.5%	8.5%	6.6%	1.9%	1.2%	3.7%	
Northern Europe	0.3%	0.8%	1.6%	0.1%	0.5%	0.4%	1.0%	1.3%	0.0%	4.0%	2.1%	2.2%
Southern Europe	0.0%	0.0%	0.1%	0.1%	12.1%	3.8%	1.5%	0.5%	0.0%	0.0%	0.0%	0.0%
Western Europe	0.0%	0.0%	0.0%	0.1%	19.6%	7.2%	5.0%	2.0%	0.0%	0.0%	0.0%	0.0%
Oceania	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Australia and New Zealand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Melanesia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Micronesia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Polynesia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total general	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 4.

	Urban Population						People living in cities with more than 1 million						People living in small and median cities					
	1960	**1970**	**1980**	**1990**	**2000**	**2010**	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**
Africa	**18%**	**23%**	**28%**	**32%**	**36%**	**40%**	**7%**	**9%**	**10%**	**11%**	**12%**	**13%**	**12%**	**15%**	**18%**	**21%**	**24%**	**28%**
Central Africa	14%	19%	29%	38%	45%	52%	3%	6%	9%	11%	13%	17%	10%	14%	20%	26%	32%	36%
Eastern Africa	7%	10%	15%	18%	21%	24%	2%	3%	4%	5%	6%	6%	5%	7%	10%	13%	15%	18%
Northern Africa	31%	37%	41%	45%	49%	52%	13%	15%	16%	16%	16%	15%	19%	22%	26%	30%	33%	37%
Southern Africa	42%	44%	45%	49%	54%	59%	21%	23%	23%	24%	26%	29%	21%	21%	21%	24%	28%	30%
Western Africa	15%	21%	27%	33%	39%	45%	4%	7%	9%	11%	13%	14%	11%	15%	18%	22%	26%	30%
America	**59%**	**64%**	**69%**	**72%**	**77%**	**80%**	**29%**	**33%**	**34%**	**35%**	**37%**	**38%**	**29%**	**32%**	**34%**	**37%**	**40%**	**42%**
Caribbean	39%	44%	51%	55%	61%	66%	13%	16%	18%	19%	21%	23%	26%	29%	33%	36%	39%	43%
Central America	46%	54%	60%	65%	69%	72%	19%	24%	28%	29%	30%	30%	27%	29%	32%	36%	39%	41%
Northern America	70%	74%	74%	75%	79%	82%	38%	41%	40%	41%	43%	45%	32%	33%	34%	34%	36%	38%
South America	51%	60%	68%	75%	79%	84%	24%	28%	32%	34%	35%	38%	27%	31%	36%	41%	44%	46%
Asia	**20%**	**23%**	**26%**	**32%**	**37%**	**43%**	**9%**	**10%**	**12%**	**13%**	**15%**	**17%**	**11%**	**12%**	**15%**	**19%**	**22%**	**26%**
Central Asia	39%	43%	45%	45%	42%	42%	6%	6%	7%	6%	6%	6%	33%	36%	38%	38%	36%	37%
East Asia	20%	23%	26%	33%	40%	48%	11%	12%	13%	14%	18%	22%	9%	11%	13%	19%	22%	27%
South Asia	17%	20%	23%	26%	29%	32%	7%	8%	9%	11%	12%	13%	11%	12%	14%	16%	17%	19%
Southeast Asia	18%	21%	25%	32%	40%	48%	8%	9%	10%	11%	11%	11%	10%	12%	15%	21%	29%	37%
Western Asia	36%	45%	52%	61%	64%	67%	16%	21%	24%	26%	28%	28%	20%	24%	28%	35%	36%	39%
Europe	**57%**	**63%**	**68%**	**71%**	**72%**	**73%**	**14%**	**15%**	**15%**	**16%**	**16%**	**16%**	**43%**	**48%**	**53%**	**55%**	**56%**	**57%**
Eastern Europe -ENC	51%	59%	67%	71%	71%	71%	12%	13%	15%	15%	16%	17%	39%	46%	52%	56%	55%	54%
Eastern Europe - EU	45%	51%	58%	62%	62%	62%	7%	8%	8%	8%	8%	8%	38%	43%	50%	53%	54%	54%
Northern Europe	71%	73%	82%	83%	84%	85%	24%	22%	21%	20%	21%	21%	47%	51%	61%	62%	63%	64%
Southern Europe	52%	59%	63%	65%	66%	69%	15%	19%	20%	19%	20%	20%	37%	40%	44%	45%	46%	49%
Western Europe	68%	71%	73%	74%	75%	77%	14%	14%	14%	14%	14%	15%	54%	57%	59%	60%	61%	62%
Oceania	**67%**	**71%**	**71%**	**71%**	**70%**	**71%**	**38%**	**41%**	**43%**	**42%**	**41%**	**40%**	**29%**	**30%**	**29%**	**29%**	**29%**	**31%**
Australia and New Zealand	80%	85%	85%	85%	87%	89%	48%	51%	54%	54%	55%	54%	33%	33%	31%	31%	32%	35%
Melanesia	9%	15%	18%	20%	19%	19%	0%	0%	0%	0%	0%	0%	9%	15%	18%	20%	19%	19%
Micronesia	27%	35%	41%	48%	52%	52%	0%	0%	0%	0%	0%	0%	27%	35%	41%	48%	52%	52%
Polynesia	26%	32%	35%	37%	36%	38%	0%	0%	0%	0%	0%	0%	26%	32%	35%	37%	36%	38%
World	**33%**	**36%**	**39%**	**43%**	**47%**	**51%**	**13%**	**14%**	**15%**	**16%**	**18%**	**19%**	**20%**	**22%**	**24%**	**27%**	**29%**	**32%**

Table 4b.

		Urban Population						People living in cities with more than 1 million						People living in small and median cities					
		1960	**1970**	**1980**	**1990**	**2000**	**2010**	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**
AM	Armenia	51%	60%	66%	68%	65%	64%	29%	31%	34%	33%	36%	36%	23%	29%	32%	34%	29%	28%
AZ	Azerbaijan	48%	50%	53%	54%	51%	52%	26%	25%	26%	24%	22%	22%	22%	25%	27%	29%	29%	30%
BY	Belarus	32%	44%	57%	66%	70%	74%	7%	10%	14%	16%	17%	20%	26%	34%	43%	50%	53%	55%
GE	Georgia	42%	48%	52%	55%	53%	53%	20%	23%	24%	25%	25%	25%	23%	25%	27%	30%	28%	28%
MD	Moldova	23%	32%	40%	47%	45%	41%	0%	0%	0%	0%	0%	0%	23%	32%	40%	47%	45%	41%
UA	Ukraine	47%	55%	62%	67%	67%	68%	8%	10%	12%	12%	13%	14%	39%	45%	50%	54%	54%	54%
Total ENC- East		**44%**	**52%**	**59%**	**64%**	**64%**	**65%**	**10%**	**12%**	**14%**	**15%**	**15%**	**16%**	**34%**	**40%**	**45%**	**49%**	**49%**	**48%**
DZ	Algeria	31%	40%	44%	52%	60%	67%	8%	9%	9%	7%	7%	8%	22%	30%	35%	45%	52%	59%
EG	Egypt	38%	42%	44%	44%	43%	43%	19%	21%	22%	21%	20%	19%	19%	21%	22%	22%	22%	24%
IL	Israel	77%	84%	89%	90%	91%	92%	47%	45%	46%	56%	58%	57%	30%	39%	42%	34%	34%	35%
JO	Jordan	51%	56%	60%	72%	78%	79%	26%	26%	29%	27%	21%	18%	25%	30%	31%	45%	57%	60%
LB	Lebanon	42%	60%	74%	83%	86%	87%	29%	37%	58%	44%	40%	46%	13%	22%	16%	39%	46%	41%
LY	Libya	27%	50%	70%	76%	76%	78%	13%	20%	22%	20%	20%	17%	14%	30%	48%	56%	57%	60%
MA	Morocco	29%	35%	41%	48%	53%	57%	13%	15%	18%	18%	19%	19%	17%	19%	24%	30%	34%	37%
SY	Syria	37%	43%	47%	49%	52%	55%	27%	30%	32%	31%	32%	34%	10%	14%	15%	18%	20%	21%
TN	Tunisia	38%	44%	51%	58%	63%	67%	0%	0%	0%	0%	0%	0%	38%	44%	51%	58%	63%	67%
Total ENC-South		**36%**	**43%**	**47%**	**51%**	**54%**	**56%**	**16%**	**19%**	**20%**	**20%**	**20%**	**20%**	**20%**	**24%**	**27%**	**32%**	**35%**	**37%**
Total ENC		**40%**	**47%**	**52%**	**56%**	**57%**	**59%**	**13%**	**16%**	**18%**	**18%**	**18%**	**19%**	**27%**	**31%**	**34%**	**38%**	**39%**	**40%**
RU	Russia	54%	63%	70%	73%	73%	73%	14%	15%	16%	17%	17%	18%	40%	47%	53%	57%	56%	55%
Total ENC + Russia		**47%**	**54%**	**60%**	**63%**	**63%**	**63%**	**13%**	**15%**	**17%**	**17%**	**18%**	**18%**	**33%**	**39%**	**42%**	**45%**	**45%**	**45%**

Note: Palestinian territory is not considered due to the lack of data

As the main objective of this paper is to analyse the relationship between urbanisation and migration processes I next analyse the correlation between these concepts. Table 5 display the correlation coefficients between migration and urbanisation rates considering the raw data and the information once time and country effects are removed.[5]

Population growth is positively correlated with emigration rates and negatively correlated with immigration rates. The sign and significance persists when the time effect is removed, but disappears country effects are not present. Consequently, the observed correlation is a country-effect: countries with higher population growth are the ones with less emigration and more immigration.

Urbanisation rates are positively correlated with both emigration and immigration rates and again the country effect dominates. More urbanised countries are the ones with higher propensity to migration, and this is particularly true for countries with higher urbanisation rates in small and median cities. Interestingly, the significance of the correlation coefficient only holds when removing time and country effects for the immigration rate for different urbanisation rates, and displaying conflicting signs: the urbanisation rate in cities of more than one million displays a negative sign, while the urbanisation rate in small and medium cities is positively correlated with the immigration rate. In other words: it looks like international immigration is being directed to smaller cities than to bigger cities.

We finally have looked also at the growth in urbanisation rates. The correlations are generally not significant, with the only exception of the urbanisation rate in large cities and the immigration rate: countries with a bigger growth in large cities are the ones experiencing a smaller international immigration rate.

These results are in line of what we found in the previous tables: more developed countries, that are usually the more urbanised ones, are the ones with higher migration rates, particularly the immigration ones. We also see a quick growth in small and median cities all over the world, while in several developed countries the proportion of people in

[5] In order to remove country and time effects I regressed every variables against time and/or country fixed effects. The residuals of every regression are used to compute the new correlations.

large cities remained almost constant. Overall it can be argued that urbanisation is more a pull than a push factor, as it is more correlated with immigration rates.

Table 5. Correlation coefficients between migration and urbanisation rates

	Emigration rate at Origin				Immigration rate at Destination			
	Raw data	Removing time effects	Removing country effects	Removing time and country effects	Raw data	Removing time effects	Removing country effects	Removing time and country effects
Population Growth	-0.1236*	-0.1161*	-0.0437	-0.0246	0.2325*	0.2536*	-0.0675*	-0.0154
Urbanisation rate	0.0945*	0.0859*	0.0336	-0.0119	0.5024*	0.5095*	0.1384*	0.0383
Urbanisation rate - 1 Million	-0.0823*	-0.0865*	0.0265	0.0035	0.2034*	0.1998*	-0.0591*	-0.1406*
Urbanisation rate - Small and median cities	0.1657*	0.1605*	0.0288	-0.0144	0.4122*	0.4129*	0.1830*	0.1138*
Urbanisation Growth rate	-0.0542	-0.0505	-0.0286	-0.0213	-0.0964*	-0.0874*	-0.0963*	-0.0534
Urbanisation rate - 1 Million - Growth rate	-0.038	-0.0373	-0.0019	-0.0002	-0.0817*	-0.0761*	-0.0067	0.0186
Urbanisation rate - Small and median cities - Growth rate	-0.0356	-0.0312	-0.0275	-0.0205	-0.0559	-0.0479	-0.0925*	-0.0612

Note: asterisks indicate statistical significance at 5%.

In order to see if there are different patterns all over the world we have divided the sample into developed and developing regions and we have computed again the correlation coefficients.[6] Table 6 presents these results.

The basic figures are generally similar to the global ones, as can be expected, particularly when we look at the raw data. Consequently, I focus the next analysis in the correlations once country and time effects are removed. Firstly, in more developed countries population growth is significantly correlated with immigration rates. On the contrary, the urbanisation rates are negatively correlated with immigration rates in more developed countries while positively correlated in less developed countries. The main driver of these differences is the urbanisation rate in small and median cities, negatively correlated in more developed countries and positively correlated with immigration in less developed countries ones, for which larger cities display a negative correlation.

[6] In order to classify every country as developed or developing, we have followed the United Nations composition of economic regions, available at http://unstats.un.org/unsd/methods/m49/m49regin.htm#ftnc. Developed countries are the ones included in the following regions: Europe, North America, Japan, Autralia and New Zealand.

How can be interpreted these negative signs? In my view it means that immigration is taking place in countries with higher urbanisation rates (positive and significant coefficients when we look at the raw data) but the *increase* in urbanisation rates is not driven by international immigration. This result is confirmed by the correlations between immigration rates and the growth in urbanisation rates (last three lines in all tables), that are mostly negative or non significant.

Table 6. Correlation coefficients between migration and urbanisation rates, by level of development

	Emigration rate at Origin				Immigration rate at Destination			
More developed countries	Raw data	Removing time effects	Removing country effects	Removing time and country effects	Raw data	Removing time effects	Removing country effects	Removing time and country effects
Population Growth	-0.087	-0.0377	-0.1727*	-0.0759	0.1867*	0.2758*	0.0031	0.2587*
Urbanisation rate	-0.1602*	-0.2072*	0.1749*	0.0653	0.3731*	0.3432*	0.2478*	-0.2070*
Urbanisation rate – 1 Million	-0.3273*	-0.3332*	0.0495	-0.0177	-0.0378	-0.0486	0.1674*	-0.0447
Urbanisation rate - Small and median cities	0.0932	0.0694	0.1771*	0.0749	0.3590*	0.3336*	0.2218*	-0.1905*
Urbanisation Growth rate	0.0308	0.0811	-0.0442	0.0446	-0.0437	0.0053	-0.0757	0.107
Urbanisation rate - 1 Million - Growth rate	-0.019	-0.013	0.0733	0.0926	-0.0538	-0.0346	-0.1265	-0.0494
Urbanisation rate - Small and median cities - Growth rate	0.0393	0.0863	-0.071	0.0113	-0.0241	0.0198	-0.0375	0.1252

	Emigration rate at Origin				Immigration rate at Destination			
Less developed countries	Raw data	Removing time effects	Removing country effects	Removing time and country effects	Raw data	Removing time effects	Removing country effects	Removing time and country effects
Population Growth	-0.1348*	-0.1285*	-0.0393	-0.0231	0.3202*	0.3408*	-0.0768*	-0.0464
Urbanisation rate	0.1148*	0.1079*	0.0281	-0.016	0.5365*	0.5530*	0.1234*	0.0695*
Urbanisation rate – 1 Million	-0.0674*	-0.0716*	0.0262	0.0045	0.2433*	0.2408*	-0.0848*	-0.1518*
Urbanisation rate - Small and median cities	0.1903*	0.1874*	0.0225	-0.0194	0.4336*	0.4423*	0.1783*	0.1545*
Urbanisation Growth rate	-0.0627	-0.0607	-0.0304	-0.0264	-0.0985*	-0.0941*	-0.1025*	-0.0818*
Urbanisation rate – 1 Million - Growth rate	-0.0389	-0.0384	-0.0048	-0.0036	-0.0784*	-0.0743*	0.0077	0.0263
Urbanisation rate - Small and median cities - Growth rate	-0.0425	-0.0402	-0.0272	-0.0235	-0.0573	-0.0543	-0.1043*	-0.0927*

3. THEORETICAL BACKGROUND

While Massey et al (1993) described six theoretical frameworks of the theories on international migration (neoclassical theory, new economics theory, dual labour market theory, world system theory, social capital theory and cumulative causation theory), most economic literature on the topic assumes the basics of the neoclassical theory: migration is caused by geographic differences in the supply of and demand for labour: resulting differential in wages causes workers from the low-wage country (region) to move to the high-wage one.

As stressed by Bertoli and Fernández-Huertas Moraga (2011), and following Hanson (2010), there is a long tradition of "estimating bilateral migration flows as a function of characteristics in the source and destination countries only". Several recent examples of this strategy are Pedersen et al., 2008; Mayda, 2010; Caragliu et al. 2012, and Belot and Ederveen, 2012), and they are not far away of similar models applied to bilateral flows, such as international trade. Nevertheless, since the work of Anderson and van Wincoop (2003) for trade, there is a growing body of literature where the econometric analysis is consistent with a theoretical background. The migration literature has a similar evolution and one can find recent works following by Douglas and Wall (1993), Douglas (1997), Wall (2001), such as Faggian and Royuela (2010). Alternatively other works follow McFadden (1974), such as Grogger and Hanson, (2011), Ortega and Peri, (2009), Beine, et al. (2011) and Bertoli and Fernández-Huertas Moraga (2011). Both approaches assume model of migration choice across multiple locations and derive an estimating equation from the model.

In this work I follow the model presented in Faggian and Royuela (2010), based on the work by Douglas and Wall (1993), Douglas (1997), Wall (2001) and Guimarães et al. (2000, 2003) and I relate it with the theoretical models based in the McFadden's qualitative choice behaviour's model.

Wall (2001) and Douglas (1997) developed a theoretical model in which each individual faces the decision whether to move to another location based on the comparison between the utility of the current location (origin) and that of the alternative location (destination). The utility of the *i-th* location for the *k-th* individual can be formally expressed as:

$$U_i^k = u\left(A_i, E_i\right) + \varepsilon_i^k \quad (1)$$

where the total utility U is made of a deterministic part u, 'common' to all individuals (i.e. on which there is 'consensus' among people) and a stochastic part ε_i^k (with expected value equal to zero by assumption) which reflects individual idiosyncratic tastes. The 'common' part u is, in turn, function of a vector of amenities (A_i), a vector of economic variables (E_i).

Let us assume each individual, k, can migrate from location i (origin) to location j (destination). If the individual decides to migrate to j, then we define the variable M_{ij}^k being equal to 1, 0 otherwise. The probability that a randomly selected resident of i migrates to j can be expressed as a function of the difference in utility between the destination and the origin, the moving costs (C_{ij}), and the utility differentials between j and the all the other possible r alternative locations.[7]

$$\Pr\left(M_{ij}^k = 1\right) = F\left(U_j - U_i - C_{ij}, U_j - U_1 - C_{ij} + C_{j1}, \ldots, U_j - U_r - C_{ij} + C_{jr}\right) \quad \text{with } r \neq i \quad (2)$$

By defining Δ_{ji}^k as being equal to the difference in the expected values of the idiosyncratic components associated to two alternative locations for individual k, i.e. $\Delta_{ji}^k = E(\varepsilon_j^k) - E(\varepsilon_i^k)$ and assuming a linear functional form, we can re-write equation (2) as:

$$\Pr\left(M_{ij}^k = 1\right) = \alpha\left(u_j - u_i - C_{ij} + \Delta_{ji}^k\right) + \beta\left(\sum_{r=1}^{R} u_j - u_r - C_{ij} + C_{jr} + \Delta_{jr}^k\right) \quad \text{with } r \neq i \quad (3)$$

The probability of moving from i to j is strictly increasing in the 'common' part of utility of location j and strictly decreasing in the 'common' part of utility associated with location i and moving costs. In equations (2) and (3) it is implicit that if the worst location (say location l) is getting worst, there will increase the probability of moving from i to j, but not because of an increase of utilities in location j, but because j becomes a better

[7] Following Wall (2001) any individual-specific cost of moving is included in the idiosyncratic term.

location compared to the rest. This is what has been called as Multilateral Resistance (see Anderson and van Wincoop, 2003 for trade and Bertoli and Hernández-Huertas Moraga, 2011 for migration), the influence of the attractiveness of other locations in the flows between a given pair of origin-destination.

The estimation of equation (3) is problematic for two reasons. Firstly, it is at an 'individual' level, while many migration statistics are at a more 'aggregate' level (such as municipalities, regions, countries, etc.). And secondly, we need appropriate 'aggregation procedures' across locations belonging to the same country to make results robust and consistent. As there is no information on intra-country location differences, Wall (2001) recognises the need to assume that the basic 'common' part of the utility is similar across all different locations within the same country *j*, so that only individual-specific evaluations (the idiosyncratic part of utility) differ. In our specific case this means that the number of migrants from location *i* belonging to country *A* to location *j* belonging to country *B*, M_{ij}, can be re-written as:

$$E\left(M_{ij}\right) = L_j \sum_{k=1}^{P_i} \Pr\left(M_{ij}^k = 1\right) \tag{4}$$

Where L_j accounts for all different locations within the same region *j*, and P_i is the population of the origin *i.* Wall (2001) demonstrates that, if P_i is large enough, equation (4) approaches:

$$E\left(M_{ij}\right) = L_j P_i \Pr\left(M_{ij}^k = 1\right) \tag{5}$$

Rearranging the terms this is equivalent to:

$$\Pr\left(M_{ij}^k = 1\right) = E\left(\frac{M_{ij}}{L_j P_i}\right) = E\left(m_{ij}\right) \tag{6}$$

where m_{ij} can be interpreted as an index of *"migration opportunities"* that the residents in *i* have across the locations in *j*.

The second problem with estimating equation (3) relates to the fact that it includes all the possible alternative locations (different from the origin and the destination). The first

problem is normally solved by using *net* migration flows (see Douglas, 1997 and Wall, 2001) instead of gross migration flows with the assumption that this is an acceptable linear approximation of (3) where β is negligible. Guimarães et al (2000, 2003) propose using a discrete choice model as a starting point instead of the traditional linear OLS. They show that the number of choices in a conditional logit is equal to the number of observations in a Poisson regression, so that, under certain conditions, estimating a model for individuals where every person can migrate to a number of countries is equivalent to estimating a model which simply counts how many people migrate to each country. The second approach is much easier to implement econometrically.

As a Poisson variable is equal to a very big sum of very small probabilities, equation (2) can be re-written as:

$$\Pr\left(Y_{ij}=M_{ij}\right)=F\left(u_j-u_i-C_{ij}+\Delta_{ji}^{k},\ \ldots\ ,u_j-u_r-C_{ij}+C_{jr}+\Delta_{jr}^{k},P_i,L_j\right)=\frac{e^{-M_{ij}}\mu_{ij}^{M_{ij}}}{M_{ij}!} \tag{7}$$

where Y_{ij} is a random Poisson distributed variable with parameter μ_{ij} defined as:

$$\mu_{ij}=\exp(\eta)=F\left(u_j-u_i-C_{ij},P_i,L_j\right) \tag{8}$$

In equation (8), similarly to equation (3), migration flows between *i* and *j* increase with an increase in 'common' utility differentials between destination and origin (in turn dependent upon amenities and economic variables), a decrease in moving costs and an increase in "migration opportunities" (in turn function of the size of the origin and the amount of locations in the country chosen as destination).

One of the main problems of the Poisson distribution is that it assumes the equality between mean and variance (equidispersion) or analytically:

$$\mu_i=\exp(\mathbf{x}_i\beta)=E[y_i\mid\mathbf{x}_i]=Var[y_i\mid\mathbf{x}_i] \tag{9}$$

where $\mathbf{x}_i$ is the vector of explanatory variables.

This can be a problem as it does not fit most real data. Very often data shows *overdispersion*, i.e. a variance well above the value of the mean. As such, the conventional Poisson mean-variance restriction may produce seriously biased parameter estimates (see Cameron and Trivedi 1998, and Wang *et al.* 1996).

One alternative is to use *mixture models*. These models explicitly model heterogeneity among observations by adding an extra parameter, which is a function of *unobserved* heterogeneity. In other words the mean in Equation (9) is replaced by:

$$\mu_i^* = \exp(\mathbf{x}_i\beta)\exp(\varepsilon_i) \tag{10}$$

The negative binomial model is a specific case of mixture models in which $\exp(\varepsilon_i)$ is supposed to be drawn from a gamma distribution so that the probability density is:

$$\Pr\left(y = M = \mathbf{x}\right) = \frac{\Gamma(y+\alpha^{-1})}{y!\Gamma(\alpha^{-1})}\left[\frac{\alpha^{-1}}{\alpha^{-1}+\mu}\right]^{\alpha^{-1}}\left[\frac{\mu}{\alpha^{-1}+\mu}\right]^{y} \tag{11}$$

where Γ indicates the standard gamma function and α determines the degree of dispersion in the predictions (the larger α, the more spread are the data). If α=0, the binomial negative model reduces to the Poisson regression model.

Another common problem when working with real data is accounting for a large number of observations whose value is zero. Lambert (1992) introduced the idea of 'zero-inflated' count models. These are two-step models. The first step is used to model the probability of belonging to the zero-group vs. the non-zero group (a binary process) while the second step is a traditional count model (either Poisson or negative binomial regression). Formally, the density function becomes (see Cameron and Trivedi, 2005):

$$g(y) = \begin{cases} f_1(0) + (1 - f_1(0))f_2(0) & \text{if y=0} \\ (1 - f_1(0))f_2(y) & \text{if y} \geq 1 \end{cases} \tag{12}$$

where $f_1(.)$ is a logit or a probit model and $f_2(.)$ can be either a Poisson or a negative binomial density. This kind of models capture two different processes: one related with the decision to migrate or not (a 0-1 decision, summarised in the logit or probit model), plus another one that summarised the amount of moves (summarised in the Poisson or negative binomial model). It is important to notice that the different variables may influence different processes.

The theoretical approach based on the works of Douglas and Wall is not so far away from other methods based on the McFadden's qualitative choice behaviour's model. Next we follow the model displayed in Bertoli and Fernández-Huertas Moraga (2011). Here the utility that the individual *i* from country *j* obtains from migrating to destination *k*, U_{ijk}, is explained by pair-specific elements, V_{ij}, which we assume that follow a linear function, and by individual specific elements, ε_{ijk}:

$$U_{ijk} = V_{ij} + \varepsilon_{ijk} = x'_{ij}\beta + \varepsilon_{ijk} \tag{13}$$

Assuming that the error term follows a Generalized Extreme Value distribution, the probability that that individual *i* will opt for destination *k* among all possible destinations is given by:

$$p_{ijk} = \frac{e^{V_{jk}/\tau_{d(j,k)}}}{e^{(1-\tau_{d(j,k)})IV[d(j,k)]}} \left[\sum_{d_j} e^{\tau_{dj} IV[dj]}\right]^{-1} \tag{14}$$

Where IV is the inclusive value, the log of the sum of the deterministic component of utility over all locations. The ratio of the probability of migrating from *i* to *k*, p_{ijk}, over the probability of opting for the origin country *j*, p_{ijj}, is given by:

$$\frac{p_{ijk}}{p_{ijj}} = \frac{e^{V_{jk}/\tau_{d(j,k)}}}{e^{(1-\tau_{d(j,k)})IV[d(j,k)]}} \frac{e^{(1-\tau_{d(j,j)})IV[d(j,j)]}}{e^{V_{jj}/\tau_{d(j,j)}}} \tag{15}$$

This ratio depends on the deterministic component of utility in location *j* and *k*, and on the deterministic components of utility in all locations. Taking logs of and using the definition of the inclusive value, one gets:

$$ln\left(\frac{p_{ijk}}{p_{ijj}}\right) = \left(\frac{x_{jk}}{\tau_{d(j,k)}} - x_{jj}\right)' \beta - \left(1 - \tau_{d(j,k)}\right) ln\left(\sum_l e^{V_{lk}/\tau_{d(l,k)}}\right) \quad (16)$$

Finally, as the individual migration decisions are observed over a set *T* of periods; the log of the scale of migration flows to country *k* at time *t* over the size of the population which opts for the origin country *j*, y_{jkt}, can be derived by averaging over the set of individuals *i*:

$$y_{ijk} = \left(\frac{x_{jk}}{\tau_{d(j,k)}} - x_{jj}\right)' \beta + r_{jkt} + \eta_{jkt} \quad (17)$$

In this model are present the elements that typically characterise the gravitational model. The size of the origin countries is present as the endogenous variable is the log of the share of emigrants over total population. Consequently, when working with the amount of migrants, population size would present in the right hand side of the equation, with elasticity equal to one. The size of the destination country, that we found in the model based on the works of Douglas and Wall, is not explicitly displayed, although can be included in the predetermined elements of the equation, *x*. Equally, the distance between countries can be included in such group of country characteristics.

Another element in the proposed equation is the multilateral resistance to migration, r_{jkt}. As it has been controlled in several papers through a fixed effect, we notice that including country-specific fixed effects would capture also the size of the countries and migration costs specific to every country (Ortega and Peri, 2009), plus demographic factors and migrant networks (Bertolli and Hernández-Huertas Moraga, 2011). Consequently, the inclusion of a particular structure of fixed effects will be an important issue for dealing

with heterogeneity, as it may reduce substantially the variability in the data that would be exploited.[8]

Additional econometric issues arise when estimating the empirical model that follows the random utility maximization that ends in a log-normal formulation. Flowerdew and Aitkin (1982) pointed to several problems: the bias created by the logarithmic transformation, the failure of the assumption that all error terms have equal variance, and the sensitivity of research results to zero-valued flows. Several alternatives are being used in the literature to overcome these problems, such as the Poisson (Santos Silva and Tenreyro, 2006), the Negative Binomial and the Zero-Inflated versions of both of them (Burger et al 2009).

A key issue in the estimation of the empirical model is the treatment of heterogeneity. As Santos Silva and Tenreyro (2006) argue, the pattern of heterokedasticty can affect not just the efficiency of the estimator but also its consistency, because of the nonlinear transformation of the endogenous variable. Additionally Cheng and Wall (2005) show that the treatment of heterogeneity using paired-fixed effects factors can alter gravity model estimates and that alternative fixed-effects models are special cases of the general model not supported statistically and inducing biased estimates for the parameters of the control variables. The use of paired-fixed effects is also the strategy followed by Ortega and Peri (2009) to control for multilateral resistance to migration, while Bertoli and Hernández-Huertas Moraga (2011) expands the multilateral resistance measurement and do not consider pair-specific dummies, as they focus in a single country, Spain. All these works include an origin country-time fixed effect which captures any economic, demographic and cost determinant of migration out of the origin country (Ortega and Peri, 2009). Cheng and Wall (2005) include global time times and interpret them as indicators of the extent of 'globalization', as a common trend toward greater flows volumes independent of the size of the economies.

Overall, introducing this complex structure of fixed effects allows to control for the determinants of migration which evolve at a pace of that is slower than the frequency of the panel data, and of course it is a measure of our ignorance, as we do not know exactly

[8] Other works, such as Ruiz and Villarubia (2007) perform a gravitational model controlling multilateral resistance by including both country origin and country destination time dummies, what result in 2*N*T dummies to be included in the model.

which variables are responsible for a potential heterogeneity bias. Nevertheless, in a massive data set as the one considered here, the amount of dummy variables expands exponentially and, as we will see below, we may face a virtually computationally unfeasible problem.

4. EMPIRICAL MODEL

The first step to operationalise the theoretical framework into a workable empirical model is to specify the 'common' part of the utility function. This implies both identifying push and pull factors together with costs. Regarding the explanatory variables, we face a typical problem in applied economics: to instrumentalise the generic economic concepts included in the predetermined component of the utility function.

Among all papers analysed in the literature review of migration, the utility that an individual expects to obtain thanks to migrating is usually based in the actual income differences (GDP per capita, income per capita, income per worker, activity rate, and unemployment rate), demographic and education differences between countries, and even social aspects, such as inequality, poverty or civil rights and democratic variables. Many of them are pull factors, while others can be considered as a measurement of distance between countries. In introduction of physical distance has been complemented in recent works with cultural distances and even with financial distances.

Individuals may only look for a monetary result of their investment in migration, although many other factors may play a role as well. If these additional factors influence subsequently economic growth, a model with just GDP per capita as an explanatory variable would be the reduced form of a wider structural model in which all factors matter. Alternatively one could skip the use of GDP per capita and try with a bunch of development explanatory factors. The economic growth literature has vastly analysed dozens of alternative variables partially correlated with the long-term rate of economic growth. Sala-i-Martin et al. (2004), using Bayesian Averaging of Classical Estimates, found that of 67 explanatory variables tested, 18 were significantly and robustly partially correlated with long-term growth, although just five different concepts are usually enough to capture the main determinants of the concept under study: initial levels of per capita

GDP -the neoclassical idea of conditional convergence- and variables for natural resource endowments, physical and human capital accumulation, macroeconomic stability, and productive specialization.

As stressed above, many papers estimate bilateral migration flows as a function of characteristics in the source and destination countries. Other works, more theoretically grounded, include a shorter list of variables, although in our view it is really hard to short the list. For example, Ortega and Peri (2009) include income per capita, but they also try the use of income in logarithms, decompose income per worker and the employment rate, and even include several controls such as population size, inequality and demographic variables.

As the aim of this paper is to relate urbanisation with international migration flows, next we devote a particular emphasis to the analysis of urbanisation as an explanatory variable in international migration processes. Urbanization, industrialization and economic development tend to be parallel processes. Theory and evidence point towards a positive effect of agglomeration on economic growth. "Due to localized spillovers, geographical agglomeration fosters growth" (Dupont 2007). Adopting various measures of urbanization, some studies empirically report a growth-enhancing effect on countries' income in the long run (Henderson 2003; Brülhart and Sbergami 2009). Additionally the degree of urban concentration may be more important than urbanization per se; the growth-enhancing effects of urbanization, related to scale and agglomeration economies, and particularly in developing countries, are significant for large urban agglomerations but not for small ones (Duranton and Puga 2004; Rosenthal and Strange 2004; Bertinelli and Strobl 2007).

Of course, urbanisation may be the result of a push rather than a pull process, due to violence and social conflict, natural catastrophes or a lack of opportunities. When urbanization takes place as a result of the forced displacement of people from the rural areas it usually takes place in a non-planned way and is, therefore, more likely to delay economic growth. Bloom et al. (2008) compare industrialization-driven urbanization in Asia (considered as likely to enhance economic growth) with urbanization due to population pressure and conflict in Africa, which is more than likely to be detrimental for

growth. In Latin America, the absence of proper urban planning is also evident in certain countries (Angotti, 1996).

Thus, if urbanisation is expected to promote economic growth, it is likely to be associated with higher opportunities and larger migration flows. In this line, the influence of the urbanisation rate in international migrations has been analysed previously in the literature (Kim and Cohen, 2010). Neumayer (2005) suggests that people living in cities in the origin country are likely to be better informed than rural inhabitants. Martin (2003) argues that migrants go to cities in developing countries to get visas or make arrangements for legal or illegal migration. In the destination country, large and growing urban areas indicate better job opportunities and higher salaries. The world system theory, one of the Massey et al (1993) theoretical frameworks on international migration, supports the idea of expanding global cities concentrating educated and well paid workforce that demands unskilled workers, usually coming from international migration. This idea can be expanded from global cities (New York, London, etc.) to the gateway cities: in many countries there are a small number of traditional gateway cities, which are usually the largest metropolitan areas (Burghardt, 1971, Johnston 1982, Frey, 1996, etc.). Consequently, large and increasing urban areas are expected to be associated with international migration. Nevertheless, size is not all: Frey (2002) has referred to a secondary migration process where immigrants move from the gateway cities to the "domestic migration magnet" cities in the United States. This is in line with recent OECD results, stressing that median and small agglomerations enjoy strong levels of development. Several OECD reports (2009 a, b, and c) highlight the idea that growth opportunities are both significant in big urban areas as well as in smaller more peripheral agglomerations. In this line, some authors have recently highlighted that economic growth does not need to depend exclusively on increasing urban concentration: "mega-urban regions are not the only possible growth pattern... context and institutions do matter when we consider economic geography" (Barca et al. 2012).

Finally, as stressed by Rodríguez-Pose and Ketterer (2012) "economic and noneconomic territorial features have been found to be essential elements determining utility differentials, and hence migration incentives of potential movers, across different territories" (p. 536). If amenities such as climate have been found important in the literature (Florida, 2002; Partridge and Rickman, 2003, 2006 in the US and Chesire and

Magrini, 2006 and Rodríguez-Pose and Ketterer, 2012 for Europe), a large amount of man-made amenities are efficiently provided in cities and consequently urbanisations does not only provide higher wages but also more opportunities, in line with Sen's concept of capabilities. Sen (1987) claims that the selection of indicators should consider two issues: the actual outcome of peoples' decisions, and their capabilities, the opportunities they have, and in our view they are wider in cities than in rural areas.

Overall, I will consider a double strategy to explain the observed international migration between countries at every point in time, m_{jkt}.

1) We will consider a los linear function following Ortega and Peri (2009), but in our case we will include two sets of fixed effects (the size of our ignorance): paired origin and destination country fixed effects (as in Bertoli and Hernández-Huertas Moraga, 2011), and origin country-time fixed effects.[9] Once we account for any origin specific cost of migration plus multilateral resistance aspects and permanent distance effects, we include in the vector of deterministic components of utility of the destination country the GDP per capita (the variable usually posed in international migration) and urbanisation (the one that focuses the main attention here). These estimates will be performed both for the full data set and for the migration matrix between the EU27 and the ENC countries + Russia.

2) The second alternative will be to consider a model following Faggian and Royuela (2010) in which I estimate consider a set of non-linear models. In this case I do not include a vast amount of fixed effects, as it becomes a computationally unfeasible problem, and consequently I estimate a typical gravitational model with control variables for both origin and destination countries. Finally I restrict the sample to the migration matrix between the EU27 and the ENC countries + Russia and I run the model following the Ortega and Peri (2009) specification using Poisson and Negative Binomial regressions.

[9] This set of fixed effects represents dozens of thousands dummy variables: NxN plus NxT.

5. DATA AND ESTIMATION RESULTS

The dependent variable is the stock of migrants between every pair of each of the 197 considered countries at every given year (every decade from 1960 to 2010).[10] As the variable mainly represents the flows between neighbouring or big countries and also very distant and small countries, we can expect a very large amount of flows between countries equal to zero.

Table 7 displays the main features of the dependent variable of our model. We can see how in almost all considered years 50% of the observations hold a value equal to zero, being the variable extremely skewed to the right. We can also see several extreme values, such as the 11.6 million Mexican migrants living in USA in 2010. As expected, this particular framework will force us to work with a probability model beyond a simple Poisson regression as, for instance, the variance is much larger than the mean. Besides, if we remove the zeros from the data base the variance of the resulting variable has a standard deviation ten times larger than the mean. Consequently we are likely to be working with a zero inflated negative binomial model, although we will try to test that hypothesis later on.

Table 7. Migration flows descriptive statistics

	1960	1970	1980	1990	2000	2010
25%	0	0	0	0	0	0
50%	0	0	0	0	1	0
75%	6	9	13	23	39	1
90%	153	232	323	497	822	709
95%	924	1320	1968	2929	4448	5624
99%	23394	29796	39985	52226	65444	98270
Largest	8662538	8141307	4803152	5211922	9367910	11635995
Observations	38612	38612	38612	38612	38612	34888
Mean	2335.6	2655.5	3007.1	3548.4	4118.7	5407.1
Std. Dev.	66737.7	64817.97	59515.93	63774.57	72785.31	88368.5
Skewness	88.44	78.00	52.58	51.78	71.93	76.58
Kurtosis	9805.53	8037.65	3433.78	3428.72	7762.56	8945.26

Source: MIGW_SEARCH dataset

[10] As expressed by Ortega and Peri (2009), the theoretical model can be interpreted as determining the relationship for stocks of migrants, or the analogous flows. Finally, they also use stocks rather than flows.

This result differs of what we observe for the migration flows from the ENC countries + Russia towards the EU27 countries (see table 7). Now the proportion of zeros is much smaller than before, and consequently it is likely that the mixed models will not be necessary.

Table 7b. Migration flows descriptive statistics. ENC+Russia towards EU27

	1960	1970	1980	1990	2000	2010
10%	0	0	0	0	6	0
25%	1	2	4	14.5	70	71.4436
50%	27.5	40	81.5	187	445	563.5431
75%	423.5	481	799.5	2061	2682	4338.763
90%	3290	4013	7386	11517	15422	24430.77
95%	15132	26498	28155	50126	53535	61358.4
99%	286209	297315	348740	384423	286498	332950.2
Largest	1177694	1493990	1424707	1375771	1057135	913793.9
Observations	432	432	432	432	432	432
Mean	10418.96	12938.33	13504.44	16422.48	14737.72	17470.37
Std. Dev.	72642.56	94316.27	88348.62	95442.04	78584.72	81166.92
Skewness	11.89035	12.20322	11.66869	10.15339	10.36596	8.343577
Kurtosis	170.7755	172.245	165.9878	123.204	126.8668	81.03178

Finally, when working with the log linear model we will add 1 to every migration stock before computing the natural logarithms, as in Ortega and Peri (2009).

Tables 8 and 8b display the results for the log linear models in which we have included subsequently no fixed effect (model 1), origin-time fixed effects (model 2) country-pair fixed effects (model 3) and finally both origin-time fixed and country-pair fixed effects (model 4). The final model considers more than forty thousand dummy variables. Following Ortega and Peri (2009) the estimates have been weighted by the destination country population to account for heterokedasticity, but we have not been able to compute the standard errors clustered by destination countries to control for correlation within those, due to computational issues. We display the estimates considering different rates of urbanisation: total, urbanisation rate in large cities (more than 1 million) and in medan and small cities (below 1 million).

The results confirm the theoretical expectations: GDP per capita matters for migration, both in logs and in levels. The results can be compared to that of Ortega and Peri (2009).

There, for a subset of 14 OECD receiving countries they obtain an elasticity of income in logarithms equal to 0.29, while our estimates is 0.36, once we account for country-pair fixed effects (Ortega and Peri consider origin country-period fixed effects and destination country fixed effects, and include a list of distance variables as controls, such as physical distance, land border, colonial ties and sharing a language). Consequently, for our data set we obtain significantly larger results than they. It is important to notice that once the full structure of fixed effects is included the net effect of GDP per capita shrinks from 1.16 to 0.36. Additionally, when we include subsequently origin country-time fixed effects and country-pair fixed effects we see that the elasticity has still large values. It implies in my view that the short run fixed effect, obtained in the model with fixed effects, is small compared with the long run structural effect.

When looking at urbanisation rates we see a complex structure. On one side we see that in model 4 (including the full fixed effects structure) urbanisation rates are non significant (model with GDP pc in logs) or significant (GDP pc in levels). Additionally, in intermediate models (particularly in model 3) the effect is negative. I interpret this result in the following terms. Model 3 controls for permanent differences between origin and destination countries, but not for the changing conditions at the origin country. Consequently the negative result in model 3 implies that migration an urbanization at destination are taking place at an inverse rhythm. This is not surprising, as developing countries both expulse people to richer countries and increase their urbanisation rates, as we have seen in previous sections.

What is more striking is the fact that the proportion of people living in large cities (more than 1 million) displays negative elasticity with migration in model 4. This result confirms a previous finding (tables 5 and 6), and contrasts with the significantly positive parameter for median and small cities. Again, we have to consider the global trends: in developed countries the *increase* in urbanisation have been particularly strong in small and median cities, while the proportion of people in large cities have been stagnated (Western Europe) or even decreased (Northern Europe). Inversely, large cities have experienced a large increase in countries that are not receiving immigration, such as African countries. Overall, urbanisation and urban concentration are not being synonymous. On the contrary: migrants go to prosperous countries offering not only higher wages but also more and better services and opportunities, but they are offered more spatially balanced over time.

At the same time, large cities in developing countries are not playing the right role as services providers, probably due to congestion and disordered urban growth.

Table 8b displays the results for migration from ENC countries to EU27 countries. The results confirm the importance of income as the key pull factor and shows a large differential compared with the elasticity observed in table 8: 2.77 in the model with the global urbanisation rate, 1.48 when considering the model with urbanisation in large cities, and 2.56 in the model with urbanisation in median and small cities. Cleary the increasing GDP per capita differential together with the proximity between the EU and the ENC countries has driven large migration flows compared with the full international sample.

Contrary to what is observed in table 8, migration flows from ENC countries + Russia are driven to countries in which the urbanisation rate in large cities has increased more, particularly in Southern Europe (see table 4 for the urbanisation rates and tables 2b and 3b for the destination flows from ENC countries). On the contrary, the urbanisation rate in small and median cities display non-significant parameters, what contrasts with the results of the full sample. Consequently, the arguments displayed for the full sample change for the ENC countries. Now people have migrated to countries where has increased more spatial concentration and income, countries where opportunities happen in large cities rather than on small and medium cities. For checking robustness, I have run several regressions for a restricted sample in which the last year migration data (2010) is not included. In this case the regressions (not reported here) weight more the observations before the political change of communism and, as one could expect, migration happened between countries belonging to the same ‘side’ of Europe and consequently, as one could expect, the parameter for GDP per capita arises as negative rather than the positive value that theory would predict.

Table 8. Log-linear regression estimates. Full sample of countries

	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	GDP pc in logs				*GDP pc in levels*			
GDP pc	1.164***	1.107***	0.525***	0.363***	0.000178***	0.000177***	0.000119***	0.000172***
	0,0129	0,0109	0,0175	0,0205	1,41E-06	1,17E-06	1,67E-06	1,58E-06
Urbanisation rate	-0.0310***	-0.0203***	-0.0302***	-0,00014	0.00458***	0.0115***	-0.0235***	0.0260***
	0,000962	0,000826	0,00109	0,00121	0,000511	0,000439	0,000773	0,00117
Origin-time FE	NO	YES	NO	YES	NO	YES	NO	YES
Origin-destination FE	NO	NO	YES	YES	NO	NO	YES	YES
Sample size	134260	134260	134260	134260	134260	134260	134260	134260
Adj R2	0,153	0,405	0,841	0,877	0,197	0,453	0,847	0,89
	GDP pc in logs				*GDP pc in levels*			
GDP pc	0.771***	0.867***	0.380***	0.362***	0.000187***	0.000196***	0.000122***	0.000165***
	0,00819	0,00709	0,0146	0,0205	1,40E-06	1,17E-06	1,67E-06	1,56E-06
Urb. - 1 Million	0.00218**	-0,000872	-0.0600***	-0.0133***	0,000208	0.00231***	-0.0727***	-0.0150***
	0,0011	0,000931	0,00237	0,00234	0,000915	0,000761	0,00203	0,00221
Origin-time FE	NO	YES	NO	YES	NO	YES	NO	YES
Origin-destination FE	NO	NO	YES	YES	NO	NO	YES	YES
Sample size	134260	134260	134260	134260	134260	134260	134260	134260
Adj R2	0,147	0,403	0,841	0,877	0,197	0,451	0,848	0,89
GDP pc	0.948***	0.957***	0.433***	0.357***	0.000181***	0.000185***	0.000113***	0.000179***
	0,00754	0,00636	0,017	0,0206	0,00000116	9,64E-07	0,00000164	0,0000016
Urb.Median & Small	-0.0252***	-0.0154***	-0.0316***	0.00556***	0.00693***	0.0168***	-0.0239***	0.0498***
	0,000846	0,000733	0,00146	0,00154	0,000633	0,00055	0,00105	0,00149
Origin-time FE	NO	YES	NO	YES	NO	YES	NO	YES
Origin-destination FE	NO	NO	YES	YES	NO	NO	YES	YES
Sample size	134260	134260	134260	134260	134260	134260	134260	134260
Adj R2	0,153	0,405	0,84	0,877	0,197	0,454	0,847	0,891

Table 8b. Log-linear regression estimates. ENC-EU27 countries

	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	GDP pc in logs				*GDP pc in levels*			
GDP pc	1.725***	1.688***	2.402***	2.767***	0.000183***	0.000179***	0.000163***	7.78e-05**
	(0.130)	(0.111)	(0.220)	(0.517)	(1.41e-05)	(1.32e-05)	(1.41e-05)	(3.05e-05)
Urbanisation rate	0.0113	0.0137*	0.0153	0.0674***	0.0105	0.0154**	0.0419***	0.0653***
	(0.00884)	(0.00750)	(0.0180)	(0.0196)	(0.00897)	(0.00781)	(0.0157)	(0.0199)
Origin-time FE	NO	YES	NO	YES	NO	YES	NO	YES
Origin-destination FE	NO	NO	YES	YES	NO	NO	YES	YES
Sample size	1,568	1,568	1,568	1,568	1,568	1,568	1,568	1,568
Adj R2	0.176	0.444	0.817	0.847	0.172	0.429	0.819	0.844
	GDP pc in logs				*GDP pc in levels*			
GDP pc	2.007***	2.021***	2.404***	1.480***	0.000202***	0.000211***	0.000187***	0.000128***
	(0.102)	(0.0902)	(0.139)	(0.520)	(1.08e-05)	(1.03e-05)	(9.81e-06)	(2.97e-05)
Urb. - 1 Million	-0.0642***	-0.0622***	0.216***	0.337***	-0.0462***	-0.0486***	0.341***	0.406***
	(0.00910)	(0.00781)	(0.0414)	(0.0408)	(0.00901)	(0.00785)	(0.0397)	(0.0402)
Origin-time FE	NO	YES	NO	YES	NO	YES	NO	YES
Origin-destination FE	NO	NO	YES	YES	NO	NO	YES	YES
Sample size	1,568	1,568	1,568	1,568	1,568	1,568	1,568	1,568
Adj R2	0.200	0.465	0.821	0.854	0.185	0.442	0.829	0.856
	GDP pc in logs				*GDP pc in levels*			
GDP pc	1.585***	1.596***	2.746***	2.561***	0.000168***	0.000170***	0.000195***	6.03e-05**
	(0.108)	(0.0923)	(0.205)	(0.529)	(1.20e-05)	(1.10e-05)	(1.44e-05)	(3.03e-05)
Urb.Median & Small	0.0373***	0.0378***	-0.0223	-0.00581	0.0310***	0.0343***	-0.00910	-0.0236
	(0.00639)	(0.00548)	(0.0172)	(0.0191)	(0.00666)	(0.00573)	(0.0163)	(0.0189)
Origin-time FE	NO	YES	NO	YES	NO	YES	NO	YES
Origin-destination FE	NO	NO	YES	YES	NO	NO	YES	YES
Sample size	1,568	1,568	1,568	1,568	1,568	1,568	1,568	1,568
Adj R2	0.192	0.460	0.817	0.845	0.183	0.441	0.818	0.842

The non-linear models (Poisson, Negative Binomial , etc.) deserve another approach, as it is not feasible to perform the estimates for such a large amount of fixed effects. Consequently I have followed a different strategy, consisting on using the characteristics in origin and destination countries as variables to be controlled for. We subsequently analyse the role of urbanisation in every regression once we look at the best option between all non-lineal models considered.

In the more complex models (mixed model), there is a first part modelling the decision to migrate or not (a 0-1 decision, summarised in the logit or probit model), plus another one that summarises the amount of moves (summarised in the Poisson or negative binomial model). In the logit (or probit) model we just include the variables usually included in the gravitational model: population at origin and destination, plus the distance between them.

In the count model we include traditional variables regarding every alternative concept. It is important to notice that not all variables have the same amount of observations. Consequently, every enlargement of the model with additional variables will result in a decrease in the data set, what will decrease the sample in the least developed countries, as the data availability for them is much smaller. Consequently, we expect that as we enrich the variable setting of our model specification we will have a smaller amount of observations and also a smaller amount of zeros, what will drive us to potentially use simpler models other than the zero inflated negative binomial ones.

Thus, I first propose a model in which I include the basic variables of the gravitational model plus several others such as the ones related with colonial relationship between countries. The results, reported in table 9, support the basic grounds of the gravitational model: large population increase the probability of migration and the amount of migrants, longer distances decrease the endogenous variables, and sharing a border or having historical ties increase the amount of moves between countries, although having a common colonial ties display conflicting results in the models. I have included year dummies in all count and inflation models and they were always significant. The amount of observations is significantly large: for the inflated models we face 225,615 observations, being the preferred specification the Zero Inflated Negative Binomial model.

Table 9. Regression results. Basic gravitational non-linear models.

	Poisson	Negative Binomial	Zero Inflated Poisson	Zero Inflated Negative Binomial
Count model				
pop_o	2.213e-09***	1.858e-08***	1.945e-09***	8.878e-09***
pop_d	2.231e-09***	1.831e-08***	2.065e-09***	1.283e-08***
contig	2.1602479***	3.0467779***	2.0517807***	2.8425224***
dist	-.00017588***	-.00014436***	-.00011159***	-.00011611***
comlang_ethno	.85136764***	.81966966***	.69269163***	.68152661***
colony	1.5827023***	3.5973908***	1.3893715***	3.3870441***
comcol	.18687581***	-.30182673***	.19505248***	-0.00405855
col45	1.3404284***	-1.1043588***	1.1632356***	-.83037746***
smctry	.45452297***	.75947663***	.39096277***	.37607558***
Year dummies	YES	YES	YES	YES
_cons	7.8552433***	6.1012994***	8.2670053***	6.7027951***
Lnalpha (NB)		2.8843946***		2.4925929***
Zero Inflated Model				
Year dummies			YES	YES
pop_o			-6.285e-09***	-2.727e-07***
pop_d			-2.677e-09***	-7.624e-08***
distw			.00013115***	.00020783***
_cons			-.36430325***	-.74539772***
Observations	227948	227948	225615	225615
Zeros			132516	132516
Log Likelihood	-1.93E+09	-751369.21	-1.66E+09	-734520.35
Chi-squared (p-value)	3.45E+09 (0.000)	41924.3 (0.000)	2.55E+09 (0.000)	35670.2 (0.000)
AIC	3.86E+09	1502766.4	3.32E+09	1469086.7
Voung test (p-value)			447.42 (0.000)	56.71 (0.000)

Note: the null hypothesis under the Vuong test considers the more parsimonious model.
Legend: * p<.05; ** p<.01; *** p<.001

The following model specifications include sequentially variables related with all concepts listed above: economic, institutional, demographic and urbanisation. We always consider the Zero Inflated Negative Binomial model as the standard model in these new estimates. Table 10 display the main results. First of all it can be seen that the sample size of every estimate differ substantially basically due to the amount of information on every considered variable.

Regarding the economic variables we see in all estimates that GDP per capita at the destination country matters. Interestingly, the GDP per capita at the origin country displays a significantly positive parameter in two out of the three estimates where it is included. Rather than interpreting this result as contrary to the intuition (according to the neoclassical theory one should expect a negative sign), it means that people in more developed countries display a higher propensity to migration. The same result can be

obtained for other economic variables, such as telephone lines per capita. This variable displays a negative parameter in the full specification, what I interpret as decreasing propensity to migrate as countries get richer.

Table 10. Gravitational models. Zero Inflated Negative Binomial Regressions

	Economic variables			Institutional	Demographic	Urbanisation	All variables
	(a)	(b)	(c)				
Count model							
pop_o	9.901e-09***	8.802e-09***	1.045e-08***	8.669e-09***	7.753e-09***	8.602e-09***	5.442e-09***
pop_d	6.812e-09***	1.182e-08***	6.681e-09***	1.505e-09***	1.131e-08***	1.072e-08***	2.472e-09***
contig	3.3509874***	2.6621882***	3.2831053***	3.3133917***	3.712183***	3.5644716***	3.5054234***
dist	-.00021148***	-.00012406***	-.00020197***	-.00019814***	-.00019381***	-.00022128***	-.00022665***
comlang_et~o	.63805573***	1.0996006***	.94508094***	1.0503358***	1.2947561***	.70916256***	.78463617***
colony	3.0371457***	2.5912563***	2.3988538***	2.8910996***	2.4066868***	2.9421941***	2.366422***
comcol	.96803943***	-.39209972***	.81155436***	.35954577***	.83242768***	.70050621***	.76651573***
col45	-0.18277009	-0.0845153	.65753666***	-.93976265***	0.12401405	-0.01772885	0.14560993
smctry	.73118121***	.6105464***	.81845719***	.64089519***	.61378256***	.86328202***	1.0318595***
gdppc_o	-9.895e-06***		8.202e-06**				.00004702***
gdppc_d	.00011567***		.00011693***				.00007732***
teleph_pc_o	.02866039***		.02200012***				-.01937779***
teleph_pc_d	.02267522***		.0236858***				-.00806678***
agr_land_o		.02379365***	.01560558***				.00883773***
agr_land_d		.00713965***	.01700718***				.0093277***
food_PI_o		.0026246***	0.00047947				-.00156916***
food_PI_d		-.00185894***	-.00328656***				-.00384519***
van_index_o				.0357459***			.01145639***
van_index_d				.04611051***			.01093526***
migstock_o				7.486e-08***			7.357e-08***
migstock_d				7.486e-07***			3.641e-07***
female_o					.1597438***		.20871605***
female_d					-.4978674***		-0.00176602
pop_0_14_o					-.05407122***		-.06185713***
pop_0_14_d					-.01444706***		-0.0044469
pop_m65_o					.0227792***		-.09152535***
pop_m65_d					.27838161***		-.04187864***
pop_urb_p_o						.00941566***	.00378722***
pop_urb_p_d						.05908297***	.0343219***
_cons	6.5833118***	5.2968484***	5.2032734***	5.8273727***	24.58067***	4.1425574***	-2.610983***
Year dummies	YES	YES	YES	YES	YES	YES	YES
Inflated model							
pop_o	-2.049e-07***	-1.990e-07***	-1.843e-07***	-1.443e-07***	-2.345e-07***	-2.727e-07***	-9.306e-08***
pop_d	-1.305e-07***	-6.605e-08***	-8.238e-08***	-2.125e-07***	-1.928e-07***	-1.311e-07***	-5.968e-08***
distw	.00019032***	.00020719***	.00018978***	.00019411***	.00017739***	.0001964***	.00015982***
_cons	-1.2107659***	-1.1566947***	-1.284593***	-1.8277002***	-.48118769***	-.52073944***	-2.0680414***
Year dummies	YES	YES	YES	YES	YES	YES	YES
lnalpha	2.2727007***	2.3910955***	2.213378***	2.2032637***	2.3248522***	2.362852***	2.0064702***
Observations	119928	178734	111956	132120	190814	223488	87712
Zeros	61986	99226	57166	66355	103540	130740	41513
% zeros	52%	56%	51%	50%	54%	58%	47%
Log Likelihood	-459092.74	-626579.46	-433388.21	-512831.87	-678713.62	-720091.67	-364326.22
Chi-squared (p-value)	35634.964	32760.367	36683.627	46100.428	57049.923	59066.643	39688.299
AIC	918239.47	1253212.9	866838.42	1025717.7	1357485.2	1440233.3	728738.43
Voung test (p-value)	35.49 (0.00)	54.46 (0.00)	36.93 (0.00)	42.61 (0.00)	47.74 (0.00)	54.91 (0.00)	45.88 (0.00)

We have included a list of variables related with the agriculture sector. These two variables (Agricultural land as a proportion land area and a Food production index) capture the sectoral composition of the country and in particular the productivity of the agriculture sector, that can be linked to the rural-urban transformation of developing

countries. Overall we see that higher agricultural weight in every country economy diminishes the propensity to migration.

Institutional aspects such as the Van Hanen Index of Democratization and the initial stock of migrants matters. Overall we see again that more developed countries (usually related with higher levels of democracy) display higher migration outcomes, and that having social networks at the other country strongly influence higher levels of migration.

Regarding demographic issues we see that countries with higher proportion of women show higher emigration rates and receive fewer immigrants, while countries with younger population exhibit less migrations. Again these variables are related with development, as more developed countries are usually characterised by higher proportions of people over 65 years old and a more balanced proportion between genders.[11]

Finally, the variables related with urbanisation display positive results. As developed countries are the more urbanised ones, this result suggests again that migration levels are higher in more developed countries. The parameter of the destination country is about 7 times larger than the parameter of the origin country. It means that more urbanised countries display higher proportion of immigrants than what they expulse. Interestingly this asymmetry, typical in migration gravitational models, is much larger than the one observed between origin and destination GDP per capita and to any other variable.

In the last exercise we do the same regressions and include the growth of urban population and also the proportion of people living in large (more than one million inhabitants) and medium sized cities. Table 11 displays the basic results of the full model (see last column in table 10) but only focused in the variables concerned with urban issues. Next I list the basic findings:

- Urban growth matters, particularly at home: people prefer migrate from own rural to own urban rather than migrating away
- Again, it is related with development, as less developed countries have increased more their urban level.
- Large cities have a stronger influence than median cities (gateway cities)

[11] Interestingly, the linear correlation between per capita GDP and the proportion of women is negatively significant (-0.16).

Table 11. Results for urbanisation variables

	(a)	(b)	(c)	(d)
pop_urb_p_o	.00402653***	.02865663***		
pop_urb_p_d	.03086862***	.03871773***		
urban_1M_p_o			.00846658*	.00774332
urban_1M_p_d			.03855981***	.03651132***
urban_me p_o			.00525746	.00723197
urban_me p_d			.02852118***	.02635642***
pop_g_urban o		-.26673529***		-.22947129***
pop_g_urban d		-.07567707**		-.12660148***
Observations	70228	13182	6987	6987

The final set of regressions considers the restricted sample of international migration from ENC countries + Russia to EU27. I work with the Ortega and Peri (2009) specification, in which I include origin country-time fixed effects (NxT dummy variables) plus destination-country fixed effects (N dummy variables). In this case the Vuong tests cannot reject the null hypothesis (only 10% of the observations are zero) and consequently we estimate the negative binomial models, as they show, again, a superior behaviour than the Poisson model. As in Ortega and Peri (2009), in order to account for fixed migration costs between countries, I include distance variables. After considering a wide set of variables, I have included the weighted distance between countries plus a dummy variable for contiguity between countries.

Table 12 displays the main results. We can see there how GDP pc is not a pull factor in these models, while regarding urbanisation rates the only indicator is the urbanisation rate in large cities (larger than 1 million). Again, it is confirmed the fact that international migration from ENC countries + Russia towards EU27 countries have been directed towards countries where large cities have experienced higher increases. This result confirms what was found for the full set of countries, with the main difference that now the set of dummy variables largely controls for the origin country circumstances

Table 12. Negative binomial regression models.

Migration flows from ENC countries +Russia to EU27

	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	GDP pc in logs			GDP pc in levels		
GDP pc	-0.0837	-0.29	-0.0475	7.72E-05	9.20E-05	8.46E-05
	(0.817)	(0.866)	(0.883)	(0.0000951)	(0.0000947)	(0.000098)
Urbanisation rate	0.084			0.0772		
	(0.0528)			(0.0536)		
Urbanisation 1 Million		0.203***			0.210***	
		(0.0734)			(0.0715)	
Urbanisation Small & median cities			0.00688			-0.00274
			(0.0386)			(0.0381)
distw	-0.00154***	-0.00158***	-0.00155***	-0.00155***	-0.00157***	-0.00155***
	(0.000505)	(0.000481)	(0.000505)	(0.000494)	(0.000468)	(0.000492)
contig	2.926***	2.802***	2.820***	2.789***	2.661***	2.675***
	(0.538)	(0.547)	(0.517)	(0.601)	(0.59)	(0.579)
Constant	4.445	7.355	8.576	3.255	3.704**	7.616***
	(7.721)	(7.656)	(8.043)	(3.15)	(1.791)	(1.748)
		0.951***	0.964***	0.953***	0.943***	0.958***
lnalpha (Neg Bin)	(0.958***)	(0.137)	(0.136)	(0.134)	(0.136)	(0.136)
	0.135					
Origin-time FE	YES	YES	YES	YES	YES	YES
Destination FE	YES	YES	YES	YES	YES	YES
Observations	1568	1568	1568	1568	1568	1568
Log pseudo likelihood	-12040.798	-12038.467	-12051.91	-12040.798	-12031.255	-12045.895

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

6. CONCLUSIONS

This work has tried to shed light on the relationship between international migration and agglomeration economies. In order to do that I have developed the following **tasks**:

1. Review of the international migration facts all over the world and at the ENC countries + Russia over the 1960-2010 period.
2. Analysis of population growth, and international emigration and immigration rates.
3. Review of the urbanisation trends I global terms and also in large cities (more than 1 million inhabitants) and small and median cities.
4. Literature review of international migration theories, posing the debate at the current state of the art, where macro empirical models follow a theoretically based microeconomics model.

5. Literature review of international migration empirical models, proposing both log linear and non-linear count models (Poisson, Negative Binomials, and mixed zero inflated models), and going one step beyond by analysing a complex structure of fixed effects with dozens of thousands of dummy variables, what allows for capturing the net effect of pull factors of international migration.
6. Joint analysis of international migration flows for both the whole world data set and for the ENC countries + Russia towards EU27 countries.

The main **conclusions** of this work can be summarised in the following bullets.

- International migration has increased in absolute terms, although in relative terms it only experienced a rebound in 2000, and is still below the 1960 figures. In ENC countries + Russia international migration represents much larger figures than in the rest of the world, being particularly large (around 15% of local population are emigrants) in ENC-East countries.
- Population growth has decreased from 2% in 1960 to 1.2% in 2010. The only subregion in the world with population losses is Eastern Europe in the period 1990-2010, being ENC-East and countries Russia the main driver of such evolution. On the contrary ENC – South countries display very large demographic growth rates (1.7% in the 2000-2010 period).
- Urbanisation rates are getting large all over the world, particularly in world regions that had low figures 50 years ago. In 2010 the urbanisation rate is 51%. Among urban citizens, 40% live in large cities (more than 1 million inhabitants), and that figure is roughly constant over the last 50 years, although world region differences are important. ENC East countries + Russia have higher urbanisation rates than ENC East countries, although large cities are more important in the latter countries.
- Emigration rate is positively correlated with urbanisation rates, although when one accounts for country and time fixed effects that correlation vanishes. It implies that urbanisation is not a push factor. When one looks at the relationship between immigration rates and urbanisation one sees that international migration is correlated with the growth in small and median cities with in less developed countries, and with the growth of larger cities in developed countries.

- Most economic literature assumes that migration is caused by differences in the supply and demand for labour, being the differential in wages and labour opportunities the main driver for migration. Recent academic works assume a model of migration choice across multiple locations and derive an estimating equation from the model. I have reviewed two alternative and complementary approaches, which can be summarised in the works of Royuela and Faggian (2010) and Ortega and Peri (2009), resulting in two alternative empirical models. I assume the critiques posed in Santos Silva and Tenreyro (2006) and estimate not only log linear models coming from Ortega and Peri (2009) but also count models, following Royuela and Faggian (2010).
- Urbanisation can be considered a pull factor, as immigrant workers not only look for monetary outcomes from migrating, but also non-economic territorial features, that have been found to be essential elements determining utility differentials.
- The final estimates report the following results: international migration flows all over the world accounts for an elasticity of the log of GDP pc of 0.36, larger than the result obtained for OECD countries by Ortega and Peri (0.29). Restricting the model to international migration from ENC countries + Russia towards EU27 we account for a much larger elasticity (2.77), what highlights the large migration flows responding to large and increasing GDP pc differentials between neighbouring countries.
- Urbanisation rates matter for international migration. In the international sample the urbanisation rate in small and median cities is positive and significantly correlated with migration, while the urbanisation in large cities display a negative and significant sign, clearly influenced by the decreasing or stagnated evolution of the urbanisation rate in large cities in more developed countries in Western and Northern Europe. The result is just the opposite for ENC countries + Russia, as migration is more driven to Southern Europe, a region that has experienced important increases in larger cities.
- Gravitational models report the following resuts: urban growth matters, particularly at home: people prefer migrate from own rural to own urban rather than migrating away; migration is related with development, as less developed countries have increased more their urban level; and large cities have a stronger influence than median cities (gateway cities).

- The count models a-la-Ortega and Peri (2009) stress the influence of urbanisation issues in the restricted sample of international migration from ENC countries + Russia towards EU27, as GDP pc arises as non-significant in all models, while urbanisation rates in large cities arises as a pull factor. Again, migrants from ENC countries are directed towards EU27 countries where urbanisation rate in large cities have increased most.

REFERENCES

- **Anderson, J.E. and van Wincoop, E** (2003) "Gravity with Gravitas: A Solution to the Border Puzzle" *The American Economic Review*, 93(1), pp. 170-19
- **Angotti, T.** (1996). "Latin American Urbanization and Planning: Inequality and Unsustainability in North and South," *Latin American Perspectives* 23(4), 12-34.
- **Barca, F., McCann, P., and Rodríguez-Pose, A.** (2012). The case for regional development intervention: Place-based versus place-neutral approaches. *Journal of Regional Science* 52(1), 134-152.
- **Belot, M. and Ederveen, S.** (2012) "Cultural barriers in migration between OECD countries", *Journal of Population Economics*, 25, pp 1077-1105.
- **Bertinelli, L., and Strobl, E.** (2007) "Urbanisation, Urban Concentration and Economic Development," *Urban Studies* 44(13), 2499-2510.
- **Bertoli, S. and Fernández-Huertas Moraga, J.** (2011) "Multilateral Resistance to Migration", FEDEA working paper dt2011-04.
- **Bloom, D. E., Canning, D., and Fink, G.** (2008). "Urbanization and the wealth of nations," *Science*, 319(5864), 772-5.
- **Borjas, G.J.** (1987) "Self-selection and the earnings of immigrants", *American Economic Review*, 77 (1987), pp. 531–553
- **Burghhardt, A.F.** (1971), A Hypothesis about Gateway Cities. Annals of the Association of American Geographers 61, pp. 269–285.
- **Burger, M. van Oort, F. and Linders, G.J.** (2009) "On the Specification of the Gravity Model of Trade: Zeros, Excess Zeros and Zero-inflated Estimation", *Spatial Economic Analysis*, 4(2), 167-190.
- **Cameron, C. & Trivedi, P.K.** (2005) *Microeconometrics: Methods and Applications*, Cambridge University Press, New York.
- **Caragliu, A., Del Bo, C., de Groot, H.L.F. and Linders G.M.** (2012) "Cultural determinants of migration", *Annals of Regional Science*, in press.
- **Castells, D. and Royuela**, V. (2012) "Agglomeration, Inequality and Economic Growth: Cross-section and panel data analysis," ERSA conference papers, European Regional Science Association. http://ideas.repec.org/p/ira/wpaper/201114.html
- **Cheng, I-H. and Wall, D.** (2005) "Controlling for heterogeneity in gravity models of trade an integration"*, Federal Reserve Bank of St. Louis Review,* (81(1), 49-63.

- **Cheshire, P. and Magrini, S.** (2006) "Population Growth in European Cities: Weather Matters – But Only Nationally," *Regional Studies*, 40(1), 23–37.
- **Cushing, B. & Poot, J.** (2004) Crossing boundaries and borders: Regional science advances in migration modelling. *Papers in Regional Science*, 83, 317-338.
- **Beine, M., F. Docquier, and C. Özden** (2011) "Diasporas," *Journal of Development Economics*, 95(1), 30-41.
- **Brülhart, M., and Sbergami, F.** (2009). "Agglomeration and growth: Cross-country evidence," *Journal of Urban Economics*, 65(1), 48-63**.**
- **Douglas, S.** (1997) Estimating relative standard of living in the United States using cross-migration data. *Journal of Regional Science*, 37(3), 411-436.
- **Douglas, S., & Wall, H.J.** (1993) Voting with your feet and the quality-of-life index - a simple nonparametric approach applied to Canada. *Economics Letters*, 42(2-3), 229-236.
- **Dupont, V.** (2007). "Do geographical agglomeration, growth and equity conflict?" *Papers in Regional Science*, 86, 193–213.
- **Duranton, G. and Puga, D.** (2000). "Diversity and Specialisation in Cities: why, where and when does it matter?" *Urban Studies* 37, 533
- **Faggian, A. and Royuela, V.** (2010), "Migration Flows and Quality of Life in a Metropolitan Area: the Case of Barcelona-Spain", *Applied Research in Quality of Life*, 5(3), pp 241-259.
- **Florida, R.** (2002) *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life*. New York: Basic Books.
- **Flowerdew, R. and Aitkin, M.** (1982) "A method of fitting the gravity model based on the Poisson distribution", *Journal of Regional Science*, 22, 191-202.
- **Frey, W. H.** (1996) "Immigration, Domestic Migration, and Demographic Balkanization in America: New Evidence for the 1990s." *Population and Development Review* 22(4):741–763.
- **Frey, W. H.** (2002) "U.S. Census Shows Different Paths for Domestic and Foreign-Born Migrants," *Population Today* 30, no. 6: 3–5.
- **Genc, M., Gheasi, M., Nijkamp, P. and Poot, J.** (2011) "The impact of immigration on international trade: a meta-analysis", Norface Migration Discussion Paper No. 2011-20.

- **Gheasi, M., Nijkamp, P., Poot, J.** (2012) "Special issue on international migration: editorial introduction", Annals pf Regional Science, in press.
- **Grogger, J., and G. H. Hanson** (2011) "Income maximization and the selection and sorting of international migrants," *Journal of Development Economics*, 95(1), 42-57.
- **Guimarães, P., Figueiredo, O. & Woodward, D.** (2000) Agglomeration and the location of foreign direct investment in Portugal. *Journal of Urban Economics*, 47, 115-135.
- **Guimarães, P., Figueiredo, O. & Woodward, D.** (2003) A tractable approach to the firm location decision problem. *Review of Economics and Statistics*, 85, 201-204.
- **Hanson, G. (2010)** "International Migration and the Developing World," in *Handbook of Development Economics*, ed. by D. Rodrik, and M. Rosenzweig, pp. 4363-4414. North-Holland, Volume 5.
- **Harris, J. R., and Todaro, M. P.** (1970). Migration, unemployment and development: a two-sector analysis. American Economic Review 60: 126-142.
- **Henderson, V.** (2003). "The Urbanization Process and Economic Growth: The So-What Question," *Journal of Economic Growth* 8, 47-71.
- **Johnston, R.J.** (1982), The American Urban System: A Geographical Perspective. London: Longman.
- **Kim, K. and Cohen, J.E.** (2010) "Determinants of International Migration Flows to and from Industrialized Countries: A Panel Data Approach Beyond Gravity", *International Migration Review*, 44(4), 899-932.
- **Kuznets, S.** (1955). "Economic Growth and Income Inequality," *American Economic Review,* 45, 1-28.
- **Lambert, D.** (1992). "Zero-inflated Poisson regression, with an application to defects in manufacturing" *Technometrics* 34, 1-14.
- **Lewis, W. A.** (1954) "Economic Development with Unlimited Supplies of Labour" *Manchester School of Economic and Social Studies*, 22, 139–191.
- **Martin, P.** (2003) ''Economic Integration and Migration: The Mexico-US Case.'' UNU/WIDER. Discussion Paper No. 2003 / 35. Helsinki, Finland: United Nations University / World Institute for Development and Economic Research
- **Massey, D.S. Arango, J Hugo, G Kouaouci, A., Pellegrinoand, A. and Taylor, J.E.,** "Theories of International Migration: A Review and Appraisal", *Population and Development Review*, 19(3), pp. 431-466.

- **Mayda, A. M.** (2010) "International migration: a panel data analysis of the determinants of bilateral flows," *Journal of Population Economics*, 23(4), 1249-1274.
- **McFadden, D. (1974)** "Conditional Logit Analysis of Qualitative Choice Behavior" in P. Zarembka Eds. *Frontiers in Econometrics*, New York Acedemic press.
- **Milanovic (2011)** "A short history of global inequality: The past two centuries", *Explorations in Economic History*, 48(4), pp. 494–506.
- **Neumayer, E.** (2005) ''Bogus Refugees? The Determinants of Asylum Migration to Western Europe." *International Studies Quarterly* 49:389–409.
- **OECD** (2009a) *How Regions Grow*, Paris. Organisation for Economic Cooperation and Development.
- **OECD** (2009b). *Regions Matter: Economic Recovery, Innovation and Sustainable Development*. Paris. Organisation for Economic Cooperation and Development.
- **OECD** (2009c). *Regions at a Glance*. Paris. Organisation for Economic Cooperation and Development.
- **Ortega, F., and G. Peri** (2009) "The Causes and Effects of International Migrations: Evidence from OECD Countries 1980-2005," NBER Working Paper No. 14883, National Bureau of Economic Research.
- **Özden, Ç., Parsons, C.R. Schiff, M. and Walmsley, T.L.** (2011) "Where on earth is everybody? The evolution of global bilateral migration 1960-2000", *The World bank Economic* Review, 25(1), pp. 12-56.
- **Partridge, M. and Rickman, D.** (2003) "The Waxing and Waning of US Regional Economies: The Chicken-Egg of Jobs Versus People," *Journal of Urban Economics*, 53, 76–97.
- **Partridge, M. and Rickman, D.** (2006) "Fluctuations in Aggregate US Migration Flows and Regional Labor Market Flexibility," *Southern Economic Journal*, 72, 958–980.
- **Pedersen, P. J., M. Pytlikova, and N. Smith** (2008) "Selection and network effects-Migration flows into OECD countries 1990-2000," *European Economic Review*, 52(7), 1160-1186.
- **Ranis, G. and Fei, J.C.H.** (1961), "A Theory of Economic Development," *American Economic Review*, 51, 533-565.
- **Rodríguez-Pose, A. and Ketterer, T.D.** (2012) "Do local amenities affect the appeal of regions in Europe for migrants?" *Journal of Regional Science*, 52(4), 535–561.

- **Rosenthal,S. and Strange, W.** (2004). "Evidence on the Nature and Sources of Agglomeration Economies," *Handbook of Urban and Regional Economics, Vol. 14, Geography and Cities* J.V. Henderson and J-F Thisse eds.
- **Ruiz, J.M and Villarubia, J.M. (2007)** "The wise use of dummies in gravity models: export potentials in the Euromed region", *Banco de España Working Papers Series,* n. 0720.
- **Sala-i-Martin, X., Doppelhofer, G., and Miller, R. I.** (2004) "Determinants of long-term growth: A Bayesian averaging of classical estimates (BACE) approach," *American Economic Review*, 3, 813–835.
- **Santos Silva, J.M.C., Tenreyro, S.** (2006) "The log of gravity" *Review of Economics and Statistics*, 88(4), 641-658.
- **Sen, A.** (1987), *The Standard of Living* (University Press, Cambridge).
- **Todaro, M.P.** (1976) *Internal Migration in Developing Countries*. Geneve. International Labour Organization.
- **Wall, H.J.** (2001), Voting with your feet in the United Kingdom: Using cross-migration rates to estimate relative living standards. *Papers in Regional Science*, 80, 1-23.
- **Wang, P., Puterman, M. L., Cockburn, I., and Le, N.** (1996) "Mixed Poisson regression models with covariate dependent rates" *Biometrics*, 52, 381–400.
- **World Bank** (2009). *World Development Report 2009: Reshaping economic geography*. Washington D.C: World Bank.

Annex 1. Considered countries, classified by continents and geographical regions

The countries classification by geographical regions corresponds to the United Nations Geoscheme, that can be accessed at http://unstats.un.org/unsd/methods/m49/m49.htm

Africa

Central Africa
- Angola
- Cameroon
- Central African Republic
- Chad
- Congo
- Equatorial Guinea
- Gabon
- Sao Tome and Principe

Northern Africa
- Algeria
- Egypt
- Libya
- Morocco
- Sudan
- Tunisia

Eastern Africa
- Burundi
- Comoros
- Djibouti
- Eritrea
- Ethiopia
- Kenya
- Madagascar
- Malawi
- Mauritius
- Mozambique
- Rwanda
- Seychelles
- Somalia
- Tanzania
- Uganda
- Zambia
- Zimbabwe

Southern Africa
- Botswana
- Lesotho
- Namibia
- South Africa
- Swaziland

Western Africa
- Benin
- Burkina Faso
- Cape Verde
- Cote d'Ivoire
- Gambia
- Ghana
- Guinea
- Guinea-Bissau
- Liberia
- Mali
- Mauritania
- Niger
- Nigeria
- Senegal
- Sierra Leone
- Togo

America

Caribbean
- Antigua and Barbuda
- Aruba
- Bahamas
- Barbados
- Cayman Islands
- Cuba
- Dominica
- Dominican Republic
- Grenada
- Haiti
- Jamaica
- Puerto Rico
- St Kitts and Nevis
- St Lucia
- St Vincent and the Grenadines
- Trinidad and Tobago
- Turks and Caicos Islands

Central America
- Belize
- Costa Rica
- El Salvador
- Guatemala
- Honduras
- Mexico
- Nicaragua
- Panama

Northern America
- Bermuda
- Canada
- Greenland
- United States

South America
- Argentina
- Bolivia
- Brazil
- Chile
- Colombia
- Ecuador
- Guyana
- Paraguay
- Peru
- Suriname
- Uruguay
- Venezuela

Asia

Central Asia	**East Asia**	**Western Asia**
Kazakhstan	China	Armenia
Kyrgyzstan	Hong Kong	Azerbaijan
Tajikistan	Japan	Bahrain
Turkmenistan	Korea, North	Cyprus
Uzbekistan	Korea, South	Georgia
South Asia	Macao	Iraq
Afghanistan	Mongolia	Israel
Bangladesh	**Southeast Asia**	Jordan
Bhutan	Brunei	Kuwait
India	Cambodia	Lebanon
Iran	Indonesia	Oman
Maldives	Laos	Qatar
Nepal	Malaysia	Saudi Arabia
Pakistan	Myanmar	Syria
Sri Lanka	Philippines	Turkey
	Singapore	United Arab Emirates
	Thailand	Yemen, North
	Vietnam	

Europe

Eastern Europe	**Northern Europe**	**Southern Europe**
Belarus	Denmark	Albania
Bulgaria	Estonia	Bosnia and Herzegovina
Czech Republic	Faroe Islands	Croatia
Hungary	Finland	Gibraltar
Moldova	Iceland	Greece
Poland	Ireland	Italy
Romania	Latvia	Macedonia
Russia	Lithuania	Malta
Slovakia	Norway	Portugal
Ukraine	Sweden	San Marino
Western Europe	United Kingdom	Slovenia
Austria		Spain
Belgium		
France		
Germany		
Luxembourg		
Netherlands		
Switzerland		

Oceania

Australia and New Zealand	**Micronesia**	**Polynesia**
Australia	Kiribati	French Polynesia
New Zealand	Marshall Islands	Samoa
Melanesia	Micronesia	Tonga
Fiji	Northern Mariana Islands	Tuvalu
New Caledonia	Palau	
Papua New Guinea		
Solomon Islands		
Vanuatu		

Annex 2. Full set of considered variables for the gravitational model (tables 9 to 11)

- Gravitation model: we use the population of origin (pop_o) and destination (pop_d).

- Migration costs:
    - We consider several alternative geographic distance measurements: Simple distance between capitals (distcap), Weighted distance (distw), Alternative weighted distances (distwces), Simple distance between most populated cities (dist), Contiguity (contig)
    - Plus several social distance measurements: Common official language (comlang_off), Common language spoken by at least 9% of the population (comlang_ethno), Former colonial relationship (colony), Common colonizer (comcol), Current colonial relationship (curcol), Common colonizer post 1945 (col45), Were or are the same country (smctry).

- Economic variables:
    - GDP per capita differences (dgdppcc)
    - Unemployment rate differences (dur)
    - Inflation, consumer prices (annual %) (infl_CPI), Inflation, GDP deflator (annual %) (infl_GDPd)
    - Telephone lines (per 100 people) (teleph_pc)
    - Sectoral variables (agriculture): Agricultural land (% of land area) (agr_land), Arable land (% of land area) (arab_land_p), Arable land (hectares per person) (arab_land_pc), Food production index (2004-2006 = 100) (food_PI)

- Institutional variables:
    - Democracy - Freedom House/Polity (fh_ipolity2), Institutionalized Democracy - Polity IV (p_democ), Index of Democratization – Van Hanen (van_index)
    - ICRG indicator of Quality of Government (icrg_qog), Human Development Index (undp_hdi)
    - Economic freedom indicators: EFW chain index (FI_CI_SUM) plus 5 components: Size of Government: Expenditures, Taxes, and Enterprises (FI_CI1_GOVSIZE); Legal Structure and Security of Property Rights (FI_CI2_LEGAL); Access to Sound Money (FI_CI3_SOUNDMONEY); Freedom to Trade Internationally (FI_CI4_TRADE); Regulation of Credit, Labor, and Business (FI_CI5_REG). Information on the index of Labor market regulations is also provided (FI_CI5b_LABREG)
    - KOF index of globalization (DR_IG)
    - Freedom of Religion (NEW_RELFRE)
    - Former stock of migrants (migstock)

- Demographic variables:
    - Population, female (% of total) (female),
    - Life expectancy at birth, total (years) (life_exp), Mortality rate, infant (per 1,000 live births) (mort_inf),
    - Population ages 0-14 (% of total) (pop_0_14), Population ages 15-64 (% of total) (pop_15-64), Population ages 65 and above (% of total) (pop_m65)

- Urbanisation variables:
    - Population density (people per sq. km of land area) (pop_dens), Population, total (pop_total)
    - Rural population (pop_rur_tot), Rural population (% of total population) (pop_rur_p)
    - Urban population (pop_urb_t), Urban population (% of total) (pop_urb_p)
    - Population in urban agglomerations of less than 1 million (total) (urban_median), Population in urban agglomerations of less than 1 million (% of total population) (urban_median_p)
    - Population in urban agglomerations of more than 1 million (urban_1M), Population in urban agglomerations of more than 1 million (% of total population) (urban_1M_p)
    - Population in largest city (pop_largest), Population in the largest city (% of urban population) (pop_larg_p)
    - Population growth (annual %) (pop_growth), Rural population growth (annual %) (pop_g_rural), Urban population growth (annual %) (pop_g_urban)

- Time: we include a dummy variable for every considered year in the data set.

WP3/04 SEARCH WORKING PAPER

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Michael Beenstock, Daniel Felsenstein

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Modeling ENP-EU Migration in a Spatial Gravity Framework

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Abstract

The study uses a spatial gravity model with spatial dependence in the bilateral flows between origins and destinations. This is important for policy because it underscores the futility of parochial policy targeting in the presence of spatial spillover. Traditionally, it has been assumed that only developments in the origins and destinations affect the magnitude of migration between them. In the present study there are spillover effects between neighboring EU destinations and neighboring ENP origins. Spatial weights in neighboring destinations are based on intra-EU migration, and spatial weights in neighboring origins are based on intra-ENP migration. We have found only weak evidence of the attractiveness of welfare generosity in EU destination countries as influencing migration from the ENP's. The same is true for the effectiveness of enforcement measures against illegal immigrants from the ENP's. It would seem that both sticks and carrots in the destination (EU) countries do not, on the whole affect immigration from ENP countries. Nor do economic conditions in the ENP countries affect immigration to EU countries. Although the evidence is not strong enough to support substantive policy prescriptions, it implies that reduced economic growth in EU and cuts in welfare are unlikely to reduce the flow of immigration from ENP countries. However, the influence of neighboring countries seems to be of more importance. These powerful spatial spillovers mean that parochial immigration policies are destined to fail, and that immigration policy must be deigned globally.

Keywords

Spatial gravity, migration

JEL Classification

J61, F22

1. INTRODUCTION

Gravity modeling has been used extensively to investigate the determinants of economic relationships in trade, capital investment and migration between origins and destinations. The gravity model hypothesizes that bilateral flows depend on push-factors in the origins and pull-factors in the destinations. For example, migration from country A to country B depends on push-factors in A and pull-factors in B. In one-way gravity models the origins and destinations are different spatial units, such as A and B. In two-way gravity models a spatial unit is both an origin and a destination; e.g. there is migration from B to A as well as from A to B.

For the most part gravity models have been estimated under the assumption that bilateral flows are independent[1]. Specifically, it is assumed that the residual errors of bilateral flows are independent. For example, migration from A to B is independent of migration from A to C and from D to B. Since B and C are alternative destinations for migrants from A, it is unlikely that AB flows will be independent of AC flows. Also, it is unlikely that AB flows will be independent of DB flows unless A and D are independent. If A and D are geographically related, then AB and DB flows are unlikely to be independent. Ignoring the dependence between bilateral flows induced statistical inefficiency at best, and bias and inconsistency at worst. The latter arises in nonlinear models e.g. when zero bilateral flows, which are usually quite frequent in the data, are modeled as a probit or Poisson process[2].

The econometric shortcomings of assuming bilateral independence in estimating gravity models were first pointed out by LeSage and Pace (2008). They investigated these shortcomings in a two-way context (migration within the United States) in which dependence between bilateral flows was modeled as a spatial lag process. This assumes that dependence between bilateral flows results from geographic proximity. In the above example B and C are geographically close. They estimated separate spatial lag

[1] Originally suggested by Pöyhönen (1963) the gravity model has become a workhorse in the empirical analysis of bilateral flows.
[2] For example, Helpman, Melitz and Rubinstein (2008) have suggested nonlinear estimators to treat zero bilateral flows. However, by assuming bilateral independence, their solution may introduce new biases. Burger, van Oort and Linders (2009 have suggested the use of a zero-inflated Poisson model.

coefficients for origins and destinations. The dependence between bilateral flows does not have to be spatial; dependence might arise for other reasons. In the example above B and C do not have to be geographically close; they might be substitute destinations for immigrants even though they are far apart. This approach is taken by Behrens, Ertur and Koch (2012) in their gravity model for trade flows.

The econometric methodology in the present paper has much in common with LeSage and Pace (2008). However, there are a number of differences. First, we propose a lagrange multiplier test for spatial autocorrelation in OLS estimates of gravity models. This test is particularly useful because if the OLS residuals from gravity models are spatially independent there is unlikely to be a strong case for making the effort to estimate spatial lags in gravity models. Second, we estimate the spatial counterpart to ARCH (or GARCH) models in time series. We refer to this phenomenon by SpARCH. In SpARCH models volatility is spatially related so that residual volatility depends upon residual volatility in neighboring regions (see for example Willocks 2010). In standard spatial models the conditional mean depends on its counterpart in neighboring spatial units. In SpARCH models both the conditional mean and its variance are spatially dependent. Third, the identities of origins and destinations are separate. Specifically, the origins are European Neighborhood Countries (ENCs) and the destinations are EU countries. Fourth, we suggest a method for estimating robust standard errors for the parameters of gravity models estimated by OLS, which exploits the pattern of spatial autocorrelation between the origins and between the destinations. This extends Driscoll and Kraay (1998) who suggested a similar idea for spatial panel data.

We illustrate these methods using migration data from the ENP countries to the EU during 2000 – 2010. The underlying hypothesis is that migration is motivated by economic differentials between the EU countries and the ENPs. Also, migration is motivated by the generosity of welfare benefits and the number of incumbent ENP migrants in the EU countries. Since the data include illegal immigrants, we also investigate whether immigration depends on the legal rights of illegal immigrants in the EU destinations.

Whereas the spatial econometrics of gravity models has been ignored, the same does not apply to the econometric treatment of zero bilateral flows (Helpman, Melitz and Rubinstein 2008, Burger, van Oort and Linders 2009). This problem arises from the fact

that typically many bilateral flows are zero, in which case OLS is inappropriate. Various approaches have been suggested for treating these zeros, including Heckman type selection, tobit censoring, and zero-inflated count data analysis. There are zero bilateral flows in our ENP – EU migration data too. However, we side-step this issue by noting that these zeros occur exclusively among the newer members of the EU, and do not arise among the EU15. Therefore, our main econometric concern is with the spatial econometrics of one-way gravity models.

In section 2 we discuss the spatial econometrics of one-way gravity models. In section 3 we specify a theoretical model for one-way international immigration, specifically immigration from the ENPs to the EU15. An innovative component is the focus on welfare-induced immigration and policy towards illegal immigrants in the EU15. The data are presented in section 4 and results are reported in section 5. Section 6 concludes.

2. METHODOLOGY

Let Y_{od} denote a bilateral flow of Y from origin o to destination d, when there are N_o origins and N_d destinations. Therefore, the total number of observations is $N = N_oN_d$. Origins are labeled by o = 1,2,..,N_o and destinations are labeled by d = 1,2,…,N_d. Let j denote a neighbor of o and k denote a neighbor of d. The gravity hypothesis of interest is:

$$Y_{od} = \alpha + X_o\beta + Z_d\gamma + u_{od} \qquad (1)$$

where X are push factors in the origin and Z are pull factors in the destination. If equation (1) is estimated by OLS it is assumed that the residuals u_{od} are uncorrelated. However, as mentioned above this is unlikely for three main reasons. First, there may be intra-destination spatial autocorrelation (SACD) so that $E(u_{od}u_{ok}) \neq 0$ Secondly, there may be intra-origin spatial autocorrelation (SACO) so that $E(u_{od}u_{jd}) \neq 0$. Third, there may be spatial autocorrelation between origins and destinations (SACOD) so that $E(u_{od}u_{jk}) \neq 0$. In what follows we focus on SACD and SACO because it is difficult to motivate SACOD.
Origins and destinations have different numbers of neighbors depending on their geography. Origin o has J_o neighbors labeled by j and destination d has K_d neighbors labeled by k. We use tildes to denote spatial variables. Equation (2a) defines the intra-

origin spatial residual for origin o to destination d. It is a weighted average of the residuals of o's neighbors to destination d. The spatial intra-origin weights w_{oj} are summed to one for convenience.

$$\widetilde{u}_{od} = \sum_{j=1}^{J_o} w_{oj} u_{jd} \qquad (2a)$$

$$\widetilde{u}_{do} = \sum_{k=1}^{K_d} v_{dk} u_{ok} \qquad (2b)$$

Equation (2b) defines the intra-destination spatial residual for unit o in destination d. It is a weighted average of o's residuals in the neighbors of destination d. The intra destination weights v_{dk} are summed to one for convenience. However, these normalizations are not essential.

2.1 Spatial Autocorrelation

The lagrange multiplier approach to misspecification testing conveniently assumes that various restrictions do not apply, and tests the validity of these assumptions ex post. By contrast, likelihood ratio tests involve the estimation of both the restricted and the unrestricted models, and Wald tests require the estimation of the restricted model. Since the restricted model may be difficult to estimate, the LM approach has obvious practical advantages. The main disadvantage is that its statistical power is inferior. In the present context the restricted model would involve accounting for the dependence between bilateral flows in the gravity model, which is a difficult task in its own right. By contrast, the LM approach ignores these restrictions, estimates the gravity model by OLS and then checks the OLS residuals for spatial autocorrelation.

If the LM statistic is not statistically significant, the OLS assumption of independence between bilateral flows is vindicated.

LM tests have to control for the covariates used to estimate the residuals, i.e. X_o and Z_d in equation (1). Therefore, the auxiliary regression for the LM test of SACD and SACO is given by equation (3):

$$\hat{u}_{od} = \phi + X_o\lambda + Z_d\mu + \theta_o\tilde{u}_{od} + \theta_d\tilde{u}_{do} + \varepsilon_{od} \qquad (3)$$

The SACO and SACD coefficients are θ_o and θ_d respectively. The former picks up SAC among the origin's J_o neighbors. The latter picks up SAC among the destination's K_d neighbors. If $\theta_o = \theta_d = 0$ it must be the case that the elements of λ and μ are zero too since OLS assumes that X_o and Z_d are independent of the residuals. Therefore, if there is no SACO and SACD the R^2 of equation (3) must be zero. The LM statistic is equal to NR^2 and it has a chi-square distribution with 2 degrees of freedom, one for SACO and the other for SACD. If the LM statistic exceeds its critical value it must be because θ_o and θ_d differ from zero.

The origin weights (w) and the destination weights (v) may be specified in terms of contiguity etc. We define them by:

$$w_{oj} = \frac{m_{oj}}{m_o} \qquad (4a)$$

$$v_{dk} = \frac{m_{dk}}{m_d} \qquad (4b)$$

where m_{oj} is the bilateral flow from o to neighbor j (intra ENC) and m_o is the total flow from o to its J_o neighbors, and m_{dk} is the flow from d to neighbor k (intra EU) and m_d is the total flow from d to its K_d neighbors. Because these weights are constructed out of intra-destination flows and intra-origin flows they are not directly dependent on flows from origins to destinations. For example, the inter o – d flow from Algeria to Belgium is independent of the intra o flow from Algeria to Morocco and the intra d flow from Belgium to Germany.

2.2 Robust Standard Errors

Spatial autocorrelation may be inherent or it might be induced by the misspecification of equation (1). In the latter case the remedy involves specifying the model correctly. In the former case the parameter estimates are unbiased but inefficient. In certain spatial panel data models they are also biased and inconsistent. Driscoll and Kraay (1998) suggested

calculating "robust" standard errors, which take account of SAC in spatial panel data. We apply their approach to SAC in gravity models using the spatial covariance matrix for the residuals of equation (1).

Vectorizing equation (1) we rewrite it as:

$$y = Q\omega + u \qquad (5)$$
$$Q = (X \ Z)$$
$$\omega' = (\beta \ \gamma)$$
$$u = (\theta_o W + \theta_d V)u + \varepsilon \quad (6)$$

where W and V are the NxN spatial connectivity matrices with elements w and v respectively. The solution to equation (6) is:

$$u = A\varepsilon \qquad (7)$$
$$A = (I_N - \theta_o W - \theta_d V)^{-1}$$

The spatially robust covariance matrix of the OLS estimate of ω is:

$$\Sigma_\omega = (Q'Q)^{-1}(Q'\Theta Q)(Q'Q)^{-1} \qquad (8)$$
$$\Theta = A\Sigma_\varepsilon A'$$

If ε is homoscedastic $\Theta = \sigma_\varepsilon^2 AA`$. To implement equation (8) estimates of A and Σ_ε based on estimates of θ_o, θ_d and ε obtained from equation (3) are substituted into equation (8).

An obvious and asymptotically superior alternative to the use of spatially robust standard errors is to estimate equation (1) by FGLS, which involves the joint estimation of the parameters in equation (1) and θ_o and θ_d.

2.3 Spatially Autoregressive Conditional Heteroscedasticity (SpARCH)

The ARCH model developed for time series assumes that current volatility, as measured by the variance, depends on lagged volatility. In the case of residual volatility, the first-

order ARCH model relates the squared residual at time t (u_t^2 which represents current volatility) to the squared residual at time t-1 (u_{t-1}^2):

$$u_t^2 = a + bu_{t-1}^2 \qquad (9)$$

where b is the ARCH coefficient. Conditional volatility is $E(u_t^2 / u_{t-1}) = a + bu_{t-1}^2$, which is heteroscedastic because it depends on t. However, unconditional volatility is homoscedastic since it equals a/(1-b), which does not depend on t. Since the homoscedasticity assumption of OLS refers to unconditional homoscedasticity ARCH has no implications for statistical inference. Matters are, however, different in nonlinear models. The LM test for (p-order) ARCH is carried out by substituting estimates of the OLS residuals in equation (9) and estimating a and b by OLS with T observations. The LM statistic is TR^2 and has a chi-square distribution with p degrees of freedom where R^2 refers to equation (9).

The spatial counterpart of equation (9) is:

$$u_i^2 = a + b\tilde{u}_i^2 \qquad (9)$$

according to which $E(u_i^2 / \tilde{u}_i) = a + b\tilde{u}_i^2$, i.e. the variance is conditionally heteroscedastic since it depends on i. To obtain the unconditional variance, equation (9) is vectorized:

$$u^2 = a + bWu^2 \qquad (10)$$

from which the unconditional variance is $a(I - bW)^{-1}$ which is homoscedastic because it does not depend on i.

In one-way gravity models the counterpart to equation (9) is:

$$u_{od}^2 = a + b_o\tilde{u}_{od}^2 + b_d\tilde{u}_{do}^2 \qquad (11)$$

where b_o is the SpARCH coefficient induced by volatility among the origins and b_d is its counterpart among the destinations. The unconditional variance is $a(I - b_oW - b_dV)^{-1}$. The LM test statistic is NR^2 which has a chi-squared distribution with 2 degrees of freedom.

2.4 Spatial Dynamics

If there is a common factor, spatial autocorrelation indicates that the spatial dynamics of model are miss-specified, and that a spatially static model with SAC is inferior to a spatially dynamic model without SAC[3]. In this case the specification of a first order lagged spatial dependent variable is the appropriate methodological response to SAC. However, if the residuals of a spatially static model are not spatially autocorrelated, this does not necessarily mean that the specification of spatial lagged dependent variables is inappropriate. We test for SAC and specify spatial lagged dependent variables in the origins and destinations, as well as spatial lags on the gravity variables (X and Z):

$$Y_{od} = \alpha + X_o\beta + Z_d\gamma + \widetilde{X}_o\psi + \widetilde{Z}_d\eta + \pi_o\widetilde{Y}_o + \pi_d\widetilde{Y}_d + u_{od} \qquad (12)$$

$$\widetilde{X}_{no} = \sum_{j=1}^{J_o} w_{oj}X_{nj} \quad \widetilde{Z}_{nd} = \sum_{k=1}^{K_d} v_{dk}Z_{nk} \qquad \widetilde{Y}_o = \sum_{j=1}^{J_o} w_{oj}Y_{oj} \qquad \widetilde{Y}_d = \sum_{k=1}^{K_d} v_{dk}Y_{ok}$$

where π_o and π_d are the spatial lag coefficients, and ψ and η are the spatial lag coefficients on the push and pull variables.

LeSage and Pace (2008) and LeSage and Fischer (2010) discuss a variant of equation (12) in which flows are two-way so that all spatial units are both origins and destinations. This simplifies the specification of the spatial weights because there is no need to distinguish between origins and destinations. On the other hand, it greatly increases the burden of estimation because there are N^2 flows instead of N. In what follows we discuss modifications to the LeSage & Pace methodology when origins and destinations have different identities.

[3] See e.g. Anselin (1988) pp 226-9.

The observations are stacked (as in panel data) by flows from origin o to all N_d destinations. The flows from origin o are denoted by y_o which is a vector of length N_d. There are N_o such vectors. Define $y` = (y_1, y_2,\ldots,y_{No})`$, which is of length N_dN_o. The N_d x N_d spatial weights matrix among the destinations with elements v_{de} is denoted by W_d and the N_o x N_o spatial weights matrix among the origins with elements w_{op} is denoted by W_o. W_d and W_o have zeros on their leading diagonal. We may write y as:

$$\tilde{y} = Dy + \Omega y = \tilde{y}_d + \tilde{y}_o \qquad (13)$$
$$D = I_{No} \otimes W_d \qquad \Omega = W_0 \otimes I_{Nd}$$

Equation (13) decomposes the spatial lagged dependent variable into its destination and origin components. Ω and D are N x N matrices ($N = N_oN_d$). D is block diagonal with W_d on the leading diagonal and N_d x N_d zero matrices elsewhere. Ω is made up of N_o blocs of matrices $w_{op}I_{Nd.}$

Equation (12) may be expressed in terms of these matrices:

$$y = \alpha + X\beta + Z\gamma + \Omega X\psi + DZ\eta + \pi_o\Omega y + \pi_d Dy + u \qquad (14)$$

The only difference between equation (14) and standard spatial lag models is the separate terms in Ωy and Dy. If $\pi_o = \pi_d = \pi$ equation (14) simplifies to the standard spatial lag model[4]:

$$y = \alpha + X\beta + Z\gamma + \Omega X\psi + DZ\eta + \pi Wy + u \qquad (15)$$
$$W = D + \Omega$$

Because equation (15) contains a single spatial lag coefficient (π) it is standard, and it may be estimated by maximum likelihood using statistical packages such as Matlab. Matters are different for equation (14) because it contains two spatial lag coefficients (π_o and π_d), and the likelihood function depends on $\ln\left|I_N - \pi_o\Omega - \pi_d D\right|$. Elhorst et al (2012) have developed estimators for higher order spatial lag models, which are used below to estimate π_o and π_d.

[4] This restriction is imposed using Matlab by Behrens et al (2012).

According to equation (1) developments in destination k (d's neighbor) do not affect migration from o to d. Nor do developments in origin j (o's neighbor) affect migration from from o to d. Indeed, migration from o to d depends only on developments in d and o; the bilateral flows are independent. According to equation (14) these bilateral flows are dependent for two reasons. First, the spatial lag coefficients (η and ψ) on the push and pull factors mean that migration from o to d depends on developments in k and j. Second, the coefficients on the spatial lagged dependent variable (π_o and π_d) mean that migration from o to d depends on developments beyond the neighbors of o and d.

If for simplicity $\alpha = \eta = \psi = 0$ and there is one push factor z and pull factor x, the solution to equation (14) is:

$$y = C(\beta x + \gamma z) \qquad (16)$$
$$C = \left(I_N - \pi_o \Omega - \pi_d D\right)^{-1}$$

Therefore:

$$Y_{od} = \beta \sum_{n=1}^{N} c_{od.n} x_n + \gamma \sum_{n=1}^{N} c_{od.n} z_n \qquad (17)$$

where $c_{od.n}$ are the elements of C from row od. Equation (17) shows that migration from o to d depends on x and z in all origins and destinations. However, these elements are likely to vary inversely with their distance from o and d. If $\pi_o = \pi_d = 0$ equation (17) simplifies to:

$$Y_{od} = \beta x_o + \gamma z_d \qquad (18)$$

i.e. only developments in o and d affect migration from o to d. Notice that the coefficients of x_o and z_d in equation (17) differ from their counterpart in equation (18) since $c_{od.od}$ generally differs from 1. Indeed, positive spatial feedback implies that $c_{od.od}$ is likely to exceed 1.

3. IMMIGRATION THEORY

The basic idea that immigration is driven by income differentials between origins and destinations is usually attributed to Hicks (1932) and Sjaastad (1962). However, Adam Smith argued that migration is driven by wage differentials, and regarded policies to limit internal migration in England immigration as unjust and economically harmful[5]. The development of the welfare state during the 20th century created a new motivation for immigration. Immigrants are attracted to destinations where welfare benefits in cash and in kind are more generous[6]. Empirical evidence in favor of this hypothesis has been found for the EU (Péridy 2006, De Giorgi and Pellizzari 2006, Docquier et al 2006 and Razin et al 2011) and for internal migration in the US (Borjas 1999, McKinnish 2007). Razin et al argue that welfare generosity disproportionately attracts unskilled immigrants because skilled immigrants are deterred by the higher taxation required to finance this generosity. In all of these studies it is assumed that bilateral migration flows are independent.

3.1 Stocks and Flows

Immigration flows during time t and t+1 are hypothesized to be determined according to Sjaastad's stock adjustment model in which the levels of push and pull factors at time t and their changes during times t to t+1 are hypothesized to determine immigration flows from origins to destinations. For example, if GDP per head is a pull factor in the destinations, immigration varies directly with the level of GDP per head at time t and the change in GDP per head between times t and t+1. If the latter happens to be zero, immigration depends only on the initial level. If the immigrant stock was at its equilibrium level in time t, the stock-adjustment model predicts that immigration during times t and t+1 should be zero.

The stock adjustment model should control for the stock of immigrants at time t. Given everything else the effect of the initial stock should be negative. If, however, incumbent

[5] Smith (1976) argued that the law of settlements, enacted to enforce poor law benefits provide by parishes, restricted internal migration and were responsible for spatial wage inequality. “The very unequal price of labour which we frequently find in England in places at no great distance from one another, is probably owing to the obstruction which the law of settlements gives to a poor man who would carry his industry from one parish to another without a certificate.” (p 142). Smith called for the repeal of the law of settlements and the promotion of economically motivated migration.

[6] Adam Smith would have been familiar with this theory since the law of settlements prevented individuals from migrating to parishes where the poor laws were administered more generously.

immigrants provide new immigrants with social network amenities, the stock of immigrants at time t might also increase immigration (isn't there a cut off point beyond which the size of stock has no effect?).

Let y_{odt} denote the stock of immigrants from o in d in time t and y^*_{odt} denote its equilibrium counterpart. The stock adjustment model predicts that the flow of immigrants between times t and t+1 is:

$$Y_{odt} = \phi(y^*_{odt} - y_{odt}) + \varphi\Delta y^*_{odt+1} \qquad (19)$$

where ϕ and φ are stock adjustment coefficients. Let P_d denote a vector of p pull factors in d, let U_o denote a vector of push factors in o, and let P denote the N_d x p matrix with rows P_d. In principle, immigrants from o may choose between all destinations. Therefore:

$$y^*_{odt} = \Gamma_o P_t + \Xi_o U_{ot} \qquad (20)$$

Equation (20) states that the equilibrium number of immigrants from o in d at time t depends via Γ_o on the pull factors in d and rival destinations, as well as the push factors in o. Substituting equation (20) into equation (19) and assuming Γ and Ξ do not vary by origin gives:

$$Y_{odt} = \phi(\Gamma P_t + \Xi U_{ot}) + \varphi(\Gamma\Delta P_{t+1} + \Xi\Delta U_{ot+1}) - \phi y_{odt} \qquad (21)$$

Therefore in equation (1) $X_o = P_t + \Delta P_{t+1}$ and $Z_o = U_{ot} + \Delta U_{ot+1}$. Equation (21) is a multilateral gravity model because bilateral flows depend on multilateral nodes. Tunisians may emigrate to France as well as other EU countries. According to equation (21) they compare pull factor in France with pull factors in other EU countries (giving appropriate spatial weights) .

One of these pull factors may be the existing number of Tunisians in France relative to other EU countries. Therefore, y_{odt} may be a pull factor. If so, this variable has a positive effect as a pull factor, and a negative effect as indicated in equation (21).

3.2. Push and Pull Factors

In gravity models immigration is assumed to depend on GDP per head in origins and destinations, as well as measures of cultural and ethnic difference. For example, if o and d share a common language immigration from o to d is likely to be greater. Also, immigration is hypothesized to vary inversely with the geographical distance between o and d. If immigrants are positively selected (Borjas 1987) they are attracted by income inequality since they expect to earn more where there is more dispersion. If so, immigration should vary directly with the gini coefficient in d.

We also investigate whether immigration is motivated by welfare. Legal immigrants benefit from social security and other benefits received by natives. Apart from pecuniary benefits, such as unemployment benefit and income support, we attach importance to benefits in kind including health, education and housing. Given everything else, we expect that d will be a more attractive destination to immigrants the more generous are its benefits.

The case of illegal (the politically correct EU parlance is ‘ irregular’) immigrants is more complicated. Procedures for dealing with political refugees vary by country; they may be more or less lenient. If d is more lenient it is likely to attract more immigrants. Illegal immigrants either did not apply for refugee status, or if they did and were refused, they go underground. Countries also vary by their alacrity in expelling illegal immigrants. Finally, countries vary by the legal rights of illegal immigrants and their children in terms of their access to health services and schooling. Countries that are more lenient and generous in their treatment of illegal immigrants are expected to be more attractive as destinations. We are unaware of empirical studies of the effects of immigration policy on illegal immigration. Indeed, Yoshida and Woodland (2005) signally do not cite such studies[7].

4. DATA

We use data from the Global Bilateral Migration Database (GBMD), compiled by the World Bank, on stocks and flows of immigrants from ENCs in EU countries. These data

[7] Their concern is with the effects of illegal immigration on natives and policies designed to achieve the socially optimum amount of illegal immigration.

have been compiled for almost all countries of the world and are based on census data. The stock data refer to 1960, 1970,..,2010, and the flow data refer to decades e.g. 2000 – 2010. Flows are defined to equal changes in stocks. Therefore, return migration, for example, by Tunisians in France appropriately reduces the number of Tunisians in France in the data. If Tunisians in France migrate to third countries e.g. Belgium, the number of Tunisians in Belgium increases and the number in France decreases. In the data the flow of immigrants from Tunisia to France decreases and the flow from Tunisia to Belgium increases[8]. Table 1 reports the immigrant flow data for 2000 – 2010 from ENC origins to EU destinations, and Table 2 reports the immigrant stock data in 2000. For example, in 2000 there were 8004 immigrants from Algeria in Belgium, but this number grew by 13,546 by 2010.

We have collected data on the rights of legal and illegal immigrants, as well as on the way countries treat illegal immigrants. We use data on expulsions and apprehensions to calculate expulsion and apprehension rates (in terms of the population at risk) in EU destinations. These rates are of the order of one percent except in Greece where they approach 30 percent (see data appendix). We also report in the data appendix an index of the treatment of legal immigrants in EU destinations in terms of the assistance they get to integrate economically, socially and politically.

5. RESULTS

The dependent variable in equation (1) is defined as the rate of immigration that took place between 2000 and 2010, i.e. it is the data in Table 1 divided by the data in Table 2. The origin variables (Z) include GDP per head in 2000 and its rate of growth during 2000 – 2010. The destination variables (X) include GDP per head in 2000 and its rate of growth during 2000 – 2010, the gini coefficient for household income, social spending per head in 2000 and its rate of growth during 2000 – 2010, spending per head on primary education, expulsion and apprehension rates, and the treatment index of immigrants. We

[8] It is unclear how the World Bank tracks these immigrants. If a Tunisian in France emigrates to Belgium as a Frenchman, it is not clear how his Tunisian identity is obtained unless census data gives place of birth. Also censuses are not decennial or coordinated. An appendix on GBMD downloaded from the website of the World Bank is provided. Also, GBMD data for Israel are different to their counterparts published by Israel's Central Bureau of Statistics.

also control for distances between origins and destinations, common official languages, and immigrant stocks in 2000.

Most of these variables turned out to be not statistically significant. Model 1 in Table 3 retains the variables which survived a specification search process in which insignificant variables were successively omitted. Since Model 1 is estimated by OLS it is assumed that the observations are spatially independent. The signs of the parameters in Model 1 are "correct" but they are not statistically significant at conventional levels. Since the LM test statistic for heteroskedasticity is highly significant, we also use robust standard errors.

Variables that do not feature in Model 1 include GDP per head and its growth in the EU destinations as well as the treatment index of immigrants. Immigration flows vary inversely with apprehension rates, and GDP per head and its growth in the EPC origins, and they vary directly with social spending per head, spending on education and income inequality. When model 1 is estimated using data for 1990 – 2000 its explanatory power is even smaller than it is for 2000 – 2010, none of the estimated parameters is statistically significant, and many parameters change their signs. In short, model 1 is not robust and depends on the observation period.

The LM statistics reported in Table 4 indicate that the residuals of model 1 are not spatially autocorrelated, and the SpARCH coefficients are not significantly different from zero. When spatially lagged dependent variables are specified in models 2 and 3, the spatial lag coefficients are statistically significant. In model 2 the spatial lag coefficients are restricted to be identical in origins and destinations. Although in model 3 these coefficients are unrestricted, their estimates turn out to be similar, but different to their counterpart in model 2. Table 4 shows that when spatially lagged dependent variables are specified, the SAC and SpARCH coefficients are statistically significant.

6. DISCUSSION

In this paper we tried to make two contributions, methodological and substantive. Standard econometric analysis of gravity models has typically assumed that the observations are independent. This assumption is surprising because it implies that flows from a given origin to alternative destinations are independent. It also assumes that flows

from different origins to the same destination are independent. We suggest a lagrange multiplier statistic to test origin – destination independence. We also model origin – destination dependence using recently developed double spatial lag estimators.

Our substantive contribution uses data on migration flows from European Neighborhood countries to EU destinations during the first decade of the 20th century to test key hypotheses concerning the determinants of international migration. These include the hypotheses that migration is driven by income differentials, income inequality, welfare generosity in the destination countries, and policies to deter irregular immigration.

During the first decade of the 20th century there is little if any evidence that migration from European Neighborhood Countries to the European Union depended on determinants that have been high-lighted in the theoretical literature. Neither the level of GDP per head in EU countries nor its rate of growth, explain migration from EN to EU. Therefore, the recent economic recession in EU is unlikely to deter migration from EN. There is some weak evidence that GDP per head and its growth in the EN countries deter migration. There is also some evidence that migrants prefer to migrate to EU countries where there is greater economic inequality. If immigrants are positively selected they stand to gain more in countries where incomes are more unequal.

There is no evidence that immigrants engage in welfare-chasing. This is true when welfare generosity is measured by social spending per head in the EU countries, when it is measured by per capita spending on primary schooling, or when expert indices are used. Nor does physical distance or common languages, which are standard variables in gravity models, significantly explain immigration from EN to EU. Indeed, immigration does not seem to be explained by any of the standard hypotheses regarding international migration. However, there is weak evidence that immigration policy, as measured by apprehension rates among irregular immigrants, deters immigration.

These results may be disappointing as far as policy recommendations are concerned. On the other hand, the methodological results are more salient. They show that results obtained using conventional econometric methods which assume gravity flows are independent are over-turned when these flows are specified to be dependent. Specifically, gravity models in which spatial lags are specified produce different results to standard

gravity models. Moreover, separate spatial lags are specified among destination countries in the EU and origin countries in the EN. The coefficients on these spatial lags are about 0.5 – 0.6, implying that there are strong spillover effects in migration between neighboring origins as well as destinations. Indeed, these effects cancel out almost all the substantive effects to which reference has already been made.

Immigration flow 2000-2010

Destination / Origin	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Luxem--bourg	Netherlands	Portugal	Spain	Sweden	UK
Algeria	188	13,546	255	313	-143,341	786	111	1,084	13,619	58	-40	267	40,077	559	-24,943
Armenia	-65	958	175	59	11,520	-6,180	1,331	83	274	1	1,660	59	9,886	440	774
Azerbaijan	56	98	63	28	-32	21,210	54	69	155	1	2,398	14	425	292	749
Belarus	181	496	321	102	287	25,321	205	538	3,866	9	444	181	3,162	713	1,500
Egypt	5,321	1,872	465	311	22,964	6,684	2,067	836	46,986	22	1,920	144	2,554	761	1,127
Georgia	327	162	48	27	-14,264	-56,940	19,840	216	998	2	828	94	9,361	211	656
Israel	471	2,125	581	356	3,800	4,728	416	366	471	16	892	137	2,060	685	5,802
Jordan	132	334	373	107	324	4,667	321	198	736	1	45	17	1,165	534	3,490
Lebanon	955	3,375	3,390	225	34,422	9,977	2,531	224	5,981	19	294	83	1,838	4,614	4,393
Libya	64	335	65	56	1,108	3,638	105	1,022	-1,409	3	125	16	1,287	183	11,972
Morocco	343	61,720	1,644	594	578,523	23,823	188	287	189,285	110	16,101	815	525,278	1,799	-8,388
Moldova	140	226	81	43	-1,881	3,689	1,887	2,377	82,508	3	130	1,340	15,718	168	429
Russia	3,788	31,550	2,450	7,007	-174,649	-679,197	21,133	4,042	13,122	87	-17,563	1,825	50,042	4,981	18,253
Syria	1,343	2,235	943	147	10,674	14,242	5,288	162	1,191	6	1,039	49	2,734	5,386	-125
Tunisia	1,038	7,366	249	223	-8,586	11,789	131	124	45,900	46	433	75	1,716	911	-5,882
Ukraine	1,742	1,433	5,136	585	3,465	144,338	11,754	3,462	158,816	42	1,373	5,592	69,788	1,473	24,196

Immigration stock 2000

Destination / Origin	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Luxem--bourg	Netherlands	Portugal	Spain	Sweden	UK
Algeria	546	8,004	932	456	1,057,135	20,295	267	861	15,861	347	3,873	0	23,269	1,664	40,555
Armenia	654	195	569	89	2,961	21,695	7,438	52	280	6	252	19	2,502	448	15
Azerbaijan	140	13	125	41	382	2,055	102	43	99	4	423	2	144	249	2
Belarus	373	45	239	154	791	3,813	336	610	1,680	42	71	5	667	590	46
Egypt	6,661	724	1,247	388	5,060	14,208	7,156	620	43,477	107	9,381	0	1,631	2,062	26,975
Georgia	332	254	110	47	15,420	75,104	21,977	150	318	12	113	105	1,341	174	82
Israel	1,696	1,679	1,423	442	4,919	9,351	335	285	2,561	74	4,314	0	912	1,500	7,729
Jordan	412	289	961	133	635	11,007	646	137	2,983	6	827	0	1,202	1,056	636
Lebanon	544	1,016	11,982	283	11,033	51,611	1,228	151	4,163	92	3,060	0	1,657	19,817	11,219
Libya	357	61	167	68	413	831	188	737	3,382	15	466	0	438	370	136
Morocco	827	110,962	4,776	998	262,462	84,619	521	302	286,498	557	151,254	1,094	253,173	4,443	20,878
Moldova	308	135	109	65	2,608	13,736	5,492	958	6,680	15	22	2,947	1,833	97	180
Russia	4,895	1,129	2,669	10,527	217,690	978,793	16,847	2,695	14,864	461	23,439	1,462	11,316	8,579	15,053
Syria	825	690	1,328	183	5,550	26,114	5,334	153	3,411	33	5,662	0	2,720	14,005	5,646
Tunisia	1,710	3,762	728	292	310,949	25,260	225	125	75,808	237	3,800	0	1,005	2,698	9,948
Ukraine	2,534	540	1,056	878	11,687	58,163	13,082	1,566	13,755	204	225	9,843	18,491	1,919	783

Table 3 Estimates of the Migration Model: 2000-2010

	Model 1: OLS		Model 2: ML		Model 3: ML	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
Intercept	-0.66	-0.58	-0.558	-0.56	-0.54	-0.53
Immigrant stock 2000*	0.013	1.53	0.0091	1.39	-0.000387	-0.06
GDP per head in origin 2000*	-0.0314	-1.31	-0.00174	0.08	-0.00373	-0.18
Growth of GDP per head in origin	-0.0137	-0.99	-0.00735	-0.61	-0.00292	-0.24
Gini	1.709	1.95	1.115	1.54	0.7435	0.99
Social spending per head*	0.3283	0.31	0.0243	0.25	0.00384	0.40
Spending per pupil in primary education	0.0111	1.65	0.00477	0.94	0.00422	0.83
Apprehension rate	-3.02	-1.22	0.1129	0.25	0.3263	0.71
Common language	0.141	1.76	0.0968	1.41	0.0393	0.57
Distance	-0.000035	-1.50	-0.0000376	-1.86	-0.0000179	-0.90
Spatial lag: origin			0.09897	2.4675	0.500119	13.85
Spatial lag: destination					0.569238	16.65
R^2 adj	0.0632		0.0592		0.0677	

Dependent variable is the rate (percent) of migration from ENC to EU during 2000 – 2010. Asterisked variables are in logarithms.

Table 4 SAC and SpARCH Coefficients

Model	1	2	3
SAC			
Origin	0.0504 (0.23)	-0.4768 (-2.06)	-0.9941 (-9.16)
Destination	-0.0511 (-0.63)	-0.0840 (-0.37)	-0.9725 (-8.90)
LM	2.6015	24.209	81.399
SpARCH			
Origin	0.6596 (0.59)	0.9152 (4.18)	0.5922 (4.33)
Destination	0.0167 (0.25)	0.2350 (2.44)	0.5961 (6.91)
LM	0.408	25.536	61.968

Notes: LM refers to lagrange multiplier statistics for SAC and SpARCH. Their critical values ($p = 0.05$) are χ^2 ($df = 2$) = 5.991. t-statistics for SAC and SpARCH coefficients reported in parentheses.

Appendix 1

Global Bilateral Migration Database (World Bank)

"Global matrices of bilateral migrant stocks spanning the period 1960-2000, disaggregated by gender and based primarily on the foreign-born concept are presented. Over one thousand census and population register records are combined to construct decennial matrices corresponding to the last five completed census rounds. For the first time, a comprehensive picture of bilateral global migration over the last half of the twentieth century emerges."
World Bank Website

The table below compares data from GBMD for Israel with data published by Israel's Central Bureau of Statistic (CBS). The discrepancies are relatively small until 1980, but become large by 2010. These discrepancies cast doubt on the reliability of GBMD for other countries.

Country of Origin	CBS	GBMD	CBS	GBMD	CBS	GBMD
	1980	1980	1990	1990	2000	2000
GRAND TOTAL	**1,447,400**	**1,428,869**	**1,503,700**	**1,621,978**	**1,957,793**	**2,231,105**
Asia – total	303,400	302,190	271,400	255,882	235,695	265,225
Turkey	44,300	1,545	37,800	15,410	31,256	34,791
Iraq	104,100	105,136	89,600	86,214	76,830	85,613
Yemen	52,300	53,470	45,600	42,746	36,968	40,931
Iran	52,000	59,753	57,100	53,077	51,638	58,326
India and Pakistan	19,500	20,921	19,100	18,650	18,145	20,579
Syria and Lebanon					13,044	14,553
Other	31,200	61,365	22,200	39,785	7,815	10,432
Africa – total	336,500	337,130	320,800	314,853	320,102	365,572
Morocco	216,300	217,033	191,700	182,652	167,372	187,826
Algeria and Tunisia	51,600	55,348	47,400	46,375	42,265	47,411
Libya	27,200	1,431	23,700	9,889	19,632	21,830
Egypt	30,500	31,199	26,100	25,275	22,133	24,672
Ethiopia					56,308	66,967
Other	10,900	32,119	31,900	50,662	7,815	16,866
Europe, America and Oceania – total	807,600	789,549	911,500	1,051,243	1,401,996	1,600,308
USSR (former)	206,100	272,571	365,700	579,468	907,209	1,065,902
Poland	174,100	175,609	126,300	121,526	83,316	89,706
Romania	183,700	193,905	154,700	151,154	125,793	139,278
Bulgaria and Greece	35,100	37,187	28,800	28,848	23,739	26,378
Germany and Austria	45,300	49,513	38,800	39,086	32,920	36,724
Czech Republic, Slovakia and Hungary	46,700	49,839	39,000	37,084	28,671	31,607
France					27,389	31,949
United Kingdom					18,626	21,489
Europe, other	43,000	6,039	60,400	30,391	30,994	11,796
North America and Oceania	37,400	2,690	50,400	35,030	69,478	80,019
Argentina					31,672	36,951
Latin America, other	30,000	2,196	47,400	28,656	22,191	28,509

Appendix 2: Data Sources

Variable	Unit	Definition	Source	Link
Immigration stock	Persons	Stock of persons born in country A living in	World Bank - Global Bilateral Migration	http://data.worldbank.org/data-

		country B at time t	Database	catalog/global-bilateral-migration-database
Immigration flow	Persons	Stock of persons born in country A living in country B at time t minus stock of persons born in country A living in country B at time t-1	World Bank - Global Bilateral Migration Database	http://data.worldbank.org/data-catalog/global-bilateral-migration-database
GDP	U.S. Dollars, current prices	Gross domestic product per capita	IMF - World Economic Outlook Databases	http://www.imf.org/external/pubs/ft/weo/2012/02/weodata/download.aspx
Education expenditure	%	Public expenditure per pupil as a % of GDP per capita	UNESCO	http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=143&IF_Language=eng
Inequality	Gini coefficient		OECD	http://stats.oecd.org/
Social expenditure	U.S. Dollars, constant PPPs (2000)	Expenditure per head	OECD	http://stats.oecd.org/
Common language	-	Common official language	CEPII Geodist dyadic dataset	http://www.cepii.fr/anglaisgraph/bdd/distances.htm
Distance	Km	Simple distance between most populated cities	CEPII Geodist dyadic dataset	http://www.cepii.fr/anglaisgraph/bdd/distances.htm
Labour Market Mobility	Index	Experts index on the Labour Market Mobility of immigrants	MIPEX – Migrant Integration Policy Index	http://www.mipex.eu/sites/default/files/downloads/mipexrawdata_final_1302_2012.xlsx
Family Reunion	Index	Experts index on the possibility of family reunion of immigrants	MIPEX – Migrant Integration Policy Index	http://www.mipex.eu/sites/default/files/downloads/mipexrawdata_final_1302_2012.xlsx
Education	Index	Experts index on the special attention given to immigrant s needs in the education system	MIPEX – Migrant Integration Policy Index	http://www.mipex.eu/sites/default/files/downloads/mipexrawdata_final_1302_2012.xlsx
Political Participation	Index	Experts index on the level of political	MIPEX – Migrant Integration Policy Index	http://www.mipex.eu/sites/default/file

		participation of immigrants		s/downloads/mipexrawdata_final_13_02_2012.xlsx
Long Term Residence	Index	Experts index on the long term residency possibilities for immigrants	MIPEX – Migrant Integration Policy Index	http://www.mipex.eu/sites/default/files/downloads/mipexrawdata_final_13_02_2012.xlsx
Access to Nationality	Index	Experts index on access to nationality possibilities for immigrants	MIPEX – Migrant Integration Policy Index	http://www.mipex.eu/sites/default/files/downloads/mipexrawdata_final_13_02_2012.xlsx
Anti-Discrimination	Index	Experts index on anti-discrimination regulations to protect immigrants	MIPEX – Migrant Integration Policy Index	http://www.mipex.eu/sites/default/files/downloads/mipexrawdata_final_13_02_2012.xlsx
Toleration of residence	Index	Index based on policy options for persons not removed due to practical or technical obstacles	FRA (European Union Agency for Fundamental Rights) - Fundamental rights of migrants in an irregular situation in the European Union	http://research.icmpd.org/fileadmin/Research-Website/FRA/FRA_irregular_migration/Final_Reports-FRA_published_2011/FRA_2011_Migrants_in_an_irregular_situation_EN.pdf
Crime	Index	Index based on whether irregular entry/stay considered a crime?	FRA (European Union Agency for Fundamental Rights) - Fundamental rights of migrants in an irregular situation in the European Union	http://research.icmpd.org/fileadmin/Research-Website/FRA/FRA_irregular_migration/Final_Reports-FRA_published_2011/FRA_2011_Migrants_in_an_irregular_situation_EN.pdf
Housing	Index	Index based on the level of punishment for renting shelter to migrants in an irregular situation	FRA (European Union Agency for Fundamental Rights) - Fundamental rights of migrants in an irregular situation in the European Union	http://research.icmpd.org/fileadmin/Research-Website/FRA/FRA_irregular_migration/Final_Reports-FRA_published_2

				011/FRA_2011_Migrants_in_an_irregular_situation_EN.pdf
Healthcare	Index	Index based on the general healthcare entitlements for migrants in an irregular situation	FRA (European Union Agency for Fundamental Rights) - Fundamental rights of migrants in an irregular situation in the European Union	http://research.icmpd.org/fileadmin/Research-Website/FRA/FRA_irregular_migration/Final_Reports-FRA_published_2011/FRA_2011_Migrants_in_an_irregular_situation_EN.pdf
Education	Index	Index based on the right to education for undocumented children	FRA (European Union Agency for Fundamental Rights) - Fundamental rights of migrants in an irregular situation in the European Union	http://research.icmpd.org/fileadmin/Research-Website/FRA/FRA_irregular_migration/Final_Reports-FRA_published_2011/FRA_2011_Migrants_in_an_irregular_situation_EN.pdf
Apprehensions	%	% of the number of foreign nationals apprehended/found to be illegally staying vs. the migrant stock in the destination country	EMN (European Migration Network) - Annual Report on Migration and International Protection Statistics 2003-2009	http://emn.intrasoft-intl.com/Downloads/prepareShowFiles.do?entryTitle=2%2E%20Annual%20Reports%20on%20Migration%20and%20International%20Protection%20Statistics
Refusals	%	% of the number of foreign nationals refused entry vs. the migrant stock in the destination country	EMN (European Migration Network) - Annual Report on Migration and International Protection Statistics 2003-2009	http://emn.intrasoft-intl.com/Downloads/prepareShowFiles.do?entryTitle=2%2E%20Annual%20Reports%20on%20Migration%20and%20International%20Protection%20Statistics

Removed	%	% of the number of foreign nationals removed vs. the migrant stock in the destination country	EMN (European Migration Network) - Annual Report on Migration and International Protection Statistics 2003-2009	http://emn.intrasoft-intl.com/Downloads/prepareShowFiles.do?entryTitle=2%2E%20Annual%20Reports%20on%20Migration%20and%20International%20Protection%20Statistics

References

Anselin J-L. (1988) *Spatial Econometrics: Methods and Models*, Dordrecht, Kluwer.

Behrens K., C. Ertur and W. Koch (2012) "Dual gravity": using spatial econometrics to control for multilateral resistance. *Journal of Applied Econometrics*, 27: 773-794.

Borjas G.S. (1987) Self selection and the earnings of immigrants. *American Economic Review*, 77: 531-533.

Borjas G.S. (1999) *Heaven's Door: Immigration Policy and the American Economy*, Princeton Universityy Press.

Burger M., van Oort F and Linders G-J (2009), On the Specification of the Gravity Model of Trade: Zeros, Excess Zeros and Zero-inflated Estimation, *Spatial Economic Analysis*, 4 (2), 167-190

De Giorgi G. and M. Pellizzari (2006) Welfare migration in Europe and the cost of harmonized social assistance, IZA discussion paper 2094.

Docquier F. and A. Marfouk (2006) International migration by education attainment, 1990 – 2000. *International Migration, Remittances, and the Brain Drain*, C. Ozden and M. Schiff (eds), New York, Palgrave Macmillan.

Driscoll J.C. and A.C. Kraay (1998) Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics*, 80: 549-560.

Elhorst J.P., D.J. Lacombe and G. Piras (2012) On model specifications and parameter space definitions in higher order spatial econometric models. *Regional Science and Urban Economics*, 42: 211-220.

Helpman E, M. Melitz and Y. Rubinstein (2008) Estimating trade flows: trading partners and trading values. *Quarterly Journal of Economics*, 132: 441-487.

Hicks J.R. (1932) *The Theory of Wages*, London, Macmillan.

LeSage J.P and M.M. Fischer (2010) Spatial econometric methods for modeling Origin – Destination flows. *Handbook of Applied Spatial Analysis: SoftwareTools, Methods and Applications*, M.M. Fischer and A Getis (eds), Springer-Verlag, Berlin Heidelberg.

LeSage J. and R.K. Pace (2008) Spatial econometric modeling of origin-destination flows. *Journal of Regional Science*, 48: 941-967.

McKinnish T. (2007) Welfare-induced migration at state borders: new evidence. *Journal of Public Economics*, 91: 437-450.

Péridy N. (2006) The European Union and its new neighbors: an estimation of migration potentials. *Economics Bulletin*, 6: 1-11.

Pöyhönen P. (1963) A tentative model for the volume of trade between countries. *Wetwirtschaftliches Archiv (Review of World Economics)*, 90: 92-100.

Razin A., E. Sadka and B. Suwankiri (2011) *Migration and the Welfare State*, Cambridge MA, MIT Press.

Sjaastad L.A. (1962) The costs and returns of human migration. *Journal of Political Economy*, 70: 80-93.

Smith A. (1776) *An Inquiry into the Nature and Causes of the Wealth of Nations,* K. Sutherland (ed), Oxford University Press, 1993.

Willcocks G (2010), Conditional Variances in UK Regional House Prices, Spatial Economic Analysis, 5(3), 339-354

Yoshida C. and A.D. Woodland (2005) *The Economics of Illegal Immigration*, New York, Palgrave Macmillan.

WP3/05 SEARCH WORKING PAPER

International Migrations as Determinant of the Urbanisation Rate

Vicente Royuela

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International migrations as determinant of the urbanisation rate

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Abstract

In this work the impact of international migration processes on urbanisation rates is analysed. Using a panel of almost 200 countries over the 1960-2010 period, the estimates signal for a significant impact of international immigration on urbanisation rates, while international emigration harms urbanisation only in less developed countries. In the 1990-2010 period the impact of international migration on urbanisation is stronger than in previous decades.

ENC countries display a significantly different picture compared to other regions in the world. There, international emigration has competed with smaller cities in attracting migrants. There exists an important space for structural change in these countries by the enlargement of a more balanced urban structure, what will happen for sure as the push factors in these countries, underdevelopment compared to their neighbours, vanishes over time.

Keywords

Urbanisation; international migration; urban concentration

JEL Classification

R00, R23, F22

1. INTRODUCTION

In 1960 one third of world's population lived in cities. By 2010 that figure is more than 50%. At that speed of growth, in 2050 around two thirds of the world population would be living in cities. The urbanisation process is related with the process of economic development, as assumed by a large literature (Lewis, 1954; Ranis and Fei, 1961; Harris and Todaro, 1970; Todaro, 1976). In some of these models migration occurs between lagged rural areas and developed urban areas, as the latter exhibit higher wages due to higher productivity, which comes from agglomeration economies. This is in line also with the model proposed by Simon Kuznets (1955) which, in turn, assumes that economic growth is likely to be associated with increasing urbanization. After all, labour mobility is the human side of the agglomeration story.

In this work I analyse together the increase of cities all over the world and the importance of international migrations. As the World Development Report (World Bank, 2009) stresses, "an important insights of the agglomeration literature – that human capital earns higher returns where it is plentiful – has been ignored by the literature of labour migration" (WDR, 2009, p. 158), and that novel understandings come from considering agglomeration economies and labour migration. Despite the largest flows of people are between places in the same country, international migration is particularly important in developed countries (around 12% of population in OECD countries), which are the more urbanised ones. Today, the number of persons who live outside their country of birth is about 200 million people, three per cent of the world population.

Using a wide data base of 197 countries over the 1960-2010 period, I analyse tentatively the relationship between international migration and urbanisation rates. Bivariate and multivariate correlation analysis point out to a strong impact of immigration rates on urbanisation rates, particularly in small and median cities. On the contrary, emigration rates have a negative impact in urbanisation rates, but this result only applies to less developed countries. We also find that the impact of international migration in urbanisation rates is stronger in the more recent decades.

ENC countries and Russia deserve a particular attention in this study. As we will see below, these countries have singular demographic and migration trends and, interestingly, the general patterns observed in the world cannot be applied for them.

The paper is structured in five sections. After this introduction I inspect the current trends in urbanisation rates and international migration (section 2). Then I propose a brief correlation analysis between these two concepts, both bivariate (section 3) and multivariate (section 4). Finally I conclude with the main findings.

2. BACKGROUND

In this section I describe the main trends in migration and in urban agglomeration all over the world. Regarding migration, our data sources are the World Bank Bilateral Migration Database 1960-2000 and the World Bank Bilateral Migration Matrix 2010.[1] It includes 197 countries for the years 1960, 1970, 1980, 1990, 2000 and 2010.[2] The variables on population and urbanisation belong to the World Bank World Development Indicators.

Table 2 presents the main urbanisation trends of continents and world subregions. As was stressed above, urban world population has increased from 33% in 1960 to 51% in 2010 (16 percentage points over 50 years). All regions in the world have increased their urbanisation rate by 20 points (but Oceania, that already had a large rate in 1960). In 2010 in 15 regions more than half of people live in cities, while in 8 regions the figure is below 50%. Urban concentration has also risen in the last 50 years (6 percentage points), being more important in America, Oceania, and in several other subregions, such as Southern Africa and Western Asia. But the global urbanisation trend has a deeper source in small and median cities (below one million inhabitants), that has risen from 20% of total world population in 1960 to 32% in 2010. It means 12 percentage points, double of the increase in larger cities. In two regions, Central Asia and Northern Europe, large cities lost weight, while small and median cities were responsible for the entire increase in urbanisation rates. In fact, in Europe we can see that more than 80% of the increase in urbanisation rates was due to the enlargement of small and median cities.

Overall, among all urban people in the world, around 38% live in larger cities and this proportion has been decreasing over the last 50 years (39% in 1960 and 37% in 2010).

[1] These databases can be respectively accessed at http://data.worldbank.org/data-catalog/global-bilateral-migration-database and http://go.worldbank.org/JITC7NYTT0

[2] The list of countries displayed by continents and world subregions is displayed in annex 1.

Table 1b presents the urbanisation rates of ENC countries and Russia. As in other world regions, there is an increase in urbanisation rates in all countries, but the distribution between large and small and median cities is heterogeneous. In Armenia, Israel, Lebanon and Syria more than one third of total population live in large cities, while in Azerbaijan, Algeria and Jordan large cities have lost weight since 1960. As in other parts of the world, the increase in urban rates was mainly driven by small and median cities (curiously 90% of the increase in the urbanisation rate in Egypt was due to smaller cities).

Finally, the weight of larger cities over total urban population in ENC countries and Russia has slightly increased (28% to 29% over the period), but strong differences are found between ENC-South countries (-9%), ENC-East countries (+2%) and Russia (-1%).

Table 2 shows the main demographics trends in the world regions. Population growth has slowed down over the last 40 years, although several World regions still have in 2010 annual growth rates over 2%, mainly in Africa and Western Asia and Melanesia. Interestingly these areas do not show particularly high rates of emigration. Finally immigration is particularly important in more developed areas, such as Europe, North America, and Oceania, while emigration affects developed countries (Europe) and regions close to developed countries (Caribbean, Central America, Central Asia, Europe, Micronesia and Polynesia).

Table 2b focuses on the ENC countries. The more strinking fact is that ENC-East countries and Russia display a demographic decline in the last two decades. In fact, Eastern Europe is the only subregion in the World with aggregate population losses. On the contrary, ENC-South countries show high population growth rates, that caused that the population in these countries has tripled from 1960 (65 million) to 2010 (203 million). The emigration rates are particularly large in ENC-East countries (15% all over the years, a very large figure compared to other world regions), while the immigration rate, being large as well, is much below and is decreasing over the years. In ENC-South we see as well higher emigration than immigration rates. Finally, Russia has reversed the sign of these rates, as since 2000 immigrants are more than emigrants.

Table 1. World urbanisation trends

	Urban Population						People living in cities with more than 1 million						People living in small and median cities					
	1960	**1970**	**1980**	**1990**	**2000**	**2010**	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**
Africa	**18%**	**23%**	**28%**	**32%**	**36%**	**40%**	**7%**	**9%**	**10%**	**11%**	**12%**	**13%**	**12%**	**15%**	**18%**	**21%**	**24%**	**28%**
Central Africa	14%	19%	29%	38%	45%	52%	3%	6%	9%	11%	13%	17%	10%	14%	20%	26%	32%	36%
Eastern Africa	7%	10%	15%	18%	21%	24%	2%	3%	4%	5%	6%	6%	5%	7%	10%	13%	15%	18%
Northern Africa	31%	37%	41%	45%	49%	52%	13%	15%	16%	16%	16%	15%	19%	22%	26%	30%	33%	37%
Southern Africa	42%	44%	45%	49%	54%	59%	21%	23%	23%	24%	26%	29%	21%	21%	21%	24%	28%	30%
Western Africa	15%	21%	27%	33%	39%	45%	4%	7%	9%	11%	13%	14%	11%	15%	18%	22%	26%	30%
America	**59%**	**64%**	**69%**	**72%**	**77%**	**80%**	**29%**	**33%**	**34%**	**35%**	**37%**	**38%**	**29%**	**32%**	**34%**	**37%**	**40%**	**42%**
Caribbean	39%	44%	51%	55%	61%	66%	13%	16%	18%	19%	21%	23%	26%	29%	33%	36%	39%	43%
Central America	46%	54%	60%	65%	69%	72%	19%	24%	28%	29%	30%	30%	27%	29%	32%	36%	39%	41%
Northern America	70%	74%	74%	75%	79%	82%	38%	41%	40%	41%	43%	45%	32%	33%	34%	34%	36%	38%
South America	51%	60%	68%	75%	79%	84%	24%	28%	32%	34%	35%	38%	27%	31%	36%	41%	44%	46%
Asia	**20%**	**23%**	**26%**	**32%**	**37%**	**43%**	**9%**	**10%**	**12%**	**13%**	**15%**	**17%**	**11%**	**12%**	**15%**	**19%**	**22%**	**26%**
Central Asia	39%	43%	45%	45%	42%	42%	6%	6%	7%	6%	6%	6%	33%	36%	38%	38%	36%	37%
East Asia	20%	23%	26%	33%	40%	48%	11%	12%	13%	14%	18%	22%	9%	11%	13%	19%	22%	27%
South Asia	17%	20%	23%	26%	29%	32%	7%	8%	9%	11%	12%	13%	11%	12%	14%	16%	17%	19%
Southeast Asia	18%	21%	25%	32%	40%	48%	8%	9%	10%	11%	11%	11%	10%	12%	15%	21%	29%	37%
Western Asia	36%	45%	52%	61%	64%	67%	16%	21%	24%	26%	28%	28%	20%	24%	28%	35%	36%	39%
Europe	**57%**	**63%**	**68%**	**71%**	**72%**	**73%**	**14%**	**15%**	**15%**	**16%**	**16%**	**16%**	**43%**	**48%**	**53%**	**55%**	**56%**	**57%**
Eastern Europe -ENC	51%	59%	67%	71%	71%	71%	12%	13%	15%	15%	16%	17%	39%	46%	52%	56%	55%	54%
Eastern Europe - EU	45%	51%	58%	62%	62%	62%	7%	8%	8%	8%	8%	8%	38%	43%	50%	53%	54%	54%
Northern Europe	71%	73%	82%	83%	84%	85%	24%	22%	21%	20%	21%	21%	47%	51%	61%	62%	63%	64%
Southern Europe	52%	59%	63%	65%	66%	69%	15%	19%	20%	19%	20%	20%	37%	40%	44%	45%	46%	49%
Western Europe	68%	71%	73%	74%	75%	77%	14%	14%	14%	14%	14%	15%	54%	57%	59%	60%	61%	62%
Oceania	**67%**	**71%**	**71%**	**71%**	**70%**	**71%**	**38%**	**41%**	**43%**	**42%**	**41%**	**40%**	**29%**	**30%**	**29%**	**29%**	**29%**	**31%**
Australia and New Zealand	80%	85%	85%	85%	87%	89%	48%	51%	54%	54%	55%	54%	33%	33%	31%	31%	32%	35%
Melanesia	9%	15%	18%	20%	19%	19%	0%	0%	0%	0%	0%	0%	9%	15%	18%	20%	19%	19%
Micronesia	27%	35%	41%	48%	52%	52%	0%	0%	0%	0%	0%	0%	27%	35%	41%	48%	52%	52%
Polynesia	26%	32%	35%	37%	36%	38%	0%	0%	0%	0%	0%	0%	26%	32%	35%	37%	36%	38%
World	**33%**	**36%**	**39%**	**43%**	**47%**	**51%**	**13%**	**14%**	**15%**	**16%**	**18%**	**19%**	**20%**	**22%**	**24%**	**27%**	**29%**	**32%**

Table 1b. European Neighbouring Countries urbanisation trends

		Urban Population						People living in cities with more than 1 million						People living in small and median cities					
		1960	**1970**	**1980**	**1990**	**2000**	**2010**	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**
AM	Armenia	51%	60%	66%	68%	65%	64%	29%	31%	34%	33%	36%	36%	23%	29%	32%	34%	29%	28%
AZ	Azerbaijan	48%	50%	53%	54%	51%	52%	26%	25%	26%	24%	22%	22%	22%	25%	27%	29%	29%	30%
BY	Belarus	32%	44%	57%	66%	70%	74%	7%	10%	14%	16%	17%	20%	26%	34%	43%	50%	53%	55%
GE	Georgia	42%	48%	52%	55%	53%	53%	20%	23%	24%	25%	25%	25%	23%	25%	27%	30%	28%	28%
MD	Moldova	23%	32%	40%	47%	45%	41%	0%	0%	0%	0%	0%	0%	23%	32%	40%	47%	45%	41%
UA	Ukraine	47%	55%	62%	67%	67%	68%	8%	10%	12%	12%	13%	14%	39%	45%	50%	54%	54%	54%
Total ENC- East		**44%**	**52%**	**59%**	**64%**	**64%**	**65%**	**10%**	**12%**	**14%**	**15%**	**15%**	**16%**	**34%**	**40%**	**45%**	**49%**	**49%**	**48%**
DZ	Algeria	31%	40%	44%	52%	60%	67%	8%	9%	9%	7%	7%	8%	22%	30%	35%	45%	52%	59%
EG	Egypt	38%	42%	44%	44%	43%	43%	19%	21%	22%	21%	20%	19%	19%	21%	22%	22%	22%	24%
IL	Israel	77%	84%	89%	90%	91%	92%	47%	45%	46%	56%	58%	57%	30%	39%	42%	34%	34%	35%
JO	Jordan	51%	56%	60%	72%	78%	79%	26%	26%	29%	27%	21%	18%	25%	30%	31%	45%	57%	60%
LB	Lebanon	42%	60%	74%	83%	86%	87%	29%	37%	58%	44%	40%	46%	13%	22%	16%	39%	46%	41%
LY	Libya	27%	50%	70%	76%	76%	78%	13%	20%	22%	20%	20%	17%	14%	30%	48%	56%	57%	60%
MA	Morocco	29%	35%	41%	48%	53%	57%	13%	15%	18%	18%	19%	19%	17%	19%	24%	30%	34%	37%
SY	Syria	37%	43%	47%	49%	52%	55%	27%	30%	32%	31%	32%	34%	10%	14%	15%	18%	20%	21%
TN	Tunisia	38%	44%	51%	58%	63%	67%	0%	0%	0%	0%	0%	0%	38%	44%	51%	58%	63%	67%
Total ENC-South		**36%**	**43%**	**47%**	**51%**	**54%**	**56%**	**16%**	**19%**	**20%**	**20%**	**20%**	**20%**	**20%**	**24%**	**27%**	**32%**	**35%**	**37%**
Total ENC		**40%**	**47%**	**52%**	**56%**	**57%**	**59%**	**13%**	**16%**	**18%**	**18%**	**18%**	**19%**	**27%**	**31%**	**34%**	**38%**	**39%**	**40%**
RU	Russia	54%	63%	70%	73%	73%	73%	14%	15%	16%	17%	17%	18%	40%	47%	53%	57%	56%	55%
Total ENC + Russia		**47%**	**54%**	**60%**	**63%**	**63%**	**63%**	**13%**	**15%**	**17%**	**17%**	**18%**	**18%**	**33%**	**39%**	**42%**	**45%**	**45%**	**45%**

Note: Palestinian territory is not considered due to the lack of data

Table 2. World Demographic trends

	Population Growth - annual rates					Emigrants as % of local population						Immigrants as % of local population					
	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	1960	1970	1980	1990	2000	2010	1960	1970	1980	1990	2000	2010
Africa	**2.5%**	**2.7%**	**2.8%**	**2.5%**	**2.3%**	**2.9%**	**2.9%**	**2.9%**	**2.6%**	**2.5%**	**2.9%**	**2.9%**	**2.2%**	**2.0%**	**1.5%**	**1.5%**	**1.5%**
Central Africa	2.1%	2.6%	2.9%	2.8%	2.7%	2.0%	1.8%	2.2%	1.9%	1.8%	2.4%	2.6%	2.0%	1.5%	1.5%	1.1%	1.5%
Eastern Africa	2.8%	2.9%	3.0%	2.7%	2.6%	3.5%	2.8%	2.1%	1.8%	1.7%	2.2%	3.5%	2.7%	1.8%	1.3%	1.2%	1.2%
Northern Africa	2.6%	2.7%	2.6%	1.9%	1.7%	3.1%	3.9%	4.1%	4.1%	3.6%	4.5%	2.1%	1.0%	0.8%	0.7%	0.7%	0.7%
Southern Africa	2.4%	2.3%	2.5%	2.3%	1.3%	2.6%	2.2%	2.1%	2.4%	2.0%	2.5%	4.9%	4.2%	3.4%	3.5%	2.3%	3.5%
Western Africa	2.3%	2.7%	2.7%	2.6%	2.6%	2.4%	2.5%	2.9%	2.4%	2.6%	2.8%	2.3%	2.4%	2.8%	2.1%	2.2%	2.0%
America	**2.0%**	**1.8%**	**1.6%**	**1.5%**	**1.1%**	**1.3%**	**1.5%**	**2.0%**	**2.5%**	**3.4%**	**3.8%**	**4.7%**	**4.0%**	**4.2%**	**4.6%**	**5.5%**	**5.8%**
Caribbean	2.0%	1.6%	1.4%	1.2%	0.9%	7.0%	9.4%	11.2%	13.4%	15.4%	16.3%	2.5%	2.8%	2.6%	2.5%	2.6%	2.1%
Central America	3.0%	2.8%	2.1%	1.8%	1.4%	1.7%	2.0%	3.5%	5.6%	9.0%	10.0%	0.9%	0.6%	0.5%	0.6%	0.8%	0.9%
Northern America	1.3%	1.1%	1.0%	1.2%	0.9%	1.0%	1.1%	1.1%	1.0%	1.1%	1.0%	6.8%	6.6%	7.9%	9.8%	12.7%	13.7%
South America	2.6%	2.3%	2.1%	1.6%	1.2%	0.9%	0.9%	1.2%	1.5%	1.9%	2.5%	3.4%	2.4%	1.9%	1.4%	1.2%	1.1%
Asia	**2.3%**	**2.1%**	**1.9%**	**1.5%**	**1.1%**	**1.8%**	**1.5%**	**1.5%**	**1.5%**	**1.6%**	**1.7%**	**1.9%**	**1.6%**	**1.3%**	**1.3%**	**1.2%**	**1.2%**
Central Asia	3.1%	2.2%	2.0%	0.9%	1.1%	7.3%	8.3%	7.9%	10.2%	12.0%	10.7%	14.9%	16.3%	14.5%	13.3%	9.4%	7.4%
East Asia	2.0%	1.8%	1.4%	1.0%	0.5%	0.8%	0.6%	0.6%	0.6%	0.7%	0.8%	0.4%	0.3%	0.3%	0.3%	0.4%	0.3%
South Asia	2.4%	2.4%	2.4%	1.9%	1.5%	3.2%	2.4%	2.0%	1.7%	1.5%	1.6%	3.1%	2.2%	1.6%	1.1%	0.8%	0.6%
Southeast Asia	2.6%	2.4%	2.2%	1.6%	1.3%	0.6%	0.6%	0.9%	1.4%	1.8%	2.1%	1.8%	1.3%	0.7%	0.6%	0.9%	1.0%
Western Asia	2.7%	2.8%	2.7%	2.2%	2.3%	3.0%	4.2%	5.9%	6.0%	6.2%	5.5%	5.3%	5.7%	6.6%	8.7%	8.4%	9.4%
Europe	**0.8%**	**0.5%**	**0.4%**	**0.1%**	**0.2%**	**7.8%**	**8.0%**	**7.6%**	**7.7%**	**7.2%**	**7.4%**	**4.9%**	**5.8%**	**6.3%**	**7.2%**	**7.7%**	**9.2%**
Eastern Europe	0.9%	0.7%	0.5%	-0.2%	-0.3%	10.3%	10.2%	9.6%	10.2%	9.1%	9.1%	5.9%	6.2%	6.2%	7.0%	6.8%	6.8%
Northern Europe	0.7%	0.3%	0.2%	0.2%	0.5%	7.4%	8.3%	7.8%	7.8%	7.8%	7.3%	4.0%	5.9%	6.7%	7.6%	8.3%	10.7%
Southern Europe	0.8%	0.8%	0.3%	0.1%	0.8%	7.9%	9.3%	8.3%	7.6%	7.5%	8.5%	0.8%	1.3%	1.9%	2.9%	4.5%	9.9%
Western Europe	0.9%	0.3%	0.3%	0.4%	0.3%	3.7%	3.4%	3.5%	3.5%	3.7%	3.9%	6.7%	8.4%	9.7%	10.4%	11.2%	11.5%
Oceania	**2.0%**	**1.7%**	**1.6%**	**1.4%**	**1.7%**	**1.8%**	**2.0%**	**2.7%**	**3.3%**	**4.3%**	**4.1%**	**13.3%**	**15.3%**	**15.0%**	**15.5%**	**15.5%**	**17.9%**
Australia and New Zealand	1.9%	1.5%	1.4%	1.2%	1.5%	2.0%	2.1%	2.6%	3.2%	4.1%	3.9%	15.9%	18.4%	18.5%	19.6%	20.0%	23.8%
Melanesia	2.4%	2.7%	2.4%	2.4%	2.3%	0.6%	0.8%	1.4%	2.0%	2.7%	2.9%	2.2%	2.7%	1.9%	1.4%	1.2%	0.9%
Micronesia	2.7%	2.1%	3.7%	1.9%	0.4%	6.9%	4.8%	10.8%	8.5%	14.7%	12.5%	8.0%	6.5%	6.2%	12.8%	16.8%	16.5%
Polynesia	3.0%	1.7%	1.2%	1.2%	0.9%	4.1%	5.2%	17.5%	20.0%	26.7%	25.9%	2.1%	3.2%	5.5%	6.5%	6.7%	5.5%
World	**2.0%**	**1.9%**	**1.7%**	**1.4%**	**1.2%**	**3.0%**	**2.8%**	**2.7%**	**2.6%**	**2.7%**	**2.8%**	**3.0%**	**2.8%**	**2.7%**	**2.6%**	**2.7%**	**2.8%**

Table 2b. ENC countries demographic trends

		Population Growth - annual rates					Emigrants as % of local population						Immigrants as % of local population					
		1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	1960	1970	1980	1990	2000	2010	1960	1970	1980	1990	2000	2010
AM	Armenia	3.0%	2.1%	1.4%	-1.4%	0.1%	20.9%	16.9%	13.8%	13.2%	27.7%	25.7%	12.0%	14.8%	12.8%	7.5%	9.5%	10.3%
AZ	Azerbaijan	2.9%	1.8%	1.5%	1.2%	1.2%	10.3%	10.9%	12.0%	14.2%	18.7%	14.2%	9.7%	8.1%	6.3%	5.6%	3.2%	1.2%
BY	Belarus	1.0%	0.6%	0.6%	-0.2%	-0.5%	23.8%	25.3%	24.1%	24.8%	17.5%	16.9%	13.0%	12.5%	13.4%	16.0%	11.4%	11.4%
GE	Georgia	0.9%	1.2%	0.7%	-0.8%	0.1%	1.9%	10.8%	12.7%	17.9%	25.8%	21.6%	9.4%	8.7%	7.3%	7.3%	5.0%	3.7%
MD	Moldova	1.8%	1.1%	0.8%	-0.2%	-0.2%	16.2%	14.9%	13.0%	16.1%	17.7%	19.9%	12.8%	13.8%	14.4%	15.8%	13.1%	10.8%
UA	Ukraine	1.0%	0.6%	0.4%	-0.5%	-0.7%	14.6%	13.4%	12.7%	13.8%	12.0%	13.1%	9.4%	11.5%	12.2%	13.3%	10.6%	10.8%
Total ENC- East		**1.2%**	**0.8%**	**0.6%**	**-0.4%**	**-0.4%**	**15.1%**	**14.8%**	**14.1%**	**15.6%**	**15.1%**	**15.0%**	**10.1%**	**11.4%**	**11.7%**	**12.5%**	**9.7%**	**9.3%**
DZ	Algeria	2.4%	3.2%	3.0%	1.9%	1.5%	7.9%	12.3%	8.5%	6.2%	4.4%	3.4%	4.0%	1.2%	0.7%	0.4%	0.3%	
EG	Egypt	2.6%	2.3%	2.4%	1.8%	1.8%	0.5%	1.0%	2.2%	3.3%	3.2%	4.2%	0.7%	0.5%	0.3%	0.2%	0.2%	0.2%
IL	Israel	3.5%	2.7%	1.9%	3.0%	1.9%	2.3%	2.8%	3.7%	4.4%	3.7%	3.6%	56.0%	47.3%	36.8%	34.8%	35.5%	35.7%
JO	Jordan	6.0%	3.8%	3.8%	4.2%	2.3%	6.2%	15.7%	22.7%	25.4%	17.3%		0.8%	1.2%	3.0%	4.8%	5.2%	
LB	Lebanon	2.6%	1.3%	0.5%	2.4%	1.2%	7.1%	7.6%	15.5%	20.0%	17.7%	15.1%	0.6%	0.5%	0.3%	6.8%	8.1%	
LY	Libya	4.0%	4.4%	3.5%	1.9%	2.0%	3.9%	3.6%	2.2%	1.5%	2.1%	1.7%	3.5%	5.6%	9.3%	9.7%	9.6%	8.1%
MA	Morocco	2.8%	2.5%	2.4%	1.5%	1.0%	5.7%	5.3%	6.2%	6.5%	5.5%	9.4%	3.4%	0.8%	0.4%	0.2%	0.2%	
SY	Syria	3.4%	3.4%	3.3%	2.6%	2.5%	2.7%	2.6%	3.3%	3.7%	3.5%	4.2%	1.1%	3.2%	0.5%	0.5%	0.5%	
TN	Tunisia	2.0%	2.2%	2.5%	1.6%	1.0%	5.5%	6.8%	8.0%	6.9%	5.9%	6.0%	3.9%	1.0%	0.6%	0.5%	0.4%	0.2%
Total ENC-South		**2.7%**	**2.6%**	**2.6%**	**1.9%**	**1.7%**	**3.5%**	**4.6%**	**5.2%**	**5.4%**	**4.7%**	**5.2%**	**3.8%**	**2.7%**	**2.0%**	**1.9%**	**2.1%**	**2.7%**
Total ENC		**2.0%**	**1.8%**	**1.8%**	**1.2%**	**1.1%**	**9.2%**	**9.3%**	**8.9%**	**9.1%**	**7.9%**	**7.8%**	**6.9%**	**6.6%**	**6.0%**	**5.8%**	**4.5%**	**4.5%**
RU	Russia	0.8%	0.6%	0.6%	-0.1%	-0.3%	7.0%	8.1%	8.4%	8.9%	7.1%	7.1%	5.1%	5.6%	5.9%	7.1%	8.2%	8.3%
Total ENC + Russia		**1.5%**	**1.3%**	**1.3%**	**0.7%**	**0.6%**	**8.1%**	**8.7%**	**8.7%**	**9.0%**	**7.6%**	**7.6%**	**6.0%**	**6.2%**	**6.0%**	**6.3%**	**5.9%**	**5.8%**

Note: Palestinian territory is not considered due to the lack of data

3. CORRELATION BETWEEN URBANISATION AND MIGRATION RATES

As the main objective of this paper is to analyse the relationship between urbanisation and international migration I next analyse the correlation between these concepts. Table 3 display the correlation coefficients between migration and urbanisation rates considering the raw data and the information once time and/or country effects are removed.[3]

Population growth is positively correlated with immigration rates and negatively correlated with emigration rates. The sign and significance persists when the time effect is removed, but disappears when country effects are not present. Consequently, the observed correlation is a country-effect issue: countries with higher population growth are the ones with less emigration and more immigration.

Table 3. Correlation coefficients between migration and urbanisation rates

	Emigration rate at Origin				Immigration rate at Destination			
	Raw data	Removing time effects	Removing country effects	Removing time and country effects	Raw data	Removing time effects	Removing country effects	Removing time and country effects
Population Growth	-0.1236*	-0.1161*	-0.0437	-0.0246	0.2325*	0.2536*	-0.0675*	-0.0154
Urbanisation rate	0.0945*	0.0859*	0.0336	-0.0119	0.5024*	0.5095*	0.1384*	0.0383
Urbanisation rate - 1 Million	-0.0823*	-0.0865*	0.0265	0.0035	0.2034*	0.1998*	-0.0591*	-0.1406*
Urbanisation rate - Small and median cities	0.1657*	0.1605*	0.0288	-0.0144	0.4122*	0.4129*	0.1830*	0.1138*
Urbanisation Growth rate	-0.0542	-0.0505	-0.0286	-0.0213	-0.0964*	-0.0874*	-0.0963*	-0.0534
Urbanisation rate - 1 Million - Growth rate	-0.038	-0.0373	-0.0019	-0.0002	-0.0817*	-0.0761*	-0.0067	0.0186
Urbanisation rate - Small and median cities - Growth rate	-0.0356	-0.0312	-0.0275	-0.0205	-0.0559	-0.0479	-0.0925*	-0.0612

Note: asterisks indicate statistical significance at 5%.

Urbanisation rates are positively correlated with both emigration and immigration rates and again the country effect dominates. More urbanised countries are the ones with higher propensity to migration, and this is particularly true for countries with higher urbanisation rates in small and median cities. Interestingly, the significance of the correlation

[3] In order to remove country and time effects I regressed every variable against time and/or country fixed effects. The residuals of every regression are used to compute the new correlations.

coefficient only holds when removing time and country effects for the immigration rate for different urbanisation rates, and displaying conflicting signs: the urbanisation rate in cities of more than one million displays a negative sign, while the urbanisation rate in small and medium cities is positively correlated with the immigration rate. In other words: it looks like international immigration is being directed to smaller cities than to bigger cities.

We finally have looked also at the growth in urbanisation rates. The correlations are generally not significant, with the only exception of the urbanisation rate in large cities and the immigration rate: countries with a bigger growth in large cities are the ones experiencing a smaller international immigration rate.

These results are in line of what we found in the previous tables: more developed countries, that are usually the more urbanised ones, are the ones with higher migration rates, particularly the immigration ones. We also see a quick growth in small and median cities all over the world, while in several developed countries the proportion of people in large cities remained almost constant. Overall it can be argued that urbanisation is more a pull than a push factor, as it is more correlated with immigration rates.

In order to see if there are different patterns all over the world we have divided the sample into developed and developing regions and we have computed again the correlation coefficients.[4] Table 4 presents these results.

The basic figures are generally similar to the global ones, as can be expected, particularly when we look at the raw data. Consequently, I focus the next analysis in the correlations once country and time effects are removed. Firstly, in more developed countries population growth is significantly correlated with immigration rates. On the contrary, the urbanisation rates are negatively correlated with immigration rates in more developed countries while positively correlated in less developed countries. The main driver of these differences is the urbanisation rate in small and median cities, negatively correlated in

[4] In order to classify every country as developed or developing, we have followed the United Nations composition of economic regions, available at http://unstats.un.org/unsd/methods/m49/m49regin.htm#ftnc. Developed countries are the ones included in the following regions: Europe, North America, Japan, Autralia and New Zealand.

more developed countries and positively correlated with immigration in less developed countries ones, for which larger cities display a negative correlation.

How can be read these negative signs? The statistical meaning of the results is that immigration is taking place in countries with higher urbanisation rates (positive and significant coefficients when looking at the raw data) but the increase in urbanisation rates is negatively correlated with increases in urbanisation under several circumstances. Consequently we assume that a multivariate analysis is needed in order to account for additional factors and this is what is performed in the next section.

Table 4. Correlation coefficients between migration and urbanisation rates, by level of development

	Emigration rate at Origin				Immigration rate at Destination			
More developed countries	Raw data	Removing time effects	Removing country effects	Removing time and country effects	Raw data	Removing time effects	Removing country effects	Removing time and country effects
Population Growth	-0.087	-0.0377	-0.1727*	-0.0759	0.1867*	0.2758*	0.0031	0.2587*
Urbanisation rate	-0.1602*	-0.2072*	0.1749*	0.0653	0.3731*	0.3432*	0.2478*	-0.2070*
Urbanisation rate – 1 Million	-0.3273*	-0.3332*	0.0495	-0.0177	-0.0378	-0.0486	0.1674*	-0.0447
Urbanisation rate - Small and median cities	0.0932	0.0694	0.1771*	0.0749	0.3590*	0.3336*	0.2218*	-0.1905*
Urbanisation Growth rate	0.0308	0.0811	-0.0442	0.0446	-0.0437	0.0053	-0.0757	0.107
Urbanisation rate - 1 Million - Growth rate	-0.019	-0.013	0.0733	0.0926	-0.0538	-0.0346	-0.1265	-0.0494
Urbanisation rate - Small and median cities - Growth rate	0.0393	0.0863	-0.071	0.0113	-0.0241	0.0198	-0.0375	0.1252

	Emigration rate at Origin				Immigration rate at Destination			
Less developed countries	Raw data	Removing time effects	Removing country effects	Removing time and country effects	Raw data	Removing time effects	Removing country effects	Removing time and country effects
Population Growth	-0.1348*	-0.1285*	-0.0393	-0.0231	0.3202*	0.3408*	-0.0768*	-0.0464
Urbanisation rate	0.1148*	0.1079*	0.0281	-0.016	0.5365*	0.5530*	0.1234*	0.0695*
Urbanisation rate – 1 Million	-0.0674*	-0.0716*	0.0262	0.0045	0.2433*	0.2408*	-0.0848*	-0.1518*
Urbanisation rate - Small and median cities	0.1903*	0.1874*	0.0225	-0.0194	0.4336*	0.4423*	0.1783*	0.1545*
Urbanisation Growth rate	-0.0627	-0.0607	-0.0304	-0.0264	-0.0985*	-0.0941*	-0.1025*	-0.0818*
Urbanisation rate – 1 Million - Growth rate	-0.0389	-0.0384	-0.0048	-0.0036	-0.0784*	-0.0743*	0.0077	0.0263
Urbanisation rate - Small and median cities - Growth rate	-0.0425	-0.0402	-0.0272	-0.0235	-0.0573	-0.0543	-0.1043*	-0.0927*

4. MULTIVARIATE CORRELATION BETWEEN URBANISATION AND INTERNATIONAL MIGRATION

This section analyses the correlation between migration rates and urbanisation once other factors have been considered. We claim now that we do not aim to perform a causality analysis but rather to inspect the correlation between urbanisation and migration once other factors have cleared. In order to do that I take advantage of the panel structure of the database and perform a set of regression analysis in which I introduce a list of controls.

As stressed in Kasarda and Crenshaw (1991), the growth of urban population can be due to three aspects: the natural increase of urban population; boundary redefinition through annexation of surrounding areas; and migration, both intranational (rural-urba and urban-urban) and international. But overall, urbanisation is seen a manifestation of development processes, and "migration is a contributor of development, a corrector of regional imbalances, and a conqueror of the tyranny of space" (Firebaugh, 1979, p.199), as it is an equalizator of the marginal productivity of labour between rural and urban spaces, and between countries.

Given the tentative nature of this work, I avoid surveying the literature on the determinants of urbanisation and consequently I refer the reader to the standard literature on the topic (Gugler, 1982, Brueckner, 1990, Ades and Glaeser, 1995, Davis and Henderson, 2003, Barrios et al., 2006, Henderson and Wang, 2007).

In order to find if the migration variables are correlated with urbanisation we propose to estimate a model in which the urbanisation rate [urban] is regressed against immigration rate at destination [immigr], the emigration rate at origin [emigr], plus a list of controls in which we include two economic variables, GDP per capita [GDPpc] and telephones per capita [telph_pc], three demographic variables, total population [pop_total] the proportion of young [pop_0_14] and older people [pop_m65] and two development variables, life expectancy at birth [life_exp] and infant mortality rate [mort_inf]. The empirical model introduces all variables in logs, but the ones expressed as percentages, and is summarised in the following equation:

$$Urban_{it} = \beta_0 + \beta_1 immigr_{it} + \beta_2 emigr_{it} + \beta_3 \ln GDPpc_{it} + \beta_4 \ln telph\_pc_{it} + \beta_5 \ln pop\_total_{it} + \beta_6 pop\_0\_14_{it} + \beta_7 pop\_m65_{it} + \beta_8 \ln life\_exp_{it} + \beta_9 \ln mort\_inf_{it} + \varepsilon_{it}$$

In concrete, we perform the between estimates (BE), that can be interpreted as measuring the long-run effects on urbanisation rates, and fixed effects (FE), that capture how time-series changes within a country affect changes in its urbanisation rate over time (given that the coefficient only reflect within-country time-series variation, they can be interpreted as short-run effects) and the pooled estimation (Pool), that can be interpreted as an average result of BE and FE estimations. As can be seen in table 5, most of the information on urbanisation rates is cross sectional, similarly to the immigration rates at destination. Consequently, we expect that the BE estimates will capture a substantial part of the variation of the urbanisation variables, while the FE results will explain the variations observed in the last 50 years.

Table 5. Descriptive statistics

	Mean	Standard Deviation		
		overall	between	within
Emigration rate at Origin	0.091	0.237	0.128	0.199
Immigration rate at Destination	0.073	0.115	0.106	0.046
Population Growth	1.870	1.444	1.122	0.913
Urbanisation rate	47.78	25.01	23.28	9.27
Urbanisation rate - 1 Million	11.62	16.38	16.12	3.07
Urbanisation rate - Small and median cities	36.16	22.40	20.96	8.00
Urbanisation Growth rate	4.361	4.315	2.789	3.297
Urbanisation rate - 1 Million - Growth rate	0.840	2.209	1.484	1.639
Urbanisation rate - Small and median cities - Growth rate	3.521	4.209	2.600	3.314

The estimates have relaxed the usual requirement that the observations are independent, and the standard errors allow for intragroup correlation: the observations are independent across groups (clusters) but not necessarily within groups. The considered groups are the world's subregions. The results are displayed in table 6.

Table 6. Regression results. Full database

	Urbanisation rate			Urbanisation rate - 1 Million			Urbanisation rate - Small and median cities		
	Pooled OLS	Between	Fixed Effects	Pooled OLS	Between	Fixed Effects	Pooled OLS	Between	Fixed Effects
Immig	35.416***	37.302***	29.926***	2.881	26.782**	-1.519	27.904***	10.521	31.445***
Emig	-10.652	-24.006	-2.007	1.113	2.035	1.098	-11.896	-26.042	-3.105
GDP pc	3.871***	7.530***	1.894	0.66	3.936**	0.015	2.232	3.594*	1.879
Telph_pc	2.702***	6.126***	2.219**	0.19	2.896	0.203	2.500***	3.229	2.016**
Pop_total	2.844***	1.164	12.531***	3.586***	4.737***	4.202**	-0.432	-3.573***	8.329***
pop_0_14	-0.17	-0.299	-0.096	-0.007	0.578	-0.017	-0.175*	-0.877**	-0.079
pop_m65	-0.132	0.143	0.307	0.242**	-0.287	0.358**	-0.319	0.43	-0.05
life_exp	20.571***	1.949	6.91	5.124*	3.348	3.899	13.827**	-1.399	3.01
mort_inf	2.792	7.714**	1.489	-0.394	0.29	-0.447	3.030**	7.424*	1.936
1970	1.905		0.807	0.478		0.538	1.687*		0.269
1980	2.920*		1.083	0.121		0.203	3.267***		0.88
1990	4.997**		1.748	-0.311		-0.29	5.828***		2.037
2000	5.411*		0.952	-0.996		-1.127	6.893***		2.078
2010	6.213**		1.144	-1.645		-1.759	8.520***		2.903
Constant	-121.9***	-59.58	-200.1***	-69.06***	-129.18	-68.41**	-43.186*	69.592	-131.74***
N	739	739	739	739	739	739	739	739	739
R2	0.650	0.701	0.744	0.251	0.396	0.352	0.443	0.505	0.664
Adj R2	0.639	0.684	0.739	0.234	0.362	0.339	0.425	0.477	0.657

Note: asterisks indicate statistical significance at 1% (***), 5% (**) and 10% (*).

From the obtained results several conclusions can be obtained:

1. There is a global trend in urbanisation that is independent of other factors and statistically significant in small and median cities. The trend does not exist for large cities.
2. Economic development matter for explaining differences in urbanisation between countries, but not over time (fixed effect estimates are never significant). Only telephones per capita display significant result in small and median cities, what would call for an important role of connectivity for smaller cities.
3. Population size is significant in almost all estimates. The positive parameter in the fixed effects specification indicates that faster growing countries are the ones that experience faster increasing urbanisation rates. We find that on average (between estimation) larger countries have a smaller proportion of small and median cities, what can be associated to the trend of growing megacities in large developing countries.
4. On the contrary, the demographic structure plays a minor role. Small and median cities display a negative and significant sign in the between estimates for the

proportion of older people: as these cities increase the proportion of older people, they diminish their importance.

5. Development variables, when significant, show a positive sign. Again, urbanisation and development are linked at the cross section level.
6. Immigration rates, as expected, display a positive and significant parameter in all estimates (pooled, between and fixed effects) for the global urbanisation rate, and also for the pooled and fixed effects for the small and median cities urbanisation rate, and for the between estimate for larger cities. Consequently, immigration is clearly linked with the increase of urbanisation rates, particularly for the one of smaller cities.
7. Emigration rates, as one could expect, display a negative sign, but it is never significant, as was found for bivariate correlation. In other words: expulsing countries do not experience smaller or decreasing levels of urbanisation.

Together with this result we have divided the full sample of countries in several sets. As most estimates show similar results for the control variables, table 7 only displays the parameters related with migration. The results confirm that larger international immigration rates are linked with higher urbanisation rates, particularly for small and median cities, but also for larger cities (between estimate). Contrary to what was found at the bivariate correlation, immigration is not significantly negatively associated with urbanisation in larger cities.

Regarding emigration, it is only significantly negative for less developed countries. In our view it means that developed countries display both high levels of emigration and immigration, as was found above. In these countries emigration is probably directed to other developed countries, and particularly to large cities as well. Consequently it would not be harming large-cities urbanisation. On the contrary, in less developed countries, when an individual has decided to emigrate, he/she faces a new decision: doing it at a local city or to a foreign city. Our results suggest then, at least in several estimates, that international emigration in less developed countries is done at the expense of local urbanisation. This is actually not surprising, on the contrary. Finally, regarding larger versus smaller cities, our results display significantly negative parameters for the smaller cities urbanisation rate, what would be saying that larger cities suffer less of the competition with international migration.

The sample for the 1960-1980 period displays less significant results than the one for the 1990-2010 period. Thus, the impact of international migration on urbanisation is more pronounced in the more recent decades than it was before. And it is true for both immigration and emigration, and for larger and smaller cities.

Table 7. Regression results. Subsamples

	Urbanisation rate			Urbanisation rate - 1 Million			Urbanisation rate - Small and median cities		
	Pooled OLS	Between	Fixed Effects	Pooled OLS	Between	Fixed Effects	Pooled OLS	Between	Fixed Effects
More developed countries									
Immg. rate	37.23***	6.622	30.16***	-1.781	19.932	-6.37	37.82***	-13.31	36.53***
Emigr rate	9.558	-39.393	13.376	2.745	13.762	3.034	8.276	-53.156	10.342
Less developed countries									
Immg. rate	40.16***	43.16***	34.49***	6.606	39.24***	-0.073	27.92***	3.925	34.56***
Emigr rate	-16.256	-34.078*	-8.572	-0.697	-25.758	-2.871	-15.922*	-8.32	-5.702
All countries. 1960-1980									
Immg. rate	40.407**	21.846	30.074	9.446	23.115	-0.671	27.924**	-1.269	30.745*
Emigr rate	0.435	-7.304	14.938	1.89	7.551	1.136	-0.631	-14.855	13.802
All countries. 1990-2010									
Immg. rate	24.842***	39.185***	15.720***	2.795	24.184**	-0.973	16.887**	15.01	16.694***
Emigr rate	-4.216	-27.752*	2.208	3.085	0.592	1.012	-6.848	-28.34*	1.196

Note: asterisks indicate statistical significance at 1% (***), 5% (**) and 10% (*).

Finally, table 8 displays the results for ENC countries and Russia. We firstly see that there is an increasing urbanisation trend since 1990, and after that moment these countries experience a decreasing path, particularly in small and median cities. As was shown in table 1b, it is particularly true for the ENC-East countries, while for the ENC-South countries there is a small increase in this rate for the more recent period. As was showed in section 2, the resurgence of international migration processes since 1990 has been accompanied by a faster increase in the urbanisation rates. Consequently there is a marked difference between the ENC countries with the full sample.

An additional aspect to be highlighted is that in several estimates economic and development variables are negatively associated with urbanisation rates, particularly telephones per capita and life expectancy at birth. The intuition behind this result is that some of these countries have experienced a dramatic structural change since 1990, and

consequently several urbanisation processes would have been accompanied by temporary losses of well-being.

Table 8. Regression results for ENC countries

	Urbanisation rate			Urbanisation rate - 1 Million			Urbanisation rate - Small and median cities		
	Pooled OLS	Between	Fixed Effects	Pooled OLS	Between	Fixed Effects	Pooled OLS	Between	Fixed Effects
Immigr	13.798	-39.167	4.722	-3.337	-78.402	-22.73*	26.778**	39.235	27.456***
Emigr	-30.62*	94.388	-28.079	11.294	-57.744	19.923	-45.06***	152.133	-48.002*
GDP pc	0.952	12.235**	-2.457	6.362***	10.996	3.109**	-2.894	1.239	-5.565
Telph_pc	1.86	3.764	1.337	3.563***	47.866**	-1.812*	1.377	-44.102*	3.149
Pop_total	-3.206	3.449	4.063	-2.496	-5.03	-4.043	-0.009	8.479	8.106
pop_0_14	-0.966	0.427	-1.208	0.649	4.461**	0.017	-1.152**	-4.034**	-1.225
pop_m65	-0.912	-0.701	-0.305	1.103	7.691**	-0.648	-1.147	-8.392*	0.342
life_exp	-5.853	41.273	-13.481	-2.381	-182.715	-22.53*	10.653	223.98	9.047
mort_inf	-0.579*	-10.72	-1.089	2.041	25.801*	-0.907	0.18	-36.52**	-0.182
1970	11.201		10.656	1.885		7.073*	5.847		3.583
1980	11.559		11.249	0.056		10.674*	4.994		0.575
1990	15.93		14.119	1.815		15.29	6.531		-1.17
2000	13.647		8.429	3.174		18.053	3.26		-9.624
2010	9.447		3.963	3.217		19.493	-1.021		-15.53
Constant	155.234	-248.328	104.163	-21.559	419.426	153.419	56.731	-667.754	-49.256
N	60	60	60	60	60	60	60	60	60
R2	0.459	0.919	0.887	0.474	0.819	0.576	0.248	0.722	0.860
Adj R2	0.406	0.797	0.852	0.443	0.548	0.445	0.198	0.306	0.816

Note: asterisks indicate statistical significance at 1% (***), 5% (**) and 10% (*).

The urbanisation rate in small and median cities is positively associated with immigration, as we could expect. Nevertheless, the opposite is found for larger cities: increasing international immigration rates is associated with *decreasing* larger cities, what can be labelled as a puzzling result. Several comments on this. First, the proportion of immigrants over local population has decreased in global terms in ENC countries, from 6.9% in 1960 to 4.5% in 2010, while Russia has experienced the opposite result. Consequently, ENC countries are less and less a destination country, while the emigration rate has remained roughly constant. It has been observed in a markedly heterogeneous population growth pattern (demographic explosion in ENC-South and demographic decline in ENC-East and Russia). Consequently the decrease in immigration rates (probably linked to the decolonization and political independence in some countries) has been associated with the increase in urbanisation in larger cities. What is surprising, though, is the different sign between larger and smaller cities. We have to remember in

this line that the weight of larger cities over total population in ENC countries + Russia slightly increased (28% to 29% over the considered period), but strong differences are found between ENC-South countries (-9%), ENC-East countries (+2%) and Russia (-1%).

In any case, these countries are characterised by larger emigration than immigration rates. This variable is negatively associated with urbanisation (pool estimate), and particularly for small and median cities (pool and FE estimate). Consequently international emigration in these countries has stopped the urbanisation process. This evidence would support the fact that migrants consider not only local cities as potential destinations, but also foreign countries. The result is found in smaller cities, but not in the larger ones, and consequently international migration would not be slowing down over-urbanisation in large agglomerations.

3. CONCLUSIONS

Individual case studies and regional comparisons analysing the impact of international migration on local cities are usual in the literature. Cross-national research, as the one developed here, allow for testing general trends in the topic. Given the wide extension of our data base (almost 200 countries over 50 years) the global conclusions deserve particular attention.

Both urbanisation and international migration are global trends all over the world, but, as the WDR (2009) stressed, traditionally they have not been considered together. Our findings using panel estimations point out that immigration is associated with increasing urbanisation, while emigration is only negatively associated with urbanisation in less developed countries. Small and median cities are more influenced by international migrations than larger cities, and the process has been more pronounced in recent decades.

ENC countries and Russia are a particular case all over the world: ENC-South experienced a population decline together with strong emigration rates and increasing urbanisation. ENC-South countries have a huge population growth associated to increasing urbanisation particularly in smaller cities. In these countries international emigration has competed with smaller cities in attracting migrants.

Overall, international migration and urbanisation are obviously linked. The analysis performed here show that these migration flows are particularly associated with the current increase of smaller and median cities all over the world. This result is in line with recent OECD results, stressing that median and small agglomerations enjoy strong levels of development. The OECD 2009 Report highlights the idea that growth opportunities are both significant in big urban areas as well as in smaller more peripheral agglomerations. In this line, some authors have recently highlighted that economic growth does not need to depend exclusively on increasing urban concentration: "mega-urban regions are not the only possible growth pattern... context and institutions do matter when we consider economic geography" (Barca et al. 2012).

ENC countries have experienced a large increase in the urbanisation rate of small and median cities. Nevertheless, it would have been even larger if international emigration would have not been as large as it is. Consequently, in my view there exists an important space for structural change in these countries by the enlargement of a more balanced urban structure, what will happen for sure as the push factors in these countries, underdevelopment compared to their neighbours, vanishes over time.

REFERENCES

Ades, A., Glaeser, E. (1995) "Trade and circuses: Explaining urban giants", *Quarterly Journal of Economics*, 110, 195–228.

Barca, F., McCann, P., & Rodríguez-Pose, A. (2012). The case for regional development intervention: Place-based versus place-neutral approaches. *Journal of Regional Science* 52(1), 134-152.

Barrios, S., Bertinelli, L. and Strobl, E. (2006) "Climatic change and rural–urban migration: The case of sub-Saharan Africa", *Journal of Urban Economics*, 60, 357–371

Brueckner, J. (1990) "Analyzing third world urbanization: A model with empirical evidence", *Economic Development and Cultural Change*, 38, 587–610.

Davis, J., Henderson, J.V. (2003) "Evidence on the political economy of the urbanization process", *Journal of Urban Economics* 53 98–125.

Gugler, J. (1982) "Overurbanization reconsidered", *Economic Development and Cultural Change*, 31 173–189.

Firebaugh, G. (1979) “Structural determinants of urbanization in Asia and Latin America, 1950-1970” *American Sociological Review*, 44, 199-215.

Harris, J. R., and Todaro, M. P. (1970). “Migration, unemployment and development: a two-sector analysis,” *American Economic Review*, 60, 126-142.

Henderson, J.V. and Wang, H.G. (2007) “Urbanization and city growth: The role of institutions”, *Regional science and urban economics*, 37(3), 283-313.

Kasarda, J.D. Crenshaw, E.M. (1991) “Third World Urbanization: Dimensions, Theories, and Determinants”, *Annual Review of Sociology*, 17, 467-501

Kuznets, S. (1955). “Economic Growth and Income Inequality,” *American Economic Review*, 45, 1-28.

Lewis, W. A. (1954) “Economic Development with Unlimited Supplies of Labour” *Manchester School of Economic and Social Studies*, 22, 139–191.

OECD (2009a). *How Regions Grow*, Paris. Organisation for Economic Cooperation and Development.

OECD (2009b). *Regions Matter: Economic Recovery, Innovation and Sustainable Development.* Paris. Organisation for Economic Cooperation and Development.

OECD (2009c). *Regions at a Glance*. Paris. Organisation for Economic Cooperation and Development.

Ranis, G. and Fei, J.C.H. (1961), “A Theory of Economic Development,” *American Economic Review*, 51, 533-565.

Todaro, M.P. (1976) *Internal Migration in Developing Countries*. Geneve. International Labour Organization.

World Bank. (2009). *World Development Report 2009: Reshaping economic geography*. Washington D.C: World Bank.

Annex 1. Considered countries, classified by continents and geographical regions

The countries classification by geographical regions corresponds to the United Nations Geoscheme, that can be accessed at http://unstats.un.org/unsd/methods/m49/m49.htm

Africa

Central Africa
- Angola
- Cameroon
- Central African Republic
- Chad
- Congo
- Equatorial Guinea
- Gabon
- Sao Tome and Principe

Northern Africa
- Algeria
- Egypt
- Libya
- Morocco
- Sudan
- Tunisia

Eastern Africa
- Burundi
- Comoros
- Djibouti
- Eritrea
- Ethiopia
- Kenya
- Madagascar
- Malawi
- Mauritius
- Mozambique
- Rwanda
- Seychelles
- Somalia
- Tanzania
- Uganda
- Zambia
- Zimbabwe

Southern Africa
- Botswana
- Lesotho
- Namibia
- South Africa
- Swaziland

Western Africa
- Benin
- Burkina Faso
- Cape Verde
- Cote d'Ivoire
- Gambia
- Ghana
- Guinea
- Guinea-Bissau
- Liberia
- Mali
- Mauritania
- Niger
- Nigeria
- Senegal
- Sierra Leone
- Togo

America

Caribbean
- Antigua and Barbuda
- Aruba
- Bahamas
- Barbados
- Cayman Islands
- Cuba
- Dominica
- Dominican Republic
- Grenada
- Haiti
- Jamaica
- Puerto Rico
- St Kitts and Nevis
- St Lucia
- St Vincent and the Grenadines
- Trinidad and Tobago
- Turks and Caicos Islands

Central America
- Belize
- Costa Rica
- El Salvador
- Guatemala
- Honduras
- Mexico
- Nicaragua
- Panama

Northern America
- Bermuda
- Canada
- Greenland
- United States

South America
- Argentina
- Bolivia
- Brazil
- Chile
- Colombia
- Ecuador
- Guyana
- Paraguay
- Peru
- Suriname
- Uruguay
- Venezuela

Asia

Central Asia	**East Asia**	**Western Asia**
Kazakhstan	China	Armenia
Kyrgyzstan	Hong Kong	Azerbaijan
Tajikistan	Japan	Bahrain
Turkmenistan	Korea, North	Cyprus
Uzbekistan	Korea, South	Georgia
South Asia	Macao	Iraq
Afghanistan	Mongolia	Israel
Bangladesh	**Southeast Asia**	Jordan
Bhutan	Brunei	Kuwait
India	Cambodia	Lebanon
Iran	Indonesia	Oman
Maldives	Laos	Qatar
Nepal	Malaysia	Saudi Arabia
Pakistan	Myanmar	Syria
Sri Lanka	Philippines	Turkey
	Singapore	United Arab Emirates
	Thailand	Yemen, North
	Vietnam	

Europe

Eastern Europe	**Northern Europe**	**Southern Europe**
Belarus	Denmark	Albania
Bulgaria	Estonia	Bosnia and Herzegovina
Czech Republic	Faroe Islands	Croatia
Hungary	Finland	Gibraltar
Moldova	Iceland	Greece
Poland	Ireland	Italy
Romania	Latvia	Macedonia
Russia	Lithuania	Malta
Slovakia	Norway	Portugal
Ukraine	Sweden	San Marino
Western Europe	United Kingdom	Slovenia
Austria		Spain
Belgium		
France		
Germany		
Luxembourg		
Netherlands		
Switzerland		

Oceania

Australia and New Zealand	**Micronesia**	**Polynesia**
Australia	Kiribati	French Polynesia
New Zealand	Marshall Islands	Samoa
Melanesia	Micronesia	Tonga
Fiji	Northern Mariana Islands	Tuvalu
New Caledonia	Palau	
Papua New Guinea		
Solomon Islands		
Vanuatu		

WP3/06 SEARCH WORKING PAPER

Migration between CIS countries: trends and policy

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Migration between CIS countries: trends and policy

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ABSTRACT

The report is focused on both permanent and labor migration between the newly independent states, that quite recently were parts of one single country, and migration between them was internal rather than international. Until the late 1980-s migratory flows in the area were affected by the differences between the republics in the rates of population growth and quality of life. Immediately after the breakdown of the USSR, the volume and structure of international migration over its territory changed dramatically. Russia became the main destination for migrants from all over the former Soviet republics: between 1992 and 1999, about 6 million migrants from these countries arrived to the RF. The current migration situation in the CIS countries is characterized by absolute dominance of the inner flows within the region, the remaining position of Russia as the main destination for migrants from the other CIS countries, especially for the states of Central Asia, as well as significant volumes of temporary forms of migration. In 2000-2010 about 92% of permanent-type immigrants in the CIS area and about 75% of emigrants arrived from or moved to the counties of the CIS. Russia was a destination country for over 50% of all emigrants from CIS states on average, and in some cases - for more than 80% of the outflow. Despite the ongoing economic crisis scale of labor migration in the CIS is enormous. In 2011 Russian migration authorities issued over 1.2 million work permits and 0.9 million patents for work in private households.

Migration regime in the CIS area is characterized by visa-free movements between the countries and implementation of a system of constraints: quotas for work permits, bans for professions for migrant workers, limited duration of stay and so on. Inefficient control over the enforcement of restrictive regulations supports the large scale of illegal employment of foreign workers in the CIS. Obvious differences between countries in the priorities of migration policy are connected with the different demographic trends and economic interests. Some countries try to encourage immigration from other countries, stipulate requirements for permanent residence of aliens and create preferences for naturalization. Other countries endeavor to influence the hosting countries to obtain guarantees for minimal social support and respect the rights of their citizens living abroad as temporary labor migrants. Gradually emerges common understanding for development of the organized forms of recruitment of foreign labor, training of migrant workers, integration programs, etc.

The research leading to these results has received funding from the European Community's Seventh Framework Programme under grant agreement No. 266864 (Project SEARCH).
Russian version is presented in Demoscope-Weekly, 2012, No 533-534: http://demoscope.ru/weekly/2012/0533/analit04.php

1. INTRODUCTION

The objective of this work is to show the picture of permanent and temporary international migration movements between the independent states of the former Soviet Union during the years of their independence. Following this objective, were have used all the sources of information available in the CIS countries: censuses, results of the current migration registration, as well as surveys of population and migrants. Comparative analysis of the volume of migration flows and the number of migrants taken from different sources, gives possibility to assess the condition of migration statistics in those countries. Information on the Russian Federation is represented in wider volume. This is not only due to a leading role of the Russian Federation in the formation of migration processes in the CIS area, but also due to a much better availability of statistics for this country. Also, the basic directions and mechanisms of migration policy in the region are presented in this article.

While describing the current migration situation over the former Soviet territory, remember that quite recently all the former Soviet republics were part of one single country, and migration between them had an intra-state nature. The former belonging to one country still reveals itself in numerous personal ties between different states and daily usage of the Russian language, in the presence of a large Diaspora consisting of people coming from other parts of the former Soviet Union. Common language space, although reduced, is still present, despite the fact that most of the newly independent states by their language policy no longer recognize the Russian as their official language, and it is much less taught at schools and universities.

2. MIGRATION UP TO THE END OF 1980S: HISTORICAL REVIEW

As it is known, the Soviet Union was a fairly closed country, i.e. international migration movements, with a small exception, were under strict government control[1]. Until the fall of the Iron Curtain and liberalization of the procedure of leaving the Soviet Union in the late 1980s, the population of the Union republics was changing by its natural increase and net migration

[1] Within the interval since 1950-s and till the end of 1980-s the most large-scale migrations took place: between Poland and USSR in 1955-1958 (over 220 thousand persons were repatriated to Poland); repatriation of Armenians to Armenians SSR till 1958 (about 120 thousand persons); re-emigration from China till 1961 (about 240 thousand persons, mainly Kazakhs and Uyghur) ; emigration to Israel in 1969-1975 (about 100 thousand persons).

exchange with other republics. The estimates in Table 1 show how the value of migration balance in the former Soviet Union was changing over the past six decades.

Table 1

Migration gain in the former soviet republics as by ten-year periods 1950-2009 (thousands)

Страны	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2009
Eastern European States						
Belarus	-925	-225	-100	-39	11	-92
Moldova	59	62	-18	-80	-856	-34
Russia	-884	-1281	302	1590	4660	2158
Ukraine	583	486	280	-99	-331	-153
Transcaucasia						
Azerbaijan	-28	-46	-79	-276	-166	151
Armenia	18	144	107	-119	-22*	-668
Georgia	-30	-109	-161	-88	-700	-50**
Central Asia						
Kazakhstan	997	616	-547	-820	-3146	21
Kyrgyzstan	-69	110	-90	-168	-276	-249
Uzbekistan	62	460	190	-581	-925	-1022
Tajikistan	74	136	11	-115	-584	-98
Turkmenistan	-37	9	-8	-83	294	-65
Baltic States						
Latvia	381	146	102	89	-180	-25
Lithuania	438	34	63	96	-205	-83
Estonia	254	82	67	44	-153	1

The authors' estimation was obtained through the demographic balance method and data of the Central Statistical Board of the USSR (up to 1991) and national statistical agencies of the CIS states (after 1991).

*The estimates for Armenia for this period should be treated with caution, since the population of Armenia in the last Soviet census of 1989 was reduced by about 160 thousand people

**- Not including Abkhazia and South Ossetia

Volumes and directions of migration flows did after all reflect the placement of investments across the country. Often well paid jobs were created in the areas where the population was sparse (Far North or Siberia), or was lacking the necessary skills/qualifications (for example in Central Asia). Migration flows were also affected by the differences between the republics in their rates of population growth and quality of living. Thus, unlike for the people of European descent, the Muslim people of the Central Asia and the Caucasus were at their early stages of demographic transition and urbanization, and had a low spatial mobility. Notable territorial differences in quality of living were preserved, despite the fact that the social policy during the Soviet period was aimed to achieve relative equality in living standards. For this, part of income from the economically developed republics was redistributed to less developed ones.

Besides the major cities, most attractive for the population in the 1960's -80's, were the Baltic republics, the Black Sea coasts of Ukraine and Russia, the foothills of the North Caucasus. [2]

In 1950-1960's significant resources were invested into rebuilding and modernization of industry in Ukraine, that suffered greatly during the war, into development of heavy industry and the virgin lands in Kazakhstan, into construction of industrial plants in Central Asia and the Baltic States. During the same period, Russia and Belarus were the main suppliers of labor to other republics. As long as most of investments were directed for the development of sparsely populated regions of the Far North, Siberia and the Far East, migration inflow to Russia was also increasing. In mid-1970s with the active development of oil and gas fields in the Western Siberia, Russia became the main center of attraction for migrants, including those from Ukraine. High demand of labor and government policy[3] encouraged return there of people, who had left earlier for Kazakhstan, the Transcaucasia and the Central Asia.

Migration between the Soviet republics during the post-war period was summarized by 1989 census (Table 2). In all in the USSR more than 30 million people or 10.6 per cent of the population resided not in the republics, where they were born. Among them, more than a half (65 per cent) lived in Russia, Ukraine and Belarus. Over half (67 per cent) of all lifetime migrants were born in these republics. The largest share of non-indigenous residents was in Latvia and Estonia, Kazakhstan and Armenia. Small number and proportion of non-indigenous residents in the Central Asia are explained by their high concentration in urban areas. Lifetime migrants from other parts of the Soviet Union formed from one quarter to one half of the total urban population in these republics.

With the fall of the Iron Curtain, migration outside the former Soviet Union increased dramatically. From the very beginning, it took the form of a mass return (repatriation) to their historic homelands of the Germans, Jews, Greeks and representatives of other ethnicities. Totally, during the period of 1988-1990 about 800 thousand people left the USSR. Emigration to the countries outside the former Soviet Union started to have a significant impact over population dynamics, especially in the republics with low fertility (Russia, Ukraine).

[2] Rybakovskiy L.L. (1973), Regional analysis of human migration. Moscow: Statistica Publishers (in Russian); Khorev B.S., Chapek V.N. (1978) The problems of migration studies. Moscow: Mysl Publishers (In Russian); Danilova I. and al. Distribution of population: regional aspects of population dynamics and policy. Moscow: Mysl Publishers (in Russian).

[3]

Table 2

Distribution of population of the Union Republics by the place of their birth according to the Soviet census of 1989

Republics	Total Population (thousands)	Born:					
		(thousands)			(%)		
		in the same republic	in the other USSR republics	In the countries outside USSR and not stated	in the same republic	in the other USSR republics	In the countries outside USSR and not stated
Russian SFSR	147021,9	134555,7	11472,1	994,1	91,5	7,8	0,7
Ukrainian SSR	51452,0	43877,3	7119,9	454,9	85,3	13,8	0,9
Belorussian SSR	10151,8	8828,2	1268,5	55,1	87,0	12,5	0,5
Uzbek SSR	19810,1	18055,6	1701,6	52,8	91,1	8,6	0,3
Kazakh SSR	16464,5	12500,8	3749,8	213,8	75,9	22,8	1,3
Georgian SSR	5400,8	5025,8	362,1	12,9	93,1	6,7	0,2
Azerbaijan SSR	7021,2	6585,7	416,9	18,6	93,8	5,9	0,3
Lithuanian SSR	3674,8	3279,5	375,8	19,5	89,2	10,2	0,5
Moldavian SSR	4335,4	3721,6	596,3	17,5	85,8	13,8	0,4
Latvian SSR	2666,6	1960,8	692,0	13,7	73,5	26,0	0,5
Kirgiz SSR	4257,8	3552,3	671,9	33,5	83,4	15,8	0,8
Tajik SSR	5092,6	4640,3	442,8	9,4	91,1	8,7	0,2
Armenian SSR	3304,8	2103,2	734,4	467,2	63,6	22,2	14,1
Turkmen SSR	3522,7	3197,7	317,9	7,1	90,8	9,0	0,2
Estonian SSR	1565,7	1146,5	411,1	8,1	73,2	26,3	0,5
USSR	285742,5	253031,0	30333,1	2378,4	88,6	10,6	0,8

Source: Estimations based *on* "USSR Population Census 1989", CD-ROM, Minneapolis: EastView Publications Inc-CISSTAT, 1996.

3. FACTORS OF MIGRATION AFTER THE DISINTEGRATION OF THE USSR

Immediately after the disintegration of the Soviet Union, the volume and structure of international migration over its territory have changed. The main phenomenon was the transformation of Russia into the main center of attraction for hundreds of thousands of migrants - both permanent and temporary- from all the former Soviet republics. According to the Russian statistics, between 1992 and 1999 about 5.9 million immigrants from the former USSR have arrived to Russia.

The increase of migration to Russia was partially due to mass inflow of refugees and internally displaced persons; it was caused above all by high level of political tension and ethnical conflicts. The first wave of refugees was the result of Armenian-Azerbaijani conflict back in the years of the USSR (1987-1991). It was followed by other inter-ethnic fights in the

Central Asia, Osh (Kyrgyzstan, 1990), Tashkent (Uzbekistan, 1989), New Uzen (Kazakhstan, 1989). The collapse of the Soviet Union ignited a series of serious armed conflict: the Civil War in Georgia (1991-1993), the war over Nagorno-Karabakh (1991-1994), the war in Abkhazia (1992-1993), the war in South Ossetia (1991-1992), armed conflict in Transdniestria (1992), the civil war in Tajikistan (1992-1997), the first Chechen war in Russia (1994-1996). Conflicts generated flows of huge masses of refugees. So, as a result of the Karabakh war, according to the UNHCR, about 300 thousand refugees were accepted by Armenia, about 230 thousand – by Azerbaijan (on top of that should be added almost 570 thousand internally displaced persons). About 280 thousand people have left the area of inter-ethnic conflicts in Georgia.[4]

A series of political events that followed the declaration of independence of the former Soviet republics: laws about the state languages, the rise of local nationalism - accelerated the outflow (or repatriation) of the Russian- speaking population from Kazakhstan, Central Asia, the Transcaucasia, Moldova into Russia, as well as to Ukraine and Belarus. The peak of outflow occurred between 1992 and 1996. A significant part of migrants have received asylum in Russia. Totally, more than 1.3 million people from the former Soviet republics got the status of a refugee or a displaced person.[5] At the same time, as the Russian-speaking population, were treated both the Russians and representatives of other ethnic groups, including the indigenous population and members of ethnically mixed families, for whom the Russian was either their mother tongue or spoken language. In the former Soviet republics of the Transcaucasia and Central Asia the Russian-speaking people mainly belonged to scientific and technical intelligentsia. Consequently, during the first 10 years of existence of the new sovereign states the population of European descent decreased from tens to a few percent.

Migration inflow to Russia also increased due to the servicemen of the Soviet Army, dismissed in the former Soviet republics by 1992; also its regiments, withdrawn by 1994 from the Eastern Europe and the Baltic States. Introduction of the institution of private property and its redistribution stimulated remigration home of those who had earlier moved to work in other Soviet republics. At the same time, because of the higher costs of education outside their own republics, educational migration over the post-Soviet area also shrank.

[4] United Nations High Commissioner for Refugees (UNHCR), Statistical Yearbook for 1994, 1995.1996, 2000 and 2007. http://www.unhcr.org/pages/4a02afce6.html

[5] Mkrtchyan N. - A decade of forced migration / Demoscope ─ Weekly No 71-72, 17-30, June 2002, http://demoscope.ru/weekly/2002/071/tema01.php

However, the political factors ultimately reflected the increasing depth of the economic crisis in the CIS. Because of disconnection of economical ties between the former republics of the USSR and restructuring of inefficient Soviet economy, a large part of industrial enterprises which employed most of the Russian population ceased their existence. Subsequently, the crisis destroyed a number of SMEs together with the agricultural sector. Decreased production in the Far North and Siberia caused the outflow of migrants from these regions to the Central Russia, and remigration to the newly independent states, mostly to Ukraine and Belarus. In the Soviet times relative equality in living standards and, in particular, the levels of salaries was maintained by the redistribution of income from the economically developed republics for the benefit of the less developed ones. With the proclamation of independence of the former Soviet republics, the system of budgetary redistributions sunk into oblivion.[6] The growing differences between the CIS countries in the pace and structure of their economical development was manifested in the increased differentiation of the living standards of population. In an advantageous position appeared those countries (Russia, Kazakhstan, Turkmenistan and Azerbaijan) that possessed significant natural resources, demanded on the world market (oil, gas, metals).[7]

The economic crisis over the post-Soviet territory resulted in reduction of the number of employees and sharp decrease in wages. The most serious situation appeared in Georgia, Moldova and Tajikistan, where the per capita GDP by the middle of 1990s had fallen by about 70per cent. As a result, the level of living had significantly fallen, and the poverty rapidly expanded. The situation was especially catastrophic in Tajikistan, where in 1999 one third of the population lived for $1 per day. Certainly, the economic advantages of Russia compared to the other CIS countries define its role as the main center of attraction for migrants. Thus, except for a short period of crisis connected with the default of 1998, during the last two decades wages in Russia were much higher than in other CIS countries, including Kazakhstan (Table 3).

[6] Gaidar Yegor (2007) Collapse of an Empire: Lessons for Modern Russia. Brookings Institution Press 2007.
[7] In Azerbaijan, after initiation of development of new oil fields, a rapid economical growth started. Gross domestic product for 2000-2010 increased by 4 times (in constant prices).

Table 3

The average wages level in the CIS (Russia = 100 per cent)

Countries	1991	2010 (в скобках – зарплата в евро)
Azerbaijan	58	58,1 /306 eur/
Armenia	61,5	41,7 /219 eur/
Belarus	98,7	59,4 /319 eur/
Georgia	49,3	51,5 /244 eur/*
Kazakhstan	80,5	75,3 /395 eur/
Kyrgyzstan	67,2	22,2 /117 eur/
Moldova	79,2	34,4 /184 eur/
Russia	100	100,0 /512eur/
Tajikistan	67,5	11,5 /61 eur/
Turkmenistan	75,5	-
Uzbekistan	66,8	25,0 /140 eur/**
Ukraine	87,6	40,5 /213 eur/

Source: CIS Statistics Committee
* - 2008;
** - 2004

The absence of a permanent job, allowing households to overcome the poverty level, is the main factor that pushes immigrants to seek jobs in Russia and Kazakhstan. Although the number of people employed in the CIS countries has been increasing since the second half of 1990s along with the overcoming of the economic crisis, this increase did not correspond to the demographic trends in the Central Asia and Azerbaijan, where the population between the ages 15 and 60 was rapidly increasing (Table 4). A significant job loss in Armenia was turning significant number of workers into redundant at the local labor market.

Table 4

Increase of population aged 15 - 60 and number of employees

Country	Period of estimation	Increase of population in ages from 15 to 60 (thousands)	Increase of number of employees (thousands)	Increase of employees to increase of population (в %)
Kyrgyzstan	1992-2008	1057	381	36,0
Tajikistan	1992-2008	1257	277	22,0
Uzbekistan	1992-2007	5584	2456	44,0
Armenia	1993-2007	36	-267	-744,9
Azerbaijan	1992-2008	1507	334	22,2

Source: Estimations based on: UN Population Division Database; ILO LABORSTA database; Denisenko M. Migration and remittances in Central Asia, Armenia and Azerbaijan (in Russian) ESCAP, Bangkok, 2010. http://www.unescap.org/sdd/meetings/egm_mig_sep2010/mig_egm_paper_russian.pdf.

In the future, Russia's role as the main center of attraction of permanent and temporary migrants from the CIS will remain. Provided, the economic and demographic factors create the necessary conditions for attraction of migrants, as sufficient ones should be recognized the deep historical/geographical/social aspects: availability of personal links between the residents of Russia and the CIS countries, as well as between extensive diasporas, knowledge of the language and daily life in Russia by the majority of migrants; geographical location and preserved transportation links over the former Soviet territory, visa-free entries for the citizens of the CIS countries.

4. COMMON PATTERNS OF MIGRATION BETWEEN THE COUNTRIES OF THE CIS

At present, the CIS migration situation is characterized by absolute predominance of resettlements within the region, the remaining role of Russia as the main hosting country for the migrants from the other CIS countries, as well as significant amounts of the forms of migration, by many times exceeding the permanent migration; the data of the national statistical offices about the flows of migrants show that 92 per cent of all immigrants coming from the other CIS countries, and about 75 per cent of those who leave, move also to the other countries of the Commonwealth (Table 5). However, the last figure should be lower, because of the undercount of immigrants in Russia and Ukraine. Thus, the number of emigrants who had left Russia for permanent residence outside the former Soviet Union in the foreign sources more than twice exceeds the Russian estimations.[8]

[8] Denisenko M. Emigration from Russia to the Far-abroad countries / Demoscope - Weekly №513-514, June 4-17 2012 http://demoscope.ru/weekly/2012/0513/index.php (in Russian)

Table 5.

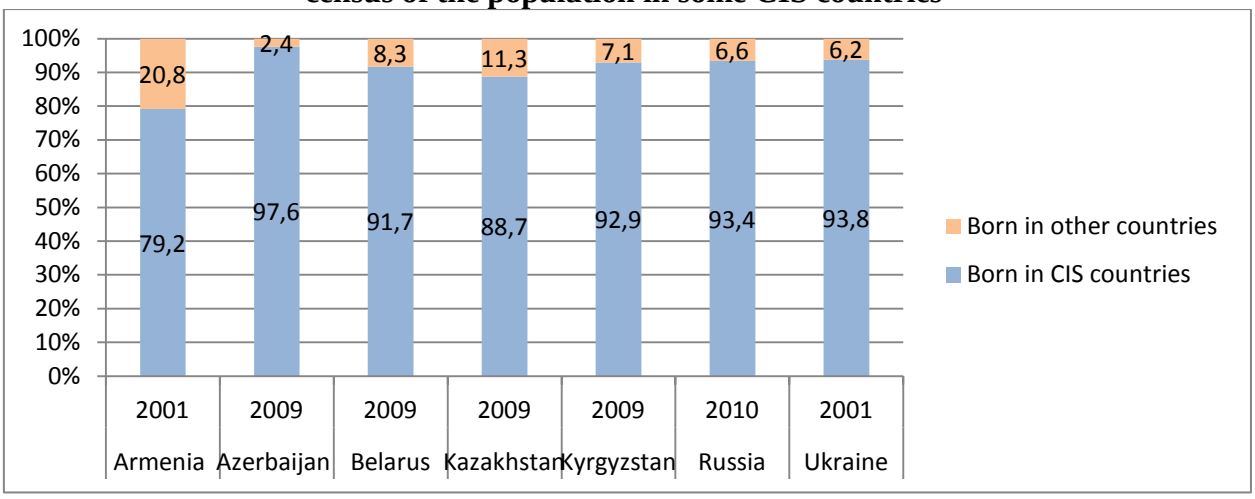
The structure of migration flows in the CIS and Georgia in 2000-2010 (in per cent)

Country	Arrivals from:				Departures to:				Reference Period
	CIS countries	*Russia*	other countries	All countries	CIS countries	*Russia*	other countries	All countries	
1	2	3	4	5	6	7	8	9	10
Azerbaijan	94,6	62,4	5,4	100	96,7	83,7	3,3	100	2000-2009
Armenia	76,9	47,4	23,1*	100	82,6	69	17,4 **	100	2000-2009
Belarus	86,5	53,5	13,5	100	65,4	55	34,6	100	2000-2010
Kazakhstan	86,3	28,7	13,7	100	77	72,4	23	100	2000-2010
Kyrgyzstan	97,8	61,1	2,2	100	95,7	82,6	4,3	100	2000-2010
Moldova	35,4	9,2	64,6	100	70,2	36,3	29,8	100	2000-2006
Russia	95,1	–	4,9	100	54,7	–	45,3	100	2000-2010
Tajikistan	99,4	76,6	0,6	100	99,7	77,3	0,3	100	2000-2010
Turkmenistan	97,5	54,7	2,5	100	97	67	3	100	2000-2006
Uzbekistan	97,3	46,8	2,7	100	90,3	49,5	9,7	100	2000-2006
Ukraine	83	51,8	17	100	61,5	54,3	38,5	100	2000-2010

* Including 8,5% that did not identified the country of the previous residence
** Including 7,6 % that did not identified the country of the next residence
Source: National statistical agencies ,UN Population Division database

The national censuses accomplished in the CIS after the collapse of the Soviet Union, also show that among the lifetime migrants born abroad, who have indicated their birth place, the vast majority are the natives of the other CIS countries - the former Soviet republics (Figure 1). A higher percentage of people born outside the CIS, in Kazakhstan could be explained by the resettlement program of repatriates, and in Armenia – by a large Armenian Diasporas living all over the world, some of its representatives have returned back to their historic homeland.

Figure 1
The percentage of lifetime migrants born in the CIS and other countries, according to the census of the population in some CIS countries



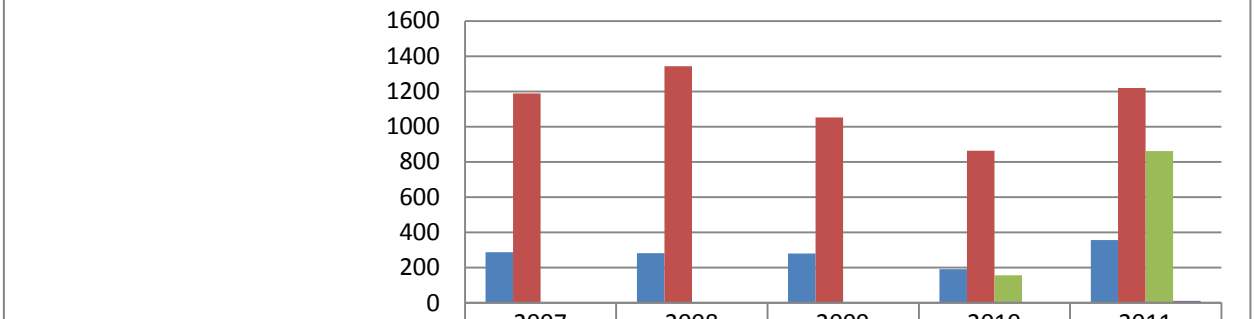
Source: Estimations based on the national censuses (excluding those persons who did not indicate their place of birth)

Temporary labor migration also mainly occurs within the CIS, the share of workers from the Central Asian states in the region amounts to 80-90 per cent; the citizens of the European part of the CIS to over 50 per cent. Domination of temporary forms of migration in the region is confirmed by the ratio of volumes of temporary labor migration and migration for permanent residence. For example, in Russia between 2007 and 2010 over one million of temporary labor migrants were annually getting their work permits; immigration for permanent residence amounted to 200-300 thousand per year (Figure 2). In 2011 1.2 million persons in Russia received their regular work permits (by quota), over 50 thousand were allowed to work beyond the quotas[9]; on top of that 856 thousand patents were sold[10]. Immigration for permanent residence was done by over 350 thousand people[11].

[9] Of these, about 40,000 are representatives of some specialties, the list of which is approved each year, as well as 11 thousand highly qualified specialists, hiring of whom has started in the middle of 2010.
[10] This new channel of simplified admission of aliens from the countries with visa-free entry to Russia was established in July of 2010.
[11] Sharp "increase" of immigration to Russia compared with 2010 was due to the changed rules of collecting statistics, the first time it included not only 132 thousand migrants, registered for permanent residence, but also over 224 thousand people, registered at the place of their stay for a period of over a year.

Figure 2

Immigration and temporary labor migration in Russia, 2007-2011 (thousands)



	2007	2008	2009	2010	2011
Immigrants	287,0	281,6	279,9	191,7	356,5
Temporary labour migarnts (issued work permits)	1189,0	1343,6	1052,3	863,0	1218,7
Patents sold				156,8	862,4
Highly qualified specialists (issued work permits)				3,1	11,3

Source: Federal Statistical Service of the Russian Federation (Rosstat) and Federal Migration Service of Russia.

In Kazakhstan, the number of foreigners who were granted work permit is close to the number of immigrants arriving to the country for permanent residence - both inflows make about 30-40 thousand per year. However, experts point out that the vast majority of migrants are not counted statistically, since they work without documented permits. Their annual number (mostly citizens of Uzbekistan) may be over 200,000. Thus, the temporary forms of migration are also several times larger than the volume of migration for permanent residence.

5. FLOWS OF MIGRANTS FOR PERMANENT RESIDENCE (LONG-TERM MIGRATION)

The source of information about migration flows during the Soviet period was the ongoing migration statistics about the persons who changed their residence for over 1.5 months. In 1990's the system of ongoing statistical registration of migration flows that was unified for all the republics, went out of order, and the quality of data on migration worsened. New institutions controlling the movement of population across the state borders in most of the newly independent states were just forming. Under the multiple changes in the regulatory framework related to population registration and collection of migration statistics, the adequate methodology

of accounting of long-term migration was never applied adequately. Because of that, data on migration in 1990s were incomplete.

However, based on it, one can get certain idea about the scale and the main directions of migration flows between the newly independent states and see the fundamental differences between the countries.[12]

Tab. 6 and 7 show the difference in the outcome of migration in the CIS countries in 1990s and 2000s. Throughout this period, after the collapse of the Soviet Union, only Russia and Belarus had positive net migration in exchange with all CIS countries; however values for the RF and Belarus differ tenfold. Other states throughout the period combined both immigration and emigration in the exchange with different countries, although their volumes are usually very different. Draws attention the fact that permanent-type migration to the new place of residence between many newly independent states practically ceased. It is primarily valid for the countries that are relatively sparsely populated or geographically distant from one another. As a result, significant flows of permanent-type migrants connect Moldova with Russia and Ukraine; Kyrgyzstan, Uzbekistan and Turkmenistan with Russia and Kazakhstan, Armenia and Azerbaijan - with Russia. Relatively close ties remain between the Slavic republics.

[12] One of the first investigations of this topic was made in the UN Population Division more that 10 years ago: Population Division, DESA. International Migration from countries with economies in Transition 1980-2000. United Nation, ESA/P/WP.166, 2001

Table 6

Net migration between the CIS countries, 1992-1999 (thousands)[13]

Countries of destination	*Countries of origin*						
	Azerbaijan	Belarus	Kazakhstan	Kyrgyzstan	Russia	Turkmenistan[14]	Ukraine
Armenia	0,0	3,1	0,9	0,1	181,5	0,3	20,2
Azerbaijan		2,8	1,3	0,7	266,4	0,2	24,2
Belarus	-1,8		-28	-2,7	-18,8	-2,1	-19,8
Georgia	9,3	15,7	1,2	0,0	311,6	0,1	31,1
Kazakhstan	1,6	5,4		-5,1	1360,9	-17,6	49,8
Kyrgyzstan	0,1	16,9	1,2		241,5	0,1	7,4
Moldova	-0,1	0,6	-1,8	-0,1	66,6	-0,1	26,5
Russia	-72,4	-91,4	-1222,9	-217,9		-87,1	-202,4
Tajikistan	0,3	3,8	11,1	9,9	287,2	7,8	19,4
Turkmenistan	-0,5	2,2	21,2	-0,1	105,5		9,5
Ukraine	-7,3	-25,0	-45,7	-7,2	368,5	-5,9	
Uzbekistan	3,6	1,8	25,1	-20	531,4	6,4	90,5
Not stated	6,4	-	-	-	-	10,9	-
Total	-60,7	-64,1	-1236,3	-242,4	3702,2	-98,0	56,6

Source: Calculations based on data of the national statistical services of the CIS; UN, Population Division: International Migration flows web database http://esa.un.org/MigFlows/MigrationFlows.html.

Table 7

Net migration between the CIS countries and Georgia, as by migration exchange countries, 2000-2010 (thousands)[15]

Countries of destination	*Countries of origin*										
	Armenia	Azerbaijan	Belarus	Kazakhstan	Kyrgyzstan	Moldova	Russia	Tajikistan	Turkmenistan	Ukraine	Uzbekistan
	2000-2009	2000-2009	2000-2010	2000-2010	2000-2010	2000-2010	2000-2010	2000-2010	2000-2010	2000-2010	2000-2006
Armenia		0,1	2	1,3	0,0	0,3	168,4	0,0	-0,2	10,6	-0,1
Azerbaijan	-3,5		2,5	1,9	-0,2	0,4	110,5	-0,1	-1,1	9,1	-0,4

[13] The columns reflect the net migration rate of the country of the source data (in columns) with the countries - partners in the migration exchange (in rows). Tables 6 and 7 show how migration statistics offices around the world see the same flows. If records of immigrants and emigrants were conducted equally well, the volumes of net migration between the two countries having the same absolute values would be different only the signs and the total net migration in the CIS in theory would be zero. However, errors in accounting and different approaches to the definition of migrants do not let to come close to this "ideal" result.

[14] Turkmen National Institute of State Statistics and Information, UNFPA. Population and Migration in Turkmenistan (Case Study). Turkmenistan, 2001.

[15] Georgia seceded from the CIS in 2009.

Belarus	-1,3	-0,7		-10,8	-1,3	-1,4	-3,7	-0,5	-0,4	-9,1	-2,3
Georgia	0,9	2,1	2,1	1,2	0,0	0,1	82,5	-0,1	-0,0	9	0,0
Kazakhstan	-0,8	-0,5	14,8		-34,1	0,0	422,8	-3,9	-28,2	15,5	-216,7
Kyrgyzstan	0,0	0,0	1,3	19,4		0,1	170,5	-7,1	-0,1	2,6	-1,4
Moldova	-0,1	0,0	3,2	0,2	0,0		99,8	0,0	-0,0	29,8	-0,1
Russia	-55,5	-18,3	39,4	-395,3	-290,3	-25,6		-73	-56,3	-51,8	-289,8
Tajikistan	0,0	0,1	0,8	3,2	4,1	0,1	119,2		-0,2	2,4	3,7
Turkmenistan	0,0	1,3	2	31,5	0,0	0,0	46	-0,1		3	0,2
Ukraine	-3,3	-0,5	20,2	-3,5	-1,5	-20,1	262,5	-1,6	-1,0		-16,5
Uzbekistan	0,0	0,8	3,6	274,4	-0,7	0,2	342,8	-7,5	-0,7	29,5	
Net migration in exchange with CIS countries	-63,6	-15,5	92	-76,5	-324	-45,9	1821,3	-94,0	-88,2	50,6	-523,3
Net migration in exchange with other countries	-6,7	0,0	-14,9	-96,8	-15,6	-9,3	-255,6	-0,3	-2,2	-125,7	-60,3
Not stated	-5,7	-	-	-	-	-	-	-	-	-	-
Total	-76	-15,5	77	-173,2	-339,6	-55,2	1565,6	-94,3	-90,4	-75,1	-583,6

Source: Calculations based on data of the national statistical services of the CIS countries.

Table 8 shows the estimations of the total immigration and emigration flows in the CIS countries during the past decade according to current migration statistics. Certainly, the demographic balance method gives a more accurate picture of net migration; however the volumes of flows, their differentiation by countries could only be estimated by the current accounting. Relatively high rates of emigration in Kazakhstan and Kyrgyzstan, compared to other countries of the Central Asia and Transcaucasia show not only the scale of migration, but also higher quality of their accounting.

Table 8

Net migration flows of migration in the CIS countries, 2000-2010 (thousands)

Countries	Period	Arrivals	Departures	Net-migration
Armenia	2000-2009	14,0 (0,2%)	90,0 (2,4%)	-76,0
Azerbaijan	2000-2009	25,2 (0,3%)	40,6 (0,5%)	-15,5
Belarus	2000-2010	196,6 (2,0%)	119,8 (1,2%)	76,8
Kazakhstan	2000-2010	617,9 (4,1%)	791,2 (5,3%)	-173,3
Kyrgyzstan	2000-2010	45,4 (0,9%)	385,0 (7,9%)	-339,6
Moldova	2000-2006	21,7 (0,6%)	50,2 (1,4%)	-28,5
Russia	2000-2010	2389,4 (1,6%)	823,8 (0,6%)	1565,6
Tajikistan	2000-2010	14,7 (0,2%)	108,1 (1,8%)	-93,4
Turkmenistan	2000-2010	5,1 (0,1%)	95,5 (2,0%)	-90,5
Ukraine	2000-2010	451,4 (0,9%)	526,5 (1,1%)	-75,1
Uzbekistan	2000-2006	47,5 (0,2%)	631,0 (2,6%)	-583,6
	2000-2010	…	…	-786,5

* - In brackets - the ratio of the population in 2000

Source: data from national statistical agencies, CIS Statistical Committee

Speaking about the trends of long-term migration to Russia, one should note the reduction of flow of immigrants from Ukraine, and especially, from Kazakhstan, two countries that in 1990s were the main suppliers of migrants. Between 2000 and 2011 the share of immigrants from Kazakhstan to Russia reduced from 35 to 10 per cent, from Ukraine went down from 21 to 12 per cent. However, the share of Kyrgyzstan migrants increased - from 4 to 12 per cent, Uzbekistan migrants - from 11 to 18 per cent, Tajikistan migrants - from 3 - to 10 per cent. Thus, in Russia, there is a tendency of gradual transition of the former temporary labor migrants to the category of migrants for permanent residence. This is indirectly confirmed by the information about the changes in the ethnic composition of migrants from the CIS. Russian statistics shows that in the flow of immigrants grew the share of titular nationalities of the countries - major suppliers of migrant workers. Between 2003 and 2007 the share of Tajik in the migration flow from Tajikistan has increased from 17 to 50 per cent, Kyrgyz (in the flow from Kyrgyzstan) - from 4 to 30 per cent, Uzbeks - from 5 to 13 per cent, of Moldovans - from 12 to 27 per cent, Azeri - from 33 to 64 per cent .

Emigration from the CIS in 2000-2010 was characterized by a relatively high percentage of departures to distant foreign countries. In the list of main destination countries for emigrants departing outside the borders of the former Soviet Union are the U.S. and Germany (Table 9). The number of immigrants to Israel has distinctly declined. However, due to migration from Ukraine and Moldova the role of the Southern European countries has increased, especially of Italy, as the region of attraction of immigrants from the CIS. But in general, over the last decade in the CIS there is a tendency of reduction of the volume of almost all major flows of permanent-type migrants.

Table 9

Migration for permanent residence from the CIS to Germany, Israel, Canada and the United States (thousands)

Countries	Germany		Israel		USA	
	1992-2001	2002-2010	1992-2001	2002-2010	1992-2001	2002-2010
Armenia	12,6	-0,5	1,6	0,2	28,4	28,2
Azerbaijan	12,5	4,5	19,5	2,8	16,2	10,6
Belarus	15,1	9,9	29,9	5,2	31,8	22,8
Georgia	13,1	3,4	18,1	2,9	6,1	12,2
Kazakhstan	776,6	116,1	15,4	2,5	9,9	16,3
Kyrgyzstan	60,4	10,8	3,2	0,6	2,5	5,0
Moldova	15,5	6,6	19,4	3,2	16,3	18,6
Russia	681,0	214,4	195,2	40,2	148,1	119,4
Tajikistan	11,1	0,4	5,5	0,1	3,3	1,9
Turkmenistan	4,3	1,2	2,2	0,7	0,8	1,7
Ukraine	126,8	59,0	197,5	26,4	161,9	128,4
Uzbekistan	27,8	7,6	42,4	6,6	24,9	33,9
USSR (not stated)	224,7	…	14,9	0	49,5	34,8
Total	1981	433	565	91	500	434

Note: for U.S. and Israel – estimations the numbers of issued residence permits; for Germany – estimations of net-migration.

6. STOCKS OF PERMANENT-TYPE MIGRANTS FROM THE NEWLY INDEPENDENT STATES

The most important characteristic of the outcome of migration is the data on migrant population (stocks) residing in the country of destination. In this respect, for the countries that not so long ago made up a single state - the Soviet Union, there are certain difficulties, since the criterion of the country of birth is hardly applicable for most migrants. As it has been already noted, in 1989 over 30 million people in the Soviet Union resided outside the republics of their birth. An impressive number of "international" migrants "born outside" Russia, Ukraine, Kazakhstan and other countries - participants of the CIS in the late 1990s is largely a result of resettlements done prior to disintegration of the USSR. Thus, according to the Russian census of 2002, out of 145.2 million of permanent population, 12 million people were born in other countries, (of which 10.2 million - in the CIS countries). This figure (12 million) with the light hand of experts from the UN Population Division and the World's Bank was presented to the world community as an estimate of the number of international migrants in the Russian Federation. But a large part of those 12 million were internal migrants, i.e. were changing their places of residence within the borders of one country. For some reason, the international experts

did not notice another number from the results of the same census: of those people who in 2002 resided in Russia, more than 5.2 million in 1989 were residents of other states, including 4.7 million - the countries of the CIS.

Thus, in the cases of countries of the former Soviet Union, the criterion of the place (country) of birth makes such people "statistical" migrants. In fact, they did not make international migration, but have become international migrants in accordance with the practice of the United Nations[16]. For this reason, data on the stock of population born outside of the CIS countries should be interpreted with caution (if it is not possible to specify the year of migrants' resettlement) because they do not always reflect the migration situation of the recent years. Over time the replacement of the generations of lifetime migrants of the Soviet period with the real international migrants of post-Soviet period will occur gradually.

Let us refer to the results of the population censuses conducted between 1989 and 2010; in those countries where the question about the place of birth was included to the census, and the census itself was conducted in the same geographical boundaries.[17] One should keep in mind that the definition of resident population in the last Soviet census is different from those that were introduced in the next censuses. By the methodology of 1989 USSR population census, the resident population covered all those who resided at a specific place for 6 months and longer, including those who were temporarily absent if their absence did not exceed 6 months. In the following censuses as time criterion for determining permanent residence was used the term of 1 year in accordance with the recommendations of the UN.

[16] Migration and Remittances. Eastern Europe and the Former Soviet Union. Eds. Mansoor A. and Quillin B. Europe and Central Asia Region. The World Bank 2006.

[17] Census of Azerbaijan (1999 and 2009.), Georgia (2002) and Moldova (2004) did not cover all the territory of these countries. National Statistical Service of Azerbaijan does not receive data from the territory of Nagorno-Karabakh, the statistical agency of Georgia for many years has not been receiving information on South Ossetia and Abkhazia. Statistical service of Armenia estimates that the number of Armenians in the last Soviet census in 1989 was lowered by about 160 thousand people. In Azerbaijan and Tajikistan the data on the place of birth were not published.

Table 10.

Distribution of population of some CIS countries by their birthplace (in thousands)

Countries	Born in:	1989	Around 2000	Around 2009	[2000] to [1989]	[2009] to [2000]	[2009] to [1989]
Belarus	CIS countries	1182,3	1069,8	850,2	0,90	0,79	0,72
	Belarus	8883,3	8886,4	8388,8	1,00	0,94	0,94
	Other	55,1	89,0	264,9	1,62	2,98	4,81
Kazakhstan	CIS countries	3518,2	1946,1	1608,5	0,55	0,83	0,46
	Kazakhstan	12714,7	12840,0	14196,6	1,01	1,11	1,12
	Other	213,8	167,1	204,5	0,78	1,22	0,96
Kyrgyzstan	CIS countries	636,4	378,3	219,5	0,59	0,58	0,34
	Kyrgyzstan	3585,8	4425,4	5126,6	1,23	1,16	1,43
	Other	33,5	19,2	16,8	0,57	0,87	0,50
Russia	CIS countries	10196,5	11254,5	10458,7	1,10	0,93	1,03
	Russia	135549,8	131608,7	127116,4	0,97	0,97	0,94
	Other	994,1	2303,5	5281,4	2,32	2,29	5,31
Ukraine	CIS countries	6606,8	4837,3	-	0,73	-	-
	Ukraine	44332,1	42909,5	-	0,97	-	-
	Other	454,9	318,9	-	0,70	-	-

Source: data from national statistical agencies

Census of Belarus (1989, 1999, 2009), Kazakhstan (1989, 1999, 2009), Kyrgyzstan (1989, 1999, 2009), Russia (1989, 2002, 2012) and Ukraine (1989 and 2001) show that the number of lifetime migrants from the CIS countries among the resident population is decreasing in all the listed republics of the former Soviet Union, with the exception of Russia (Table 10). This reduction was strongest in Kazakhstan (54 per cent) and Kyrgyzstan (65 per cent). There was substantial increase of the number of those who did not indicate their places of birth as Belarus and Russia. There were 188 thousand of such persons in Belarus by 2009 Census, in Russia by 2010 census - 4.5 (!) million people.

Table 11

The population of some CIS countries by the region of birth (thousands)

Countries	Region of birth	1989	Around 2000	Around 2009	[2000] to [1989]	[2009] to [2000]	[2009] to [1989]
Belarus	European part of CIS	1076,3	946,6	726,0	0,88	0,77	0,67
	Central Asia	30,0	31,9	33,0	1,06	1,03	1,10
	Transcaucasia	76,0	91,3	91,2	1,20	1,00	1,20
Kazakhstan	European part of CIS	3125,4	1593,2	941,9	0,51	0,59	0,30
	Central Asia	297,2	302,1	628,5	1,02	2,08	2,11
	Transcaucasia	95,6	50,7	36,1	0,53	0,71	0,38
Kyrgyzstan	European part of CIS	414,2	184,6	83,5	0,45	0,45	0,20
	Central Asia	210,4	187,3	132,7	0,89	0,71	0,63
	Transcaucasia	11,8	6,3	3,3	0,53	0,53	0,28
Russia	European part of CIS	6494,1	5236,8	4541,5	0,81	0,87	0,70
	Central Asia	2646,9	4061,3	4225,8	1,53	1,04	1,60
	Transcaucasia	1055,4	1956,4	1691,4	1,85	0,86	1,60
Ukraine	European part of CIS	677,2	490,3	-	0,72	-	-
	Central Asia	5729,2	4133,1	-	0,72	-	-
	Transcaucasia	200,4	213,9	-	1,07	-	-

Source: data from national statistical agencies

Analysis of the data by the regions of birth shows that in all of the countries that we deal with, the number of those who were born in the European part of the CIS was reduced. But it was especially significant in the Central Asia. In Kazakhstan, the total number of natives of Belarus, Russia, Ukraine and Moldova has decreased by 70 per cent, in Kyrgyzstan - by 80 per cent (!). Obviously, this dynamics is the result of the repatriation of the population of European descent. The characteristics of population dynamics should also be taken into account: age composition of the remaining non-native-born people of European origin with high proportion of individuals of the elder age groups compared to the indigenous peoples. Thus, in Kyrgyzstan the share of persons above working age (men - 60 and older, women - 55 and older) among the Russians was 24 per cent, among the Kirgiz - 6.3 per cent. At the same time, the share of persons born in other Slavic republics and Moldova decreased in Belarus, Russia, and Ukraine, due to the reduction of migration exchange between them.

The number of immigrants born in Central Asia has increased in Russia, in Kazakhstan and in Belarus. In Kazakhstan and in the other republics of the Central Asia, the number of natives of the other Central Asian republics is growing not only because of economic migration, but also due to active policy of attracting repatriates (compatriots). The feature of Kyrgyzstan for two decades is that in this country the number of natives of almost all former Soviet republics has been reducing. This country also serves as a model for the rest of the Central Asian countries that have lost a significant part of population born in other republics of the Soviet Union due to migration. The number of natives of the countries of Transcaucasia has increased in Russia, Belarus and Ukraine, mostly due to the lasting cultural/historical links and geographical proximity.

Trends in long-term migration allow us to trace and make statistics of the number of foreign population constantly residing in a particular country. Of greatest interest are the examples of Russia and Kazakhstan, since these countries receive the main part of migrants from the CIS countries (Table 12 and 13). The characteristics of citizenship of migrants are of relatively "short-term" nature, especially under the mass application of simplified naturalization procedures in Russia[18] (and partially - in Kazakhstan). However, the Censuses show the growth among the resident population in Russia and Kazakhstan of the stock of citizens of such countries of Central Asia that are the main suppliers of temporary labor migration. In Kazakhstan, the stock of citizens of the Central Asian countries in the last intercensal period has increased very rapidly: the number of citizens of Turkmenistan - about 9 times, Uzbekistan - 7 times, Kyrgyzstan - 5.5 times. However, such growth was observed on the background of a relatively small number of citizens from these countries in 1999.

[18] For instance, within 2007-2011 over 99.9% of l 1.4 million applicants who obtained the RF citizenship did it through simplified procedures. The period between application submission and citizenship acquisition in major part of cases lasted from a few months to one year

Table 12

The permanent population of the Russian Federation by citizenship, the All-Russia censuses of 2002 and 2010 (thousands)

Citizenship	2002	2010	2010/2002 (%)
Total Population	145166,7	142856,5	98,4
Citizens of Russia	142442,4	137856,2	96,8
Total foreign population	1025,4	687,0	67,0
Citizens of CIS countries and Georgia	906,3	578,7	63,8
Azerbaijan	154,9	67,9	43,9
Armenia	136,8	59,4	43,4
Belarus	40,3	27,7	68,6
Georgia	52,9	12,1	22,8
Kazakhstan	69,5	28,1	40,4
Kyrgyzstan	28,8	44,6	154,7
Moldova	51,0	33,9	66,5
Tajikistan	64,2	87,1	135,8
Turkmenistan	6,4	5,6	86,9
Uzbekistan	70,9	131,1	184,9
Ukraine	230,6	93,4	40,5
Others	119,1	96,2	80,8
Stateless	429,9	178,2	41,5
Not stated	1269,0	4135,1	325,8

Source: Federal Statistical Service of the Russian Federation (Rosstat)

Table 13

Resident population of Kazakhstan by citizenship, 1999 and 2009 censuses (thousands)

Citizenship	1999	2009	2009/1999
Total Population	14953,1	16009,6	1,07
Citizens of Kazakhstan	14867,9	15850,7	1,07
Total foreign population	85,2	101,6	1,19
Citizens of CIS countries and Georgia	54,2	86,4	1,60
Armenia	0,6	1,0	1,59
Azerbaijan	1,2	3,2	2,64
Belarus	0,2	0,6	2,44
Georgia	0,5	0,7	1,38
Kyrgyzstan	1,7	9,3	5,53
Moldova	0,2	0,2	1,11
Russia	44,0	38,6	0,88
Tajikistan	0,6	1,8	2,85
Turkmenistan	0,3	1,8	6,96
Ukraine	1,8	2,4	1,37
Uzbekistan	3,1	26,9	8,70
Other	31,0	15,2	0,5
Not stated	0,0	57,3	-

Source: Agency of Statistics of the Republic of Kazakhstan

In general, before the collapse of the USSR approximately 26 million people who were born in other countries of the Commonwealth resided in the future CIS countries, by 2010 this number, by our estimations reduced to 18 million people. This decrease was mainly due to the reduction of the number of non-native-born not in Russia, where over the past two decades since the collapse of the Soviet Union, it has even increased, but at the expense of the other former Soviet republics.

7. LABOR MIGRATION

Migrant-receiving countries were the first to start counting migrant-workers in the former USSR area via establishment of administrative systems of work permits issuance. These sources have created the bases of statistics of the foreign labor force in these states. Migrant-sending countries in the late 1990s have started to conduct sample surveys of households, using the questions about the absent household members, and questions addressed to return migrants. Similar questions were asked in the censuses. Currently, statistics about the population that is absent for labor reasons are being developed, mainly based on population surveys and censuses' materials (Armenia, Kyrgyzstan, Moldova, Tajikistan).

Accurate calculation of migrant workers leaving the CIS countries is not available, since all countries are making their measurement using different criteria. Some countries are trying to estimate the flows (of those who have left during the period), the other - the stock of people that are absent from the country of residence at the time of the survey (census). Also different time thresholds are used to count migrants or, alternatively, to exclude them from observation. We can definitely say that millions of the CIS residents are involved in labor migration each year. Only Russia annually hosts over a million of legal migrants (number of work permits issued in 2010 was 1.2 million and 863 thousand migrants were employed). The number of migrants working illegally in Russia, can be three to five times larger, experts estimate it as 3-4 million. Besides Russia, significant flows of migrants from Moldova and Ukraine move to the EU countries (according to national surveys - 29 per cent and over 40 per cent, respectively). Over one third of labor migrants from Uzbekistan choose Kazakhstan. Assuming that Russia takes over 70 per cent of the flow, the total number of labor migrants from the CIS countries in the former Soviet territories can be estimated as 7-8 million. Table 14 presents some estimation of the volumes of flows of labor migrants from certain countries of the Commonwealth. Undoubtedly, these estimations need to be clarified, but they reflect the true scale of the phenomenon, including the relation to the population of working age in the countries of origin of migrant workers.

Table 14

Estimations of flow or the number of labor migrants from the CIS countries, 2005-2010. [19]

Country	Labour migrants (thousands)	Proportion of population in 15-59 [20]	Proportion of migrants working in Russia (%)	Source:
Armenia	127 (up to 300 in Russia)	(15%)	85-95	Living standard survey 2008, (experts' estimates)[21]
Azerbaijan	(up to 350)	**(5 %)**	**85%**	(experts' estimates)[22]
Belarus	41,8 (at the census date), (up to 300 in Russia)	(5 %).	90	Population Census 2009 [23]
Kyrgyzstan	225 (at the census date) (outflow up to 500 per year)	**(15%)**	**83-89**	Population Census 2009; (experts' estimates)[24]
Moldova	300 per year (to Russia up to 300)	(20%)	60	Labour force survey 2009-2010[25]
Tajikistan	430 (**700)**	**(20 %)**	**95-99**	Labour force survey 2008; Азиатский банк развития; (experts estimates) [26]
Uzbekistan	(1200-1600 in Russia)	**(more than 10%)**	**60-65**	(experts' estimates) [27]
Ukraine	1476 (within 2005-2008)	(5%)	48	Ukrainian External Labour Migration. National survey 2005-2008[28]

Note: including undocumented migrants; in brackets – experts' estimates.

[19] Russia and Kazakhstan plan to conduct surveys with a set of questions on labor migration in the future. Perhaps they will reveal the scale of departures from the countries that are currently considered in the region only as hosting countries for migrant workers.

[20] Authors' estimates for the reference period

[21] In accordance with experts' estimates in the beginning of 2000-s the total number of migrant workers from Armenia – both short- and long-term, made about 500 thousand persons including 280 thousand that worked in Russia (Mukomel V. (2005), Migration Policy in Russia. M., 2005. p. 328 (in Russian)). In 2010 the head of the Migration service of Armenia estimated the stock of labour out-migrants as follows: over 600-700 thousand of long-term and over 80-thoussand seasonal migrant workers (Yeganyan G. Armenian net. Armenian news in Russian 19.07.2010: http://armeniya.net/2010/07/19)

[22] According to MOI of Azerbaijan information in the beginning of 2000-s up to 1 million Azerbaijan citizens stayed in Russia as migrant-workers, 9 of 10 violated migration law of the RF (Irregular Migration/ Otechestvennye Zapiski, 2004 № 4 б p. 174 (In Russian): http://www.strana-oz.ru/2004/4/nelegalnaya-migraciya); Denisenko M. Migration and remittances in Central Asia, Armenia and Azerbaijan (in Russian) ESCAP, Bangkok, 2010. http://www.unescap.org/sdd/meetings/egm_mig_sep2010/mig_egm_paper_russian.pdf.

[23] National experts of Belarus note that there are no any more or less agreed estimates of volumes of labour out-migration from the country; all available values differ by one order (Shakhotko L. International Labour Migration of the Citizens of Belarus. Voprosy Statistiki, 2011, No.8 (in Russian).

[24] Before the crisis – up to 500 thousand. Kyrgyzstan: Economic Growth, Employment and Poverty Reduction. UNDP, ILO 2008

[25] LFS of Moldova demonstrate a certain dynamics of migrant-workers stock from Moldova abroad (thousand): 2006 – 310, 1; 2007 – 335, 6; 2008 – 309, 7; 2009 – 294, 9. According to the Census 2004 data 273 thousand of residents of Moldova stayed abroad, including 242 thousand that left with a purpose to work.

[26] Kuddusov J. Impact of the world financial crisis on Tajikistan migrant workers: migrants' opinion / ILO, Ministry of labour RT (in Russia); Olimova S. (2009) Tajikistan: from forced migration to labour migration In: Post-Soviet transformations: reflection in migrations. Ed. by Zaionchkovskaya Zh. and Vitkovskaya G. M. (in Russian) p. 391; Migrant Remittances to Tajikistan, The Potential for Savings, Economic Investment and Existing Financial Products to Attract Remittances ILO, 2010

[27] Denisenko M. opt. cit

[28] Ukrainian External Labour Migration. National survey 2005-2008. Kyiv, 2009

Statistics of labor ***in-migration*** is based on administrative records that are usually done by migration services or agencies authorized to issue work permits, licenses to national employers for hiring foreigners and to make reports about the hired workers. Unfortunately, there is no information about the actual period of migrants' employment, their sex/age/qualification composition in these statistics. The Russian Federation was developing data on labor migration with a number of variables, but the methodology was considered as incorrect.[29] Other CIS countries, as a rule, limit themselves with publication of information about the number of work permits issued by the countries of migrants' citizenships.

Almost all CIS countries keep the records of citizens of those countries who received a job offer through the authorized (licensed) employment agencies before the departure. However, only a small part of labor emigrants are leaving through these channels. Their share in the total number of persons who are absent is low. For example, in Russia in 2008-2009 only about 2 per cent of labor migrants from Kazakhstan and Ukraine and 6-8 per cent of migrants from Tajikistan were employed through this channel.[30] Russia also keeps records of citizens who left via the licensed agencies to work abroad; their annual number makes about 70,000 persons. But this is a highly specialized channel of employment. Almost 80 per cent of migrant workers are employed on ships under foreign flags (mostly Cyprus, Liberia, Malta) and the other 20 per cent - are mostly students working during their holidays. The actual number of Russians working abroad can only be accessed through statistics of the destination countries.

Among the CIS countries, except Russia, the foreign labor is imported by Kazakhstan, legally hosting 30-50 thousand people per year. In Ukraine the number of temporary migrants annually makes about 20,000. The CIS countries, that are traditionally considered as labor-exporting, also attract a certain number of migrant workers from abroad. Of course, the volumes of these flows, compared with Russia are small and vary from a few hundred people (in Moldova) to several thousand: from two thousand persons in Tajikistan - to 9000 in Azerbaijan (Table 15).

[29] Other variables (age, sex, occupations) were developed for the incorrectly calculated aggregated value of the "had worked during the reporting period", that was a sum of migrant stock at the beginning of the year and inflow in the same year. It implied a significant overestimation of the real size of foreign labour force. Since 2011 Russia has been in the process of reformation of statistics of labour migration also taking into account its new forms and channels.
[30] Calculated on the basis of the FMS of Russia and the CIS Statistical Committee data.

Table 15.

Flows of foreign labor force in selected CIS countries (persons)

Country	Citizenship of Foreign workers	2005	2006	2007	2008	2009
Belarus	CIS-countries	409	507	826	1060	1943
	Other	242	415	670	1403	2892
	Total	651	922	1496	2463	4835
Moldova	CIS-countries	103	130	201	214	131
	Other	628	698	801	922	459
	Total	731	828	1002	1136	590
Kazakhstan	CIS-countries	4164	6427	5528	6447	2749
	Other	20596	34470	53282	47757	28239
	Total	24760	40897	58810	54204	30988
Russia *(in thousands)*	CIS-countries	303	871	984	785	659
	Other	267	323	359	267	204
	Total	570	1194	1344	1052	863
Ukraine	CIS-countries	3367	3994	5194	7032	5844
	Other	6586	8601	14357	19949	13186
	Total	9953	12595	19551	26981	19030

Source: CIS Statistical Committee

The main difference of the flows of foreign labor between Russia and other countries of the region is not only in their volume, but also in composition of migrants by citizenship. The share of legal labor migrants from other CIS countries during the recent years in Russia has reached 75 per cent[31], in Belarus - about 40 per cent, in Ukraine – 30 per cent, in Moldova - roughly 20 per cent. In Kazakhstan, Tajikistan and Azerbaijan the share of migrants from the CIS did not exceed 10-12 per cent. Among the attracted foreign labor from the remote foreign countries in the CIS dominate the citizens of China, Turkey and Vietnam. Taking into account the patents that were sold, the proportion of citizens of the CIS in the flow of labor migrants in Russia are currently over 90 per cent. Currently, among foreign workers who arrived in the Russian Federation predominate citizens of the Central Asia - Uzbekistan (38 per cent) and Tajikistan (16 per cent). The flow of migrants from China is also significant (7 per cent).

[31] Until 2010 the RF data about the workers from the CIS countries represented foreigners that were legally *hired by* Russian employers (who sent a special notification to the migration authorities). Since 2011 the information is available only on the number of *issued regular work permits*. Over 83 per cent of these documents were granted to the citizens of the CIS countries.

Since 2010, Russia accepts a special category of foreign workers, the so-called highly qualified specialists (HQS)[32]. In this so far small group of migrants (the stock of HQS by the end of 2011 made about 10 thousand people) share of CIS citizens was less than 7-8 per cent.

A typical feature of labor migration in the CIS is a huge number of migrants with irregular status or working without permits. The main reason for this is believed to be a very limited ability to control the situation from the side of the governments of the receiving countries (first of all - Russia and Kazakhstan); the exaggerated scale of "gray" economy[33], that employs most of the illegal migrants, the high profitability of using such migrants, that maintains the unpunished corruption schemes of hiring such foreigners. With all the relativity of data comparison, obtained from different sources applying different definitions of the migrant, they still make it possible to see that from the number of migrants who stayed in Russia to work, legally were employed no more than 60 per cent of the citizens of Moldova (2009) and 35 per cent of the citizens of Armenia (2008), less than 30 per cent of the citizens of Tajikistan (2009), about 30 per cent of the citizens of Kyrgyzstan (2009).

8. CONCLUDING POLICY REMARKS

The presented picture of migration over the post-Soviet territory is one of the most large-scale on the map of the world. Although, in comparison with the Soviet period, the volume of permanent-type migration between the former Soviet republics, that transformed from domestic to international has declined, temporary migration started to develop. At the same time, the main sources of temporary labor migration has become a region that in the Soviet period was characterized by low mobility of indigenous population – the Central Asia, Azerbaijan, and Moldova. Currently, the turnover of permanent migration between the countries of the Commonwealth makes up to 1 million persons per year, the flow of migrant workers in legal and illegal forms makes not less than 7-8 million. Stocks of natives of other CIS countries are still rather big in the countries that host migrants (Russia, Ukraine, Belarus and Kazakhstan). Although the number of the latter over the whole former Soviet territory has significantly reduced, it is still rather large - 18 million people.

In the future, the weakening of migration flows should not be expected, especially between Russia and Kazakhstan on one hand, and the other former Soviet republics, on the other. Pushing factor of development of these relations will be the continued differences in the

[32] The only criterion applied to migrants of this category is the wage - not less than 2 million rubles per year, and 1 million for professors and researchers (about 50 000 or 25 000 Euro respectively).

[33] The share of the shadow economy as estimated by the experts makes at least one third of the GDP (see http://www.gazeta.ru/financial/2011/04/01/3572005.shtml), and in Kazakhstan - not less than 20 per cent.

expected scenarios of economic and demographic development. In Russia, however, as well as in Ukraine and Belarus, a significant decrease of population of working age (up to 10 million by 2021) is expected, as well as the acceleration of the aging process. Under these circumstances, an acute question arises: "Is the economic growth possible under the conditions of shrinking and aging of the working population?" Along with this process, in three Central Asian countries - Uzbekistan, Tajikistan and Kyrgyzstan - the population of working ages will increase by 5.4 million people. At the same time, millions of natives of the Commonwealth, who do not reside in the countries of their birth, along with the migrant workers are the guarantors of maintaining personal ties between the different countries of the CIS, and keeping a common language area.

The CIS countries are clearly divided into those that supply migrants and those that host them. Understanding of the importance of migration, not limited by "economic sense" is growing in the countries. Along with this a need to establish mechanisms for migration management is growing too[34]. More and more attention is paid to the regulation of labor migration in order to reduce its social and economic costs. Gradually an understanding is getting formed of donor and recipient countries for development of organized forms of recruitment of foreign labor, professional training of migrant workers, learning the language of a hosting country, etc.

In the recent years, the CIS countries apply the practice of concluding bilateral or multilateral (for a limited number of participants) agreements and alliances that facilitate access of citizens of the partner countries to national labor markets of these countries. In most cases, experts are skeptical about the effectiveness of such agreements. The lower the status of the agreement, the higher is estimation of its efficiency. As most inefficient are considered agreements concluded within the CIS. They are declarative and isolated from reality.[35]

Despite the large number of bilateral and multilateral agreements between the CIS countries in the field of migration, it is still impossible to talk about the formation of a common labor market and free movement between the countries. The CIS countries apply a system of constraints - in the form of quotas for work permits, employment bans for migrant workers, and so on. The lack of efficient enforcement of restrictive rules and regulations cause a large scale of illegal employment of foreign workers in the CIS[36].

[34] For more detailed information on migration policies in the CIS area, main mechanisms applied to regulate migration and obstacles for free mobility of labour in the region see: Chudinovskikh O. Migration and Bilateral Agreements in the Commonwealth of Independent States. In: Free Movement of Workers and Labour Market Adjustment. Recent Experiences from OECD Countries and the European Union. OECD 2012.

[35] Zayonchkovskaya Zh. Interstate partnership of Russia and the countries of Central Asia in the sphere of labour migration. Paper presented at the Scientific Council of the Federal Migration Service of the Russian Federation, April 10, 2009 (in Russian): http://www.fms.gov.ru/upload/iblock/4c6/zai.pdf

[36] Choudinivskikh O. opt. cit.

Nevertheless, there are positive examples of interstate cooperation in migration management. The most vivid of these is the Customs union between Russia, Belarus and Kazakhstan, and the agreement in the framework of the Union State of Russia and Belarus. However, the flows of labor between these two countries can not fundamentally change the picture of the migration regime in the region.

Due to these conditions, the future of migration situation in the CIS strongly depends on policy of the Russian Federation. In the regulatory framework of Russia, related to migration and naturalization, important changes occur during recent years. On June 13, 2012 the President of Russia has signed a new conception of the State Migration Policy of the Russian Federation. It is intended to increase the selective component of the migration policy, application of differential mechanisms of attracting and usage of the foreign labor, development of various forms of temporary employment, educational and academician migration. One of the key directions of the new migration policy, that has been in demand for a long time both in Russia and in the countries of origin, is the development and implementation of the programs of integration of migrants, including learning Russian language, getting acquainted with information about legislation, cultural traditions and norms of behavior in the hosting society.

WP3/07 SEARCH WORKING PAPER

Immigrant-Native Wage Gaps and the Returns to Human Capital

Raúl Ramos, Alessia Matano, Sandra Nieto

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SEARCH
SHARING KNOWLEDGE ASSETS: INTERREGIONALLY COHESIVE NEIGHBORHOODS

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Immigrant-native wage gaps and the returns to human capital[1]

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Abstract

The aim of this paper is to quantify immigrant-native wage gaps in the European Union countries putting special attention to the role of favourable or unfavourable policies supporting the labour market integration of recently arrived immigrants. Analysing data from MIPEX for the period 2007-2010, we identify that nearly all new EU member states (EU-12) have unfavourable policies while in the old EU member states (EU-15) there are two clear groups of countries: one formed by Austria, Belgium, Greece, Ireland, Italy, Luxemburg and the United Kingdom with less favourable policies and a second one formed by Germany, Denmark, Spain, Finland, France, Netherlands, Portugal and Sweden where policies are more favourable. Using cross-sectional microdata from the EU-SILC, we estimate separate Mincer equations for the three groups of countries. Our results show that wage differentials between immigrant and natives are lower in those countries with more favourable policies, but this is the result of a better relative situation of medium-skilled workers and not of highly-qualified ones. In any case, the wage gap for immigrants in EU-15 countries is clearly lower than for those arriving at EU-12 countries. However, although our results suggests that these policies do have some effects on immigrants' labour market integration, it is not possible to disentangle which part of the effect is due to this particular measure, to other migration policy or even to 'non-migration policies'.
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Keywords

Returns to human capital, migration.

JEL Classification

J15, J24, J31, J61.

[1] We make use of microdata from the European Commission, Eurostat, cross-sectional EU-SILC 2004 to 2010 database made available by Eurostat under contract EU-SILC/2012/17. Eurostat has no responsibility for the results and conclusions reported here.

1. MOTIVATION AND OBJECTIVES

The relative situation of immigrants in the labour market of the host country has played a central role in the numerous studies carried out in recent decades on the subject of international migration and its consequences. Both academics and policy makers have placed particular attention on the wage gap between immigrants and native-born workers. As summarised in Sanromá et al. (2009), the key empirical findings of this literature are twofold: first, immigrants typically face a significant wage gap when arriving to the host country and, second, this gap tends to diminish the longer they remain in their host country. Recent contributions have argued that the wage disadvantage experienced by immigrants when they arrive in a new country can generally be attributed to the limited transferability of the human capital they have acquired in their home country. In fact, as highlighted by Dustman and Glitz (2011), the educational attainment of the foreign-born population serves as a key indicator of their performance in the host country's labour market. The reason may lie in the lower quality of the educational system there or in a different cultural background, but whatever the case may be, the relevant fact is that newly arrived immigrants lack sufficient human capital for their host country's labour market. However, the main explanatory factor behind the rapid growth over time in immigrant wage levels is related to their accumulation of different types of human capital in the host country, which is particularly significant in the first years of residence in the host country. This process could be facilitated by a favourable legislation to labour mobility in the host country.

The aim of this paper is to quantify immigrant-native wage gaps in the European Union countries putting special attention to returns to human capital and the role of favourable or unfavourable policies supporting the labour market integration of recently arrived immigrants. In particular, to find a job, not all foreign residents with the right to work have equal access to the full labour market, education system or employment services. For instance, only nationals and EU nationals in Europe enjoy equal opportunities in the public sector and better procedures to recognise their non-EU degrees. With the aim of identifying differences in this policy frameworks, we have analysed the MIPEX[2] 1.3 index for the period 2007-2010 which focuses on "Targeted Support for Labour Mobility". This index goes from 0 to 100, with lower values indicating more unfavourable policy frameworks for immigrants. As shown in table 1, according to these data, we can identify that nearly all new EU member states (EU-12) have unfavourable policies while in the old EU member states (EU-15) there are two clear groups of countries: one formed by Austria, Belgium, Greece, Ireland, Italy, Luxemburg and the United Kingdom with less favourable policies and a

[2] http://www.mipex.eu/

second one formed by Germany, Denmark, Spain, Finland, France, Netherlands, Portugal and Sweden where policies are more favourable. Table 2 also shows that between 2007 and 2010 the situation has been fairly stable. In fact, only Austria will change from less favourable to more favourable policies at the end of the period. Looking at these two groups, it seems that, in general, immigrants have better access and targeted support in the established countries of immigration. Likewise, the countries that restrict access are not usually the ones that try to take advantage of immigrants' specific skills.

Table 1. Different policy frameworks supporting labor market mobility

MIPEX 1.3. TARGETED SUPPORT FOR LABOR MARKET MOBILITY (average value 2007-2010)	EU15	EU12
Critically unfavourable (0) Unfavourable (1-20) Slightly Unfavourable (21-40)	AT (25), BE (37.5), GR (0), IE (18.8), IT (25.0),LU (6.3), UK (25)	BG (25), CY (12.5), CZ (12.5), HU (12.5), LT (25), LV (12.5), MT (12.5), PL (12.5), RO (37.5), SI (18.8), SK (0)
Halfway favourable (41-59) Slightly favourable (60-79) Favourable (80-100)	DE (87.5), DK (68.8), ES (50), FI (62.5) FR (62.5), NL (75), PT (56.3), SE (100)	EE (62.5)

Austria (AT); Belgium (BE); Bulgaria (BG); Cyprus (CY); Czech Republic (CZ); Germany (DE); Denmark (DK); Estonia (EE); Spain (ES); Finland (FI); France (FR); Greece (GR); Hungary (HU); Ireland (IE); Italy (IT); Lithuania (LT); Luxembourg (LU); Latvia (LV); Malta (MT); Netherlands (NL); Poland (PO); Portugal (PT); Romania (RO); Sweden (SE); Slovenia (SI); Slovak Republic (SK); United Kingdom (UK)

Source: Own elaboration from MIPEX

Table 2. Changes in policy frameworks supporting labor market mobility between 2004 and 2010

MIPEX 1.3. TARGETED SUPPORT FOR LABOR MARKET MOBILITY Change between 2007 and 2010	EU15	EU12
Unfavourable change	IE (-12.5)	SI (-12.5)
No significant change	BE, DE, ES, FI, FR, GR, IT, NL, SE, UK	BG, CY, CZ, EE, HU, LT, LV, MT, PL, RO, SK
Favourable change	AT (50), DK (3.5), LU (12.5)	

Austria (AT); Belgium (BE); Bulgaria (BG); Cyprus (CY); Czech Republic (CZ); Germany (DE); Denmark (DK); Estonia (EE); Spain (ES); Finland (FI); France (FR); Greece (GR); Hungary (HU); Ireland (IE); Italy (IT); Lithuania (LT); Luxembourg (LU); Latvia (LV); Malta (MT); Netherlands (NL); Poland (PO); Portugal (PT); Romania (RO); Sweden (SE); Slovenia (SI); Slovak Republic (SK); United Kingdom (UK)

Source: Own elaboration from MIPEX

Taking this into account, our objective is to test if returns to human capital (and, in particular, to formal education) are more similar between native and immigrants in countries with more favourable policies than in those with less favourable ones. The analysis of the impact of migration policies is not an easy task. As surveyed by Czaika and de Haas (2011), the scarce quantitative empirical literature finds rather unambiguous evidence that restrictive immigration policy measures do have significant effects on the magnitude and composition of immigration flows targeted by such policies. So far, empirical tests on the effectiveness of policy interventions, or more precisely, their qualitative-directional and quantitative-numerical effects on stocks or flows of different types of migrants, have basically used a migration policy dummy variable measuring the effect of the implementation of a particular type of policy or a country year-dummy dummy indicating the year in which any migration policy change has occurred. In this paper, we will use a similar approach that could be interpreted as a difference-in-difference estimator. In fact, we will carry out separate analysis for the two different groups of countries distinguishing between old and new EU member states. In particular, using cross-sectional microdata from the EU-SILC, we estimate separate Mincer equations for the three groups of countries. Our results show that wage differentials between immigrant and natives are lower in those countries with more favourable policies, but this is the result of a better relative situation of medium-skilled workers and not of highly-qualified ones. In any case, the wage gap for immigrants in EU-15 countries is clearly lower than for those arriving at EU-12 countries. However, although our results suggests that these policies do have some effects on immigrants' labour market integration, we have to admit that it is not possible to disentangle which part of the effect is due to this particular measure, to other migration policy or even to 'non-migration policies'.

The rest of the paper is structured as follows: first, in section 2, data sources are described and some descriptive evidence is presented; next, in section 3 the methodology and the empirical results are shown, while last, section 4 concludes with some final remarks.

2. DATA SOURCES AND DESCRIPTIVE EVIDENCE

To conduct our analysis, we use the most recent waves of the EU Statistics on Income and Living Conditions (EU-SILC) which provide comparable microdata for the member states of the European Union. In particular, the EU-SILC cross sectional files for 2004, 2005, 2006, 2007, 2008, 2009 and 2010 are used in our empirical analysis. Although the dataset provides information for 26 EU countries (Malta is not included) plus Iceland and Norway, only 22 EU countries will be considered. In particular, we exclude from the analysis Bulgaria, Poland, Romania and the

Slovak Republic because the presence of immigrants is very low. We have also decided to consider data for 2004 although data is only available for a few countries and to keep Cyprus and Ireland although no information is available for 2010 at the moment of carrying out our analysis. Data for Latvia for 2005 and 2006 is also incomplete, but it is also included in our analysis.

EU-SILC provides detailed information on foreign-born, education, wages and other personal and job characteristics that make it an appropriate data set for our study. We have chosen to focus our analysis on employees between 16 and 65 years old not currently involved in education and working full time

Regarding variables related to human capital, we focus our attention in the role of formal education, although we also control for potential experience including age and the squared of age as explanatory variables in our model. One shortage of the EU-SILC database is that it does not provide information about the age at arrival to the host countries that would have permitted to calculate years since migration and to differentiate actual experience in the home and in the host countries. Coming back to formal education, instead of converting the information on educational levels available in the EU-SILC into schooling years, we have chosen to construct three different educational levels: no education, primary education and low-secondary education; upper-secondary education and tertiary education. Our objective is to minimize the potential measurement errors when converting information from different educational systems (not only among EU countries but also between the different home countries of immigrants) into schooling years.

Regarding the measurement of the earnings variable, for all of the analysed countries we use the variable “Cash or near cash income received in the main and any secondary or causal jobs including social contributions and income taxes” which reflects gross income. However, the collected information between countries slightly varies. In particular, gross monthly wages are facilitated for Austria, Spain, Greece, Italy, Portugal and United Kingdom, while for the rest of countries data on gross annual wages is provided but we convert it to monthly wages. All monthly wages have been deflated using national indexes on purchasing power parities for actual individual consumption provided by Eurostat.

Descriptive statistics for main variables in our analysis are shown in Annex I. Table 3 shows some descriptive evidence of wage gaps between native and immigrants in the considered countries distinguishing between their level of studies and the policy framework.

Table 3. Average montlhly wages and wage differentials between natives and immigrants by educational levels

		Native	Immigrant EU	Immigrant Non-EU	Diff Native-EU	Diff Native-Non EU
EU15	All	1948.6	2402.7	1673.4	23.3%	-14.1%
	Primary or lower secondary education	1407.5	1571.3	1245.4	11.6%	-11.5%
	Upper-secondary education	1762.1	1842.3	1449.4	4.6%	-17.7%
	Tertiary education	2583.6	3563.7	2524.6	37.9%	-2.3%
EU15 favourable policies	All	1788.2	1779.2	1337.2	-0.5%	-25.2%
	Primary or lower secondary education	1258.2	1403.4	1111.7	11.5%	-11.6%
	Upper-secondary education	1540.9	1492.6	1152.6	-3.1%	-25.2%
	Tertiary education	2389.5	2325.2	1790.3	-2.7%	-25.1%
EU12	All	724.1	1017.6	565.9	40.5%	-21.9%
	Primary or lower secondary education	645.8	910.1	501.1	40.9%	-22.4%
	Upper-secondary education	573.1	901.7	358.5	57.3%	-37.4%
	Tertiary education	1161.6	1379.8	910.7	18.8%	-21.6%

As we can see from this table, wage differentials are very different when comparing the situation of immigrants from EU countries with those from non-EU countries. The wage gap is positive in nearly all cases for the first group, while for the second group is clearly negative. Surprisingly, the wage gap is higher in those EU-15 countries with more favourable policies and it does not clearly decrease with the level of studies. However, as these are raw wage differences, no conclusion can be derived from this table. We need to isolate the effect of personal and job characteristics on wages before we can extract any conclusion from these figures.

3. METHODOLOGY AND RESULTS

The model used in this section to analyse the native-immigrant wage gap is a semi-logarithmic Mincerian wage equation with the form:

$$w_i = \alpha + \beta_1 \cdot sch_i + \beta_2 \cdot age_i + \beta_3 \cdot age_i^2 + \gamma \cdot X_i + \varepsilon_i \quad (1)$$

where w_i corresponds to the logarithm of the monthly wage for individual i, sch_i represent the different dummy variable associated to educational levels (primary and low-secondary studies is taken as the reference category), the variable age_i denotes the age of the individual and age_i^2 its squared, as is usual in the literature. X_i is a vector that represents other individual characteristics which have an influence on wages such as gender, marital status, and so on, while ε_i is a random error term.

Table 4 shows the result of estimating equation on the sample described in the previous section, treating the logarithm of monthly wages as the endogenous variable. As can be seen in the first column of this table studies have a positive and significant effect on native and immigrant wages when working with all the considered countries in our analysis. An individual with upper-secondary education earns a 20% more than an individual with primary education, while this gap increases up to 60% when considering a worker with tertiary education. Age, acting as a proxy of potential experience, has a positive effect: each year increases wage around 6%, although there is an upper limit to the returns to the experience as indicated by the negative sign of the age squared. According to this estimate, the wage gap between immigrant and natives is above 15%. When introducing additional controls related to the job characteristics (permanent/temporary contract, occupational dummies and activity sectors), the returns to experience and to education decrease but are still positive and significant. The wage gap is now around 8%, a lower value than in the

previous specification. This result can be interpreted as clear evidence of job segregation of immigrants in the European Union. When the sample of countries is divided between old and new EU member states (columns 3 and 4), we can see that the returns to tertiary education are higher in EU12 countries than in EU15 countries in relative terms, but the wage gap between native and immigrants is also higher.

Table 5 shows the results of estimating model (1) for the two groups of EU15 countries. The previous model is also enlarged with the interaction between the "immigrant dummy" and the variables associated to the different educational levels. With this new specification, we can capture potential differences between native and immigrants in returns to human capital and see whether these differences are lower in those countries with more favourable legislations. Looking at results in table 5, we can see how wage differentials between native and immigrants once personal and job characteristics are controlled are lower in those EU15 countries with more favourable policies than in those with less favourable policies: 4% and 10%, respectively. However, the augmented model (columns 2, 4 and 5 for the EU12 countries) show that most qualified workers are less benefited by more migrant-friendly legislations.

Tables 6 and 7 provide a similar analysis but distinguishing between immigrants from EU countries and for immigrants from non-EU countries. After correcting for composition effects, wage differentials are of a similar size for immigrants from EU and non-EU countries. However, there are clear differences when we look at low and high qualified workers and we take into account the different legislation frameworks. For immigrants from the EU now living in other EU15 countries with favourable policies, wage differences are not significant for all workers, although for high qualified workers a 3% wage gap still remains. This is not the case in EU15 countries with less favourable policies where there is 12% wage gap between immigrants and natives and much more intense for low qualified workers, a similar result to the one obtained for EU immigrants in the new EU member states. The results in table 7 for non-EU immigrants provide a similar picture, although wage gaps are higher.

In summary, our results show that wage differentials between immigrants and natives are lower in those countries with more favourable policies, but this is the result of a better relative situation of medium-skilled workers and not of highly-qualified ones. In any case, the wage gap for immigrants in EU-15 countries is clearly lower than for those arriving at EU-12 countries.

Table 4. Pooled OLS estimates of the Mincer equation 2004-2010 – All immigrants

	(1)	(2)	(3)	(4)
	All countries	All countries	EU15 countries	EU12 countries
	Coeff.	Coeff.	Coeff.	Coeff.
Male	0.271***	0.234***	0.215***	0.274***
Single	-0.027***	-0.029***	-0.031***	-0.042***
Married	0.063***	0.042***	0.045***	0.032***
Age	0.062***	0.054***	0.056***	0.053***
Age Squared	-0.001***	-0.001***	-0.001***	-0.001***
Household size	-0.024***	-0.014***	-0.014***	-0.015***
Dependent children	0.039***	0.021***	0.019***	0.014***
Upper-secondary education	0.200***	0.095***	0.112***	0.086***
Tertiary education	0.582***	0.256***	0.248***	0.319***
Immigrant	-0.153***	-0.081***	-0.072***	-0.091***
Constant	5.920***	6.119***	6.076***	5.767***
Observations	783438	783438	561629	221809

Model (1) also includes country and time fixed-effects.
Models (2), (3) and (4) also include control variables related to permanent/temporary contracts, occupations (27 groups), activity sector (14 industries) and country and time fixed effects.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5. Pooled OLS estimates of the Mincer equation 2004-2010 – All immigrants

	(1)	(2)	(3)	(4)	(5)
	EU15 countries with favourable policies		EU15 countries with non favourable policies		EU12 countries
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
Male	0.225***	0.225***	0.202***	0.201***	0.274***
Single	-0.040***	-0.040***	-0.027***	-0.028***	-0.042***
Married	0.044***	0.044***	0.048***	0.048***	0.031***
Age	0.067***	0.067***	0.040***	0.040***	0.053***
Age Squared	-0.001***	-0.001***	-0.000***	-0.000***	-0.001***
Household size	-0.015***	-0.015***	-0.017***	-0.017***	-0.015***
Dependent children	0.017***	0.017***	0.025***	0.026***	0.014***
Upper-secondary education	0.116***	0.121***	0.104***	0.096***	0.089***
Tertiary education	0.227***	0.234***	0.281***	0.255***	0.330***
Immigrant	-0.040***		-0.103***		
Immigrant x Primary or low-secondary		0.014*		-0.163***	-0.060***
Immigrant x Upper-secondary education		-0.044***		-0.128***	-0.070***
Immigrant x Tertiary education		-0.079***		-0.009	-0.158***
Constant	5.877***	5.872***	6.403***	6.416***	5.766***
Observations	335811	335811	225818	225818	221809

All models also include control variables related to permanent/temporary contracts, occupations (27 groups), activity sector (14 industries) and country and time fixed effects.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6. Pooled OLS estimates of the Mincer equation 2004-2010 – Immigrants from other EU countries

	(1)	(2)	(3)	(4)	(5)	(6)
	EU15 countries	EU15 countries with favourable policies		EU15 countries with non favourable policies		EU12 countries
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
Male	0.216***	0.227***	0.228***	0.201***	0.200***	0.270***
Single	-0.034***	-0.042***	-0.042***	-0.031***	-0.032***	-0.041***
Married	0.044***	0.043***	0.043***	0.047***	0.047***	0.032***
Age	0.057***	0.069***	0.069***	0.042***	0.042***	0.055***
Age Squared	-0.001***	-0.001***	-0.001***	-0.000***	-0.000***	-0.001***
Household size	-0.013***	-0.014***	-0.014***	-0.016***	-0.015***	-0.015***
Dependent children	0.017***	0.014***	0.014***	0.024***	0.025***	0.009***
Upper-secondary education	0.116***	0.117***	0.119***	0.113***	0.101***	0.097***
Tertiary education	0.257***	0.233***	0.235***	0.293***	0.268***	0.340***
Immigrant	-0.077***	0.002		-0.121***		
Immigrant x Primary or low-secondary			0.083***		-0.249***	-0.055**
Immigrant x Upper-secondary education			-0.020*		-0.138***	-0.031**
Immigrant x Tertiary education			-0.031**		-0.006	-0.086***
Constant	6.031***	5.030***	5.029***	6.342***	6.351***	5.063***
Observations	531820	320916	320916	210904	210904	206566

All models also include control variables related to permanent/temporary contracts, occupations (27 groups), activity sector (14 industries) and country and time fixed effects.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7. Pooled OLS estimates of the Mincer equation 2004-2010 – Immigrants from non-EU countries

	(1)	(2)	(3)	(4)	(5)	(6)
	EU15 countries	EU15 countries with favourable policies		EU15 countries with non favourable policies		EU12 countries
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
Male	0.213***	0.225***	0.225***	0.196***	0.196***	0.274***
Single	-0.034***	-0.040***	-0.040***	-0.034***	-0.034***	-0.043***
Married	0.046***	0.045***	0.045***	0.049***	0.049***	0.030***
Age	0.056***	0.068***	0.068***	0.041***	0.040***	0.053***
Age Squared	-0.001***	-0.001***	-0.001***	-0.000***	-0.000***	-0.001***
Household size	-0.014***	-0.015***	-0.015***	-0.018***	-0.018***	-0.014***
Dependent children	0.019***	0.016***	0.016***	0.026***	0.026***	0.013***
Upper-secondary education	0.109***	0.118***	0.122***	0.095***	0.097***	0.090***
Tertiary education	0.245***	0.230***	0.235***	0.267***	0.264***	0.332***
Immigrant	-0.084***	-0.064***		-0.112***		
Immigrant x Primary or low-secondary			-0.008		-0.112***	-0.259***
Immigrant x Upper-secondary education			-0.066***		-0.142***	-0.168***
Immigrant x Tertiary education			-0.116***		-0.062***	-0.167***
Constant	6.073***	5.868***	5.864***	6.418***	6.417***	5.761***
Observations	536473	327806	327806	208667	208667	208200

All models also include control variables related to permanent/temporary contracts, occupations (27 groups), activity sector (14 industries) and country and time fixed effects.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4. FINAL REMARKS

The aim of this paper was to quantify immigrant-native wage gaps in the European Union countries putting special attention to the role of favourable or unfavourable policies supporting the labour market integration of recently arrived immigrants. The main channel through we argue these policies improve the relative situation of immigrants in the labour market is human capital transferability.

In order to identify countries with more favourable policies for the labour market integration of immigrants, in a first step we have used data from MIPEX to identify two clear groups of countries: one formed by Austria, Belgium, Greece, Ireland, Italy, Luxemburg and the United Kingdom with less favourable policies and a second one formed by Germany, Denmark, Spain, Finland, France, Netherlands, Portugal and Sweden where policies are more favourable. In a second step, we have used microdata for the EU Statistics on Income and Living Conditions (EU-SILC) to estimate separate Mincer equations for these three groups of countries. Our results show that wage differentials between immigrants and natives are lower in those countries with more favourable policies, but this is the result of a better relative situation of medium-skilled workers and not of highly-qualified ones. In any case, the wage gap for immigrants in EU-15 countries is clearly lower than for those arriving at EU-12 countries.

From a policy perspective, the obtained results suggest that policies that try to improve the situation of immigrants in the labour market of the host country seem to have a positive effect, although only for some particular groups of immigrants. However, we have to recognise that it is not possible to disentangle which part of the effect is due to this particular measure, to other migration policy or even to ‘non-migration policies’. Further research should be devoted to identify proper econometric strategies to deal with this identification issue.

5. REFERENCES

Czaika, M., de Haas, H. (2011), “The effectiveness of immigration policies. A conceptual review of empirical evidence”, DEMIG project paper no. 3.

Dustman, C., Glitz, A. (2011), “Migration and Education” in Hanushek, Machin Woessmann (ed.), Handbook of the Economics of Education, Volume 4, chapter 4, pp 327-441.

Sanromá, E., Ramos, R., Simón, H. (2009), "Immigrant Wages in the Spanish Labour Market: Does the Origin of Human Capital Matter?," IZA DP 4157.

ANNEX I. DESCRIPTIVE STATISTICS

Variables	Mean	Standard Deviation
Monthly wage (PPP adjusted)	1,611	1,650
Immigrant	0.0895	0.285
Male	0.588	0.492
Married	0.724	0.447
Age	41.00	10.93
Age squared	1,800	894.4
Household size	3.222	1.321
Dependent children	0.538	0.499
Primary or low-secondary education	0.205	0.404
Upper-secondary education	0.492	0.500
Tertiary education	0.303	0.460
Permanent contract	0.752	0.432
Austria (AT)	0.0336	0.180
Belgium (BE)	0.0289	0.168
Cyprus (CY)	0.0216	0.146
Czech Republic (CZ)	0.0539	0.226
Germany (DE)	0.0553	0.229
Denmark (DK)	0.0460	0.209
Estonia (EE)	0.0386	0.193
Spain (ES)	0.0806	0.272
Finland (FI)	0.0660	0.248
France (FR)	0.0634	0.244
Greece (GR)	0.0310	0.173
Hungary (HU)	0.0482	0.214
Ireland (IE)	0.0174	0.131
Italy (IT)	0.111	0.314
Lithuania (LT)	0.0302	0.171
Luxembourg (LU)	0.0291	0.168
Latvia (LV)	0.0205	0.142
Netherlands (NL)	0.0382	0.192
Portugal (PT)	0.0320	0.176
Sweden (SE)	0.0471	0.212
Slovenia (SI)	0.0700	0.255
United Kingdom (UK)	0.0370	0.189
EU15	0.717	0.451
EU15 favourable policies	0.429	0.495
EU12	0.283	0.451
2004	0.0901	0.286
2005	0.137	0.343
2006	0.151	0.358
2007	0.160	0.367
2008	0.161	0.368
2009	0.155	0.362
2010	0.146	0.353
Observations	783,438	

WP3/08 SEARCH WORKING PAPER

Skill mismatches in the EU: Immigrants vs. Natives

Sandra Nieto, Alessia Matano, Raúl Ramos

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SKILL MISMATCHES IN THE EU: IMMIGRANTS vs. NATIVES[1]

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Abstract:

The situation of immigrants within their host countries' labour markets is generally worse than the situation of natives. We focus our interest in the analysis of the differences in skill mismatches between immigrants and natives in EU countries. We use microdata from the Adult Education Survey (AES) carried out in 2007. This dataset allows us to analyse the incidence of different types of skill mismatches (vertical and horizontal) among native and immigrant workers. We do not find any significant difference in the probability of having horizontal mismatch between natives and immigrants once individual characteristics are controlled for. However, we find that immigrants are more likely to be overeducated than natives, and that this effect is higher for immigrants coming from non-EU countries than for those coming from other EU countries. Nonetheless, the pace of the assimilation process in the host country is faster for the first group. By means of the Yun decomposition, we also find that immigrants from the EU have a higher probability of being overeducated than natives because they have worse observable characteristics which influence positively the probability of overeducation, whereas results for immigrants from non-EU countries suggest the opposite: the gap is explained by differences in the returns to observable characteristics. This result suggests that immigrants from non-UE countries have a limited transferability of their human capital that pushes their situation of overeducation in the host country.

Keywords: Immigration, overeducation, assimilation.

JEL Codes: J61, J24

[1] We make use of microdata from the European Commission, Eurostat, AES 2007 database made available by Eurostat under contract AES/2012/06. Eurostat has no responsibility for the results and conclusions reported here.

1. INTRODUCTION, BACKGROUND AND OBJECTIVES

Human capital is one of the key factors in the determination of most of labour market outcomes (Card, 1999; Psacharopoulos and Patrinos, 2004). Consistent with this perspective, the analysis of the situation of immigrants within their host countries' labour markets has also focused on their human capital. In particular, the two main empirical results from this literature —the presence of a significant initial wage gap relative to native-born workers and the rapid wage growth from the moment of arrival—can basically be explained by their human capital. Further, human capital partially explains most differences between immigrants and natives in terms of participation in labour market or job quality, among others. Thus, the disadvantage experienced by immigrants when they arrive in a new country can generally be attributed to the limited transferability of the human capital they have acquired in their home country. The reason may lie in the lower quality of the educational system there or in the different cultural background. Whatever the case, the relevant fact is that newly arrived immigrants seem to lack human capital adequate to the needs of the host country's labour market (Chiswick, 1978; Chiswick and Miller, 1985, 2009; Friedberg, 2000). Moreover, the explanatory factor behind the rapid growth in immigrant labour market outcomes over time, especially in wages, can be found in the accumulation of different types of human capital in the host country, which is particularly significant in the first years of residence in the host country (i.e, command of the host country language). It is also noteworthy that this rapid growth in labour market outcomes generally leads to assimilation with the native population (Chiswick, 1978; Baker and Benjamin, 1994; Chiswick and Miller, 1995 and Bell, 1997, among others).

Within this literature, recent studies have focused on the role played by educational (or vertical) mismatch and more specifically, on the level of overeducation. Although an extensive body of research has analysed overeducation[2] since the seminal contributions of Freeman

[2] Surveys by Hartog (2000), Rubb (2003) and McGuiness (2006) have summarised the main findings of this literature.

(1976) and Duncan and Hoffman (1981), only a few recent studies have considered differences between natives and immigrants in terms of skill mismatches[3].

Overeducation is usually defined as the situation where workers have greater educational skills than their jobs require (Rumberger, 1981). The idea underpinning this new literature is thus that the imperfect portability of human capital acquired in origin countries forces immigrants to accept jobs requiring lower qualifications than those acquired in their country, making them formally overeducated workers[4]. The main outcomes of these recent studies can be summed up in two empirical regularities. Firstly, there is a greater incidence of overeducation among immigrants than there is among the native population. And secondly, immigrant workers succeed in reducing the difference in overeducation with regards to the native population as their stay in the new country is prolonged, i.e. the phenomenon of assimilation takes place in overeducation (in a similar way to the one found in earnings assimilation).

The literature on immigrant assimilation started with Chiswick (1978) who explained the lower marginal returns of immigrant human capital in the USA by the limited portability of their human capital. The results obtained for other economies confirm the differences between natives and immigrants in terms of the remuneration of their human capital, and they also find the existence of assimilation process (Chiswick and Miller, 1995, for Australia; Baker and Benjamin, 1994, for Canada; Bell, 1997, for the UK; Schmidt, 1992, and Constant and Massey, 2003, for Germany, and Longva and Raaum, 2003, for Norway). Shields and Wheatley Price (1998) and Friedberg (2000) obtained also interesting results separating the education acquired by immigrants in their country of origin from their studies conducted in the country of destination. They find that human capital imported from culturally distant countries receives a lower remuneration than that acquired in the country of destination, and it differs depending on the characteristics of the origin country. Thus, the greater the distance in terms of language, culture, and economic development, the less portable the human capital acquired abroad becomes and the greater the initial inequality in the job market in comparison with members of the native population. However, Duleep and Regets (1997) also found that the

[3] See for instance, Piracha and Vadean (2012); Dustman and Glitz (2011) and Leuven and Oosterbeek (2011)

[4] Possible differences in the quality of the different educational systems limit the comparison of native and immigrants workers. Nevertheless, many other factors (including an incomplete command of the language, qualifications not being recognised and studies adapted to the new labour market) reduce the expected productivity of hiring immigrants leading them to accept lower-paid jobs.

immigrants with lower portability of their human capital present a higher speed of assimilation.

Other interesting results were found when introducing overeducation into the analysis of the differences between natives and immigrants. Most of the literature concludes that immigrants have a higher rate of overeducation than natives (Chiswick and Miller, 2010). For instance, using data from Australia, Kler (2006) and Green et al. (2007) found that the incidence of overeducation is higher among immigrants from non-English-speaking countries, who show lower returns for overeducation. In the case of the United Kingdom, Lindley and Lenton (2006) found a higher incidence of overeducation not just among immigrants but also for non-white members of the native-born population. Using data from United States, Chiswick and Miller (2008) claim that the educational mismatch explains almost two thirds of the differences in human capital returns between native and immigrants.

In the study of the incidence of overeducation on immigrants, other results concerning the degree of transferability of human capital acquired in the origin country and the process of assimilation are also interesting. In particular, Chiswick and Miller (2007) found that the greater the work experience in the country of origin, the greater the probability of overeducation in the United States, which indicates low transferability not just of schooling but also of work experience acquired in origin. Sanromá et. al (2008) found that immigrants living in Spain accumulate knowledge and experience that are perfectly adapted to the local labour market, thus making for an easier assimilation process that reduces the intensity of over-education. However, the pace of assimilation is notably slow, so that around fifteen years of living in Spain would be necessary to eliminate the educational mismatch, and it differs depending on the origin country. Using data from New Zealand, Poot and Stillman (2010) also concluded that it was relevant to control for origin heterogeneity when analysing the pace of assimilation of immigrants in terms of overeducation. Last, Nielsen (2007) obtained that overeducation in Denmark affects immigrants with studies from abroad more than it does for natives and immigrants who have studied in Denmark. According to this author, this fact reveals the partial portability of human capital acquired in origin. Furthermore, immigrants with studies acquired in their own country reduce their overeducation as they increase their effective work experience in Denmark. Thus, they successfully assimilate. As for the returns of years of overeducation, this is lowest for immigrants with studies from abroad, followed by immigrants with Danish qualifications, and is the highest for the native-born population.

On the other hand, there are some studies that have not found any evidence of a successful assimilation process by immigrants in the host country. Dell'Aringa and Pagani (2010) found that the "catch-up" by foreigners in Italy seems unachievable, even once they have adapted their skills to the host country's labour market. Comparing data from 25 countries, the OECD (2007) obtained similar results in most of the countries when disaggregating results for men and women. A similar conclusion is found by Aleksynska and Tritah (2011) when analysing data from the European Social Survey for 22 European countries for the period 2002-2009.

Most of these papers consider vertical mismatch, i.e. mismatch between worker's educational level and the one required for their job, as an indicator of skill mismatch. However, there are other indicators of skill mismatch that have not been used until now in the analysis of immigrants. Horizontal mismatch measures the degree of adjustment between the workers' educational field and the one required for their job[5].

With the purpose of analysing the role played by these two components of skill mismatches, we use a database which allows us to measure both vertical and horizontal mismatches. Indeed, to the best of our knowledge, there are no previous studies that have analysed both types of skill mismatches separately for natives and immigrants using homogeneous information for a wide group of European Union countries. Taking this into account, the aim of this paper is twofold. First, we examine the determinants of being in a situation of vertical or horizontal mismatch focusing on natives and immigrants from EU countries and from non-EU countries and we analyse whether there is assimilation or not. Second, we try to identify the factor behind the observed differences in the probability of being mismatched between natives and both types of immigrants.

The rest of the paper is organized as follows. Section 2 describes the database used and defines the variables of interest. Section 3 shows descriptive evidence of the incidence of vertical and horizontal mismatches between natives and immigrants, focusing also in the analysis of the assimilation process of immigrants. Section 4 explains the applied methodology and shows the results. Last, section 5 summarises the findings of previous sections and point out the main policy conclusions of the analysis.

[5] For instance, Robst (2007) and Wolbers (2003) use this measure as indicator of skill mismatch.

2. DATA SOURCES AND VARIABLES DEFINITION

2.1. Adult Education Survey

In order to achieve our objectives, we use microdata from the Adult Education Survey (AES) provided by Eurostat. It is a survey addressed to private households with members between 25 and 64 years old. The survey has been carried out in 29 countries between 2005 and 2008 and the reference year is set at 2007. The main objective of the survey is to study lifelong learning, that is, those training and learning activities that the adult population performs with the objective of improving or extending their knowledge, skills and competences, from a personal, civil, social or work-related perspective.

This database is particularly appropriate for our analysis because, as far as we know, is the only one that allows us to measure both vertical and horizontal mismatch in a homogeneous way for a wide set of European Union countries and to make comparisons between immigrant (from EU countries and from non-EU countries) and native workers.

As we focus our interest on immigrants living in EU countries, we only consider those countries where immigration is a relevant phenomenon (more than 4% of total population). Thus, as we can see in Figure 1, we do not consider Bulgaria, Poland, Romania and the Slovak Republic. We also have excluded from the analysis Hungary and the Netherlands because immigrant population in the Adult Education Survey is clearly underrepresented when compared with aggregate data from Eurostat. We also have to exclude Finland, Italy and the United Kingdom from the analysis because these countries do not include in their national surveys some relevant information for our analysis (in particular, immigrants' years of residence in the host country). So, after these restrictions, we consider in our analysis the following 15 European Union countries: Austria, Belgium, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, France, Greece, Latvia, Lithuania, Portugal, Sweden and Slovenia.

We restrict our analysis to men and women employed at the time of the survey with valid information about their occupation and level and field of education. We exclude from the analysis individuals below the ISCED3 educational level. The reason to do it is because the

variable field of education is only defined for individuals with educational levels higher than ISCED2. The final sample consists of 28409 native born and 2492 immigrants, of which 984 come from European Union countries and 1598 come from non- European Union countries.

FIGURE 1

The variables used in our analysis are related to personal and job characteristics. As for personal characteristics, we use information related to gender, age, nationality, years of residence in the host country, number of members of the household, children at home, level and type of education and participation in non-formal education activities during the last 12 months. As for job characteristics, we consider information about tenure in the current firm, type of contract (permanent or not), part-time job, the economic activity of the firm, and the size of the firm. Last, we consider information about the country of residence. Descriptive statistics for these variables are shown in Table A.1 of the Annex.

2.2. Measuring skill mismatches

Three different methods have been proposed in the literature to measure vertical mismatch: objective, subjective and statistical method (in terms of the mean and the mode). Each procedure has its own advantages and weaknesses[6]. As a consequence, the use of one or other method usually depends on the nature of the data available.

The objective method is based on "dictionaries" of jobs, compiled by job analysts who determine what level and type of education workers should have in order to perform a certain job. A person is then overeducated if their level of education is higher than the level the analysts define to be ideal for the occupation. The subjective method takes into account the perception of the workers to determine the educational mismatch. Last, the version of the statistical method based on the mean (Verdugo and Verdugo, 1989) considers that workers are overeducated if they have more years of education than the mean of the years of education (plus one standard deviation) of the workers in that occupation. Nevertheless, Kiker et al.

[6] For a discussion, see Hartog (2000).

(1997) propose the use of the mode instead of the mean; so they consider as overeducated a person who has more years of education than the mode of years of education in the job they perform.

As for horizontal mismatch, most studies have applied similar methods to the ones used to analyse vertical mismatch. In particular, they use similar approaches but using the variable "field of education" instead of "years of education". In this paper, we will use the statistical method in terms of the mode for two reasons. First, we cannot use the objective method because, unfortunately, this kind of indicator is not available for most countries, as massive efforts will be needed to build these dictionaries, which can easily become obsolete due to occupational change. We can neither use the subjective method because the Adult Education Survey does not provide this information. So, we measure vertical and horizontal mismatch using the statistical method based on the mode the Adult Education Survey provides the needed information: occupations, educational levels and fields of education. It is worth mentioning that as we are working with immigrants from countries with heterogeneous educational systems, we measure vertical mismatches considering the level of education instead of schooling years. With this way of proceeding, we expect to minimize potential measurement errors derived from the comparison of very heterogenous educational systems.

Taking into account these previous considerations, we define both types of mismatches as follows: workers will have vertical mismatch (overeducation) if their level of education is higher than the mode of the workers' level of education within each occupation whereas workers will have horizontal mismatch if their field or type of education is different than the mode of the workers' field of education within each occupation.

3. DESCRIPTIVE EVIDENCE

In this section, we show a descriptive analysis on the differences between natives and immigrants regarding horizontal and vertical skill mismatches. The percentage of natives, immigrants from EU countries and immigrants from non-EU countries that suffer vertical and horizontal mismatch are shown in figures 2 and 3, respectively. Some relevant results can be identified from these figures. First, it is worth noting that the percentages of horizontal mismatch are higher in all groups than percentages of vertical mismatch (40-45 versus 25-35).

Second, figure 2 also shows that 25% of natives are overeducated whereas this percentage is 31% for immigrants from EU countries and 35% for immigrants from other countries. Nevertheless, in figure 3 we can see that the percentage of horizontal mismatch for natives and immigrants from EU countries is around 40% for both groups whilst for immigrants from countries outside EU is higher, 45%. Although the incidence of horizontal mismatch is higher than vertical mismatch for all groups, we observe more differences between natives and immigrants in the incidence of vertical mismatch.

FIGURES 2 and 3

Focusing now our interest only in the immigrant population, we can see some interesting differences depending on the years of residence in their host country. Figures 4 and 5 show, respectively, the percentage of immigrant workers with vertical and horizontal mismatch by years of residence in the host country. We can see in figure 5 that the incidence of horizontal mismatch decreases for both groups of immigrants as their years of residence increase. This result could be interpreted as evidence of immigrant assimilation. Some different results can be observed, however, in relation to vertical mismatch (Figure 4). Regarding immigrants from countries outside the EU, the incidence of overeducation also reduces as the years of residence of these immigrants increase. However, such behaviour is not observed for immigrants from EU countries. Immigrants residing less than 2 years in the host country present a lower percentage of overeducation than immigrants residing between 3 to 5 years. In this case, it seems that the assimilation process in the first 5 years in the host country is not as clear for immigrants from EU countries than for the others.

FIGURES 4 and 5

However, the descriptive analysis carried out in this section does not consider the effect of the characteristics of the individuals on differences in overeducation. This aspect is considered in the following section.

4. METHODOLOGY AND RESULTS

In order to know whether there are differences in the probability of being overeducated and in the probability of having horizontal mismatch between natives and immigrants after controlling for observable characteristics, we estimate two binomial probit models.

$$prob(V\_MISM) = \Phi(X\beta) \quad (1)$$

$$prob(H\_MISM) = \Phi(X\beta) \quad (2)$$

where prob(V_MISM) and prob(H_MISM) denote the probability of being overeducated and the probability of having horizontal mismatch respectively, Φ is the standard normal cumulative distribution function, X represents the set of observable characteristics and β is the coefficients' vector.

The explanatory variables can be clustered in two groups. The first one is related to personal characteristics of individuals as gender, age, immigrant condition (also distinguishing immigrants from UE countries and from non-UE countries), years of residence in the host country, number of household members, whether there are children at home (13 years old or less), level of education (ISCED3, ISCED4 and ISCED5&6), type or field of education (8 categories[7]) and whether the workers have followed any non-formal education activity in the last 12 months. As we focus our interest in immigrants and their process of assimilation, we also include interactions between the variables related to their different origin and their years of residence. The second group of characteristics is related to job characteristics as tenure in the current firm (in years), type of contract (permanent or temporary), fulltime or part time work, economic activity of the firm (5 categories) and firm size (we consider that 10 or less workers is a small company and a company with more than 10 workers is a big company). We also include country fixed-effects.

[7] Education: Teacher training and education science. / Humanities: Humanities, languages and arts. Foreign Languages. /Social Science: Social Science, business and law. / Science: Science, mathematics and computing. / Engineering: Engineering, manufacturing and construction. / Agriculture: Agriculture and veterinary. / Health: Health and welfare. / Services: Services.

To decompose the differences in the probability of having vertical (and horizontal) mismatch between immigrants and natives, we then apply Yun's (2004) methodology that is composed by two steps. The first one consists in estimating equation (1) separately for immigrants and natives:[8,9]

$$prob(V\_MISM)_I = \Phi(X_I\beta_I) \quad (3)$$

$$prob(V\_MISM)_N = \Phi(X_N\beta_N) \quad (4)$$

The second step consists in decomposing the mean difference between immigrants (I) and natives (N) in the probability of having vertical (horizontal) mismatch as:

$$\overline{prob(V\_MISM)_I} - \overline{prob(V\_MISM)_N} = \underbrace{\left[\overline{\Phi(X_I\beta_I)} - \overline{\Phi(X_I\beta_N)}\right]}_{E} + \underbrace{\left[\overline{\Phi(X_I\beta_N)} - \overline{\Phi(X_I\beta_I)}\right]}_{C} \quad (5)$$

The component labeled *E* refers to the part of the differential due to differences in observable characteristics. On the other hand, the *C* component refers to the part of the differential due to differences in coefficients. The last component explains the differences in the probability of being overeducated between immigrants and natives if both are characterized by the same characteristics. The method also proposes a detailed decomposition to understand the unique contribution of each predictor to each component of the difference. Yun (2004) also highlights the need to take into account the normalization of dummy variables in order to solve the well-known problem in the detailed Oaxaca decomposition that it is not invariant to the choice of the reference category when sets of dummy variables are used[10]. This correction is used in this paper.

[8] We apply the same methodology for the case of horizontal mismatch.
[9] It is worth mentioning that in this kind of analysis it is not possible to include information on the years of residence as this characteristic is not shared also by natives.
[10] See Yun (2004) for more details about Yun decomposition and the normalization of the dummy variables.

The marginal effects of the probability of being overeducated are shown in table 1. Models (1) and (2) only include some personal characteristics as explanatory variables while in models (3) to (5) additional controls are added sequentially.

TABLE 1

Results from model (1) clearly show that immigrants are more likely to be overeducated than natives after controlling for observable characteristics (44.5%). However, the negative sign of the variable years of residence indicates that the more are the years in the host country the less is the probability to be overeducated. For each additional year of residence in the host country, the probability of being overeducated is reduced by 3%. So, there seems to be an assimilation process in the host country in terms of overeducation. In model (2) we introduce two different dummies for immigrant workers distinguishing between immigrants from EU countries and immigrants from non-EU countries. In this case, we see that immigrants from non-EU countries are more likely to be overeducated than immigrants from EU countries. Concerning the process of assimilation of both types of immigrants, the results for the interactions between years of residence and immigrant dummies show that an additional year of residence reduces the probability to be overeducated for immigrants from outside EU countries more than for those coming from EU countries. In particular, the probability to be overeducated for an immigrant from EU country is reduced 2.4% by year of residence in the host country while this percentage is 3.5% for immigrants from countries outside EU. That is, although immigrants from countries outside the EU have a higher probability to be overeducated, their process of assimilation is faster than the one for immigrants from EU countries. The results hold when additional controls are included in models (3) to (5).

The probability of having horizontal mismatch is shown in table 2. As before, models (1) and (2) include only some controls while in models (3) to (5) additional explanatory variables are included.

TABLE 2

Model (1) shows that immigrants are 15% more likely to have horizontal mismatch than natives. It is worth noting that the incidence of horizontal mismatch on immigrants is much lower than the incidence of overeducation (which corresponds to 44.5%) according to the descriptive statistics. Regarding the years of residence in the host country, we can see that the probability of having horizontal mismatch is only reduced by 1% for each additional year. Results from model (2) show that immigrants from non-UE countries are more likely to have horizontal mismatch than natives. However, this effect is no longer statistically significant for immigrants from EU countries when compared to natives. Moreover, the interactions between years of residence and both types of immigrants are not significant. When additional variables are included in models (3) to (5), the higher probability of horizontal mismatch of immigrants from non-EU countries is no longer significant when compared to natives. This means that differences in the characteristics of natives and immigrants explain the raw difference in the probability of having horizontal mismatch.

Given that there are no differences statistically significant in the probability of having horizontal mismatch between immigrants and natives, we only apply the Yun (2004) decomposition in the case of vertical mismatch. This decomposition allows us to identify which factors influence in the discrepancies in the probability of being overeducated between immigrants and natives. In particular, the method decompose whether the differences are due to different observable characteristics (worse endowment of human capital or worse job characteristics), or whether the remuneration of those characteristics is worse for immigrants than for natives. Table 3 shows the aggregated results of Yun's (2004) decomposition[11]. From this table we can see that the differences in the probability of being overeducated between both types of immigrants and natives are statistically significant and consistent with the differences in the percentages of overeducation between groups observed in figure 2. In particular, we obtain that this difference is around 6%, although it is around 10% when immigrants from non-EU countries are compared to natives. In both cases, immigrants experience the higher probability of being overeducated, but the causes of these differences are not the same in both cases. In the case of the difference in the probability of being overeducated between immigrants from EU countries and natives, we can see that the 61% of this difference is explained by differences in characteristics. So, immigrants from EU countries have higher probability of being overeducated because they have worst observable characteristics than natives. The 39% of the difference is due to differences in coefficients, but

[11] The results of the detailed decomposition are shown in Table A.2. in the Annex.

is not statistically significant. That is, immigrants from EU and natives with the same endowments are equally remunerated. Concerning the difference in the probability of being overeducated between immigrants from non-EU countries and natives, the 81% of this difference can be explained by differences in coefficients (is statistically significant). That is, immigrants from non-EU countries are not remunerate at the same way than natives, although both are characterized by the same endowments.

5. FINAL REMARKS

In this paper, we have analysed differences in skill mismatches between immigrants and natives in EU countries. Using microdata from the Adult Education Survey (AES), we have analysed the incidence of different types of skill mismatches (vertical and horizontal) among native and immigrant workers.

Our results show that there is no significant difference in the probability of having horizontal mismatch between natives and immigrants once individual characteristics are controlled for. However, we found that immigrants are more likely to be overeducated than natives, and that this effect is higher for immigrants from non-EU countries than for those from other EU countries, although the pace of the assimilation process in the host country is faster for the first group. Applying Yun's (2004) decomposition, we also found that immigrants from the EU have a higher probability of being overeducated than natives because they are characterized by worse observable characteristics which influence positively the probability of overeducation, whereas results for immigrants from non-EU countries suggest the opposite: the gap is explained by differences in the remuneration of observable characteristics. This result points out that immigrants from non-UE countries have a limited transferability of their human capital that pushes their situation of overeducation in the host country.

To sum up, our results confirm that immigrants experience a higher overeducation penalty than natives due to the imperfect transferability of the human capital acquired in their origin countries. However, immigrants accumulate knowledge and experience in the host country that adapt to the local labour market, thus facilitating an assimilation process that reduces the intensity of overeducation. The pace of assimilation however is notably slow for immigrants. Therefore there is a certain risk that immigrants from outside the European Union remain

permanently trapped in bad jobs, regardless of their levels of education. Taking into account the wage consequences of overeducation, this last result implies that the wage gap between native and immigrants will not disappear after several years of residence in the host country. Policy actions should focus on three different aspects: first, incorporating in the migration policy formal criteria related to educational levels and to the match with the current needs in the labour market (i.e, like the Australian points system); second, trying to design a system of assessment and recognition of foreign-acquired educational degrees in order to give an appropriate signal to the labour market and, third, providing publicy-provided informal training to recently arrived immigrants with appropriate skills in order to improve the transferability of their skills to the new labour market.

6. REFERENCES

Aleksynska, M. & Tritah, A. (2011). Occupation-Education Mismatch of Immigrant Workers in Europe: Context and Policies. CEPII WP 2011-16.

Baker, M. & Benjamin, D. (1994). The Performance of Immigrants in the Canadian Labor Market, *Journal of Labor Economics*, vol. 12(3), pp. 369-405.

Bell, B. (1997). The Performance of Immigrants in the United Kingdom: Evidence from the GHS. *Economic Journal*, vol. 107(441), pp. 333-344.

Card, D. (1999). Causal Effect of Education on Earnings. In: Ashenfelter O, Card D (dir.), *Handbook of Labor Economics*, vol. 3, Elsevier Science: Amsterdam; 1801-1863.

Chiswick, B. R. (1978). The Effect of Americanization on the Earnings of Foreign-born Men. *Journal of Political Economy*, vol. 86(5): 897-921.

Chiswick, B. R. & Miller, P. (1985). Immigrant Generation and Income in Australia. *Economic Record*, vol. 61(173), pp. 540-553.

Chiswick, B. R. & Miller, P. (1995). The endogeneity between language and earnings: an international analysis. *Journal of Labor Economics*, vol. 13(2), pp. 246-288.

Chiswick, B. R. & Miller, P. (2007). The International Transferability of Immigrants' Human Capital Skills. IZA Discussion paper n. 2670, March 2007, 27 p.

Chiswick, B. & Miller, P. (2008). Why is the payoff to schooling smaller for immigrants?. Labour Economics, vol. 15, pp. 1317–1340.

Chiswick, B. & Miller, P. (2009). The International Transferability of Immigrants' Human Capital Skills. Economics of Education Review, vol. 28 (2), pp. 162-169.

Chiswick, B. & Miller, P. (2010). The Effects of Educational-Occupational Mismatch on Immigrant Earnings in Australia, with International Comparisons. International Migration Review, vol. 44(4), pp. 869–898.

Constant, A. & Massey, D. (2003). Self-selection, earnings, and out-migration: A longitudinal study of immigrants to Germany. *Journal of Population Economics*, vol. 16, pp. 631-653.

Dell'Aringa. C. & Pagani, L. (2010). Labour Market Assimilation and Over Education: The Case of Immigrant Workers in Italy. *Quaderni dell'Istituto di Economia dell'Impresa e del Lavoro*, 57.

Duleep, H. & Regets, M. (1997). The Decline in Immigrant Entry Earnings: Less Transferable Skills or Lower Ability?. The Quarterly Review of Economics and Finance, vol. 37, Special Issue, pp. 189-208.

Duncan, G. & Hoffman, S. (1981). The Economic Value of Surplus Education. *Economics of Education Review* vol. 1 (1), pp. 75-86.

Dustman, C. & Glitz, A. (2011). Migration and Education. in *Handbook of the Economics of Education*, vol. 4, pp. 327-439.

Freeman, R. B. (1976). *The Overeducated American*. London: Academic Press.

Friedberg, R. (2000). You Can't Take It with You? Immigrant Assimilation and the Portability of Human Capital. *Journal of Labor Economics*, vol. 18, n. 2, pp. 221-251.

Green, C., Kler, P. & Leeves, G. (2007). Immigrant overeducation: Evidence from recent arrivals to Australia. *Economics of Education Review* 26, pp. 420-432.

Hartog, J. (2000). Over-education and earnings: where are we, where should we go?. *Economics of Education Review*, vol. 19, pp. 131–147.

Kiker, B.F., Santos, M.C. & Mendes de Oliveira, M. (1997). Overeducation and Undereducation: Evidence for Portugal. *Economics of Education Review*, vol. 16 (2), pp. 111-125.

Kler, P. (2006). Overeducation among tertiary educated immigrants to Australia: A longitudinal study. Labour Economics Research Group, University of Queensland, Discussion Paper n. 9, January 2006, 39 p.

Leuven, E. & Oosterbeck, H, (2011). Overeducation and Mismatch in the Labor Market in Handbook of the Economics of Education, vol. 4, pp. 283-326.

Lindley, J. & Lenton, P. (2006). The Overeducation of UK Immigrants: Evidence from the Labour Force Survey. Sheffield Economic Research Paper Series n. 2006001, 20 p.

Longva, P. & Raaum, O. (2003). Earnings assimilation of immigrants in Norway – A reappraisal. *Journal of Population Economics*, vol. 16, pp. 177-193.

Mcguinness, S. (2006), Overeducation in the labour market. *Journal of Economic Surveys*, Vol. 20 (3), pp. 387-418.

Nielsen, Ch. P. (2007). Immigrant Overeducation: Evidence from Denmark. World Bank Policy Research Working Paper 4234, may 2007, 54 p.

OECD (2007). International Migration Outlook, Annual Report 2007. OECD, Paris.

Piracha, M. & Vadean, F. (2012). Migrant Educational Mismatch and the Labour Market. IZA DP 6414.

Poot, J. & Stillman, S. (2010). The Importance of Heterogeneity When Examining Immigrant Education-Occupation Mismatch: Evidence from New Zealand. IZA DP 5211.

Psacharopoulos, G. & Patrinos, H. A. (2004). Returns to investment in education: A further update. *Education Economics,* vol. 12(2), pp. 111-134.

Robst, J. (2007). Education and job match: The relatedness of college major and work. *Economics of Education Review*, vol. 26(4), pp. 397-407.

Rumberger, R. (1981). Overeducation in the US Labor Market. Praeger, New York.

Rubb, S. (2003). Overeducation in the labor market: A comment and re-analysis of a meta-analysis*. Economics of Education Review,* vol. 22 (6), pp. 621-629.

Sanromá, E., Ramos, R. & Simón, H. (2008). The Portability of Human Capital and Immigrant Assimilation: Evidence for Spain. IZA Discussion Paper No. 3649

Schmidt, C. (1992). Country of origin differences in the earnings of German immigrants. Discussion Paper 92-29, University of Munich.

Shields, M. & Wheatley Price, S. (1998), The earnings of male immigrants in England: evidence from the quarterly LFS, *Applied Economics*, vol. 30, pp. 1157-1168.

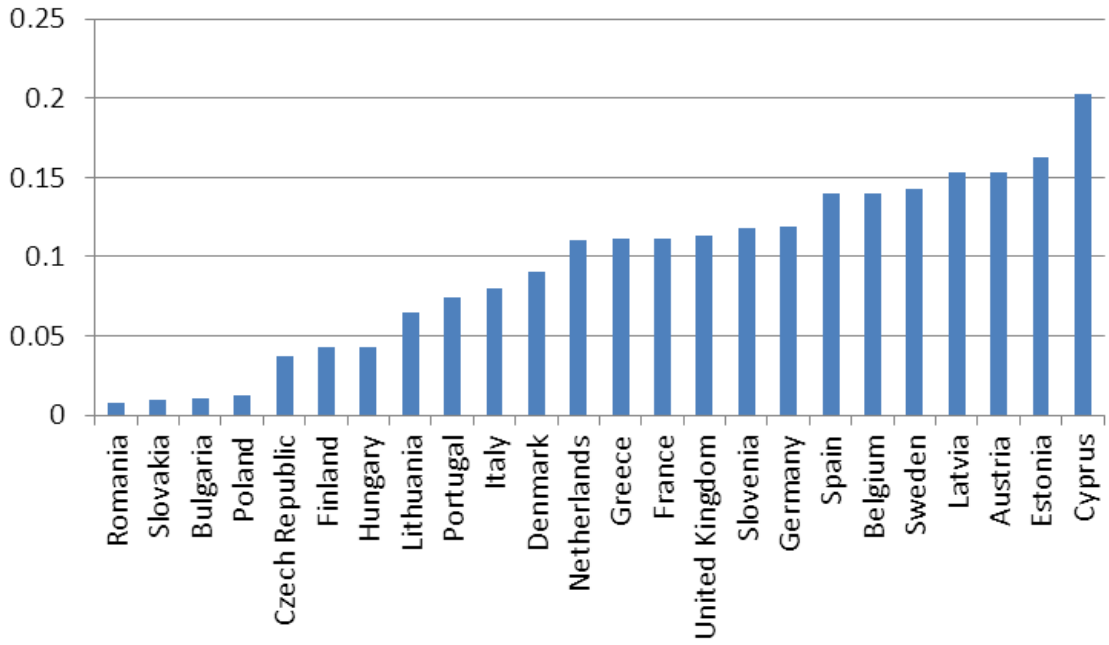
Verdugo, R. & Verdugo, N. (1989). The impact of surplus schooling on earnings. Journal of Human Resources, vol. 24 (4), pp. 629-643.

Wolbers, M. (2003). Job Mismatches and their Labour-Market Effects among School-Leavers in Europe. *European Sociological Review*, vol. 19 (3), pp. 249-266.

Yun, M. (2004). Decomposing differences in the first moment. *Economics Letters*, vol. 82(2), pp. 275-280.

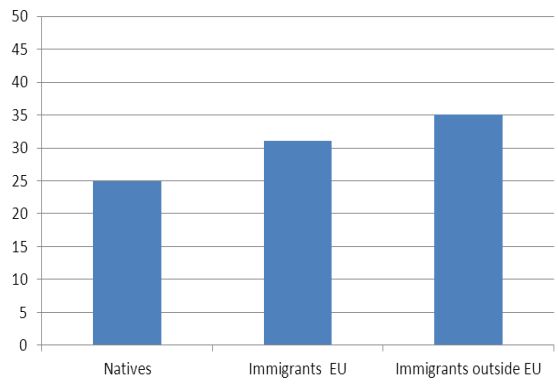
7. FIGURES AND TABLES

Figure 1. Proportion of immigrant' population in total population (average 2009-2011)



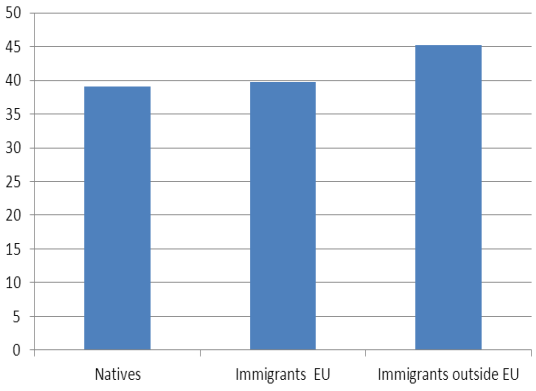
Source: Eurostat

Figure 2. Percentage of vertical mismatch



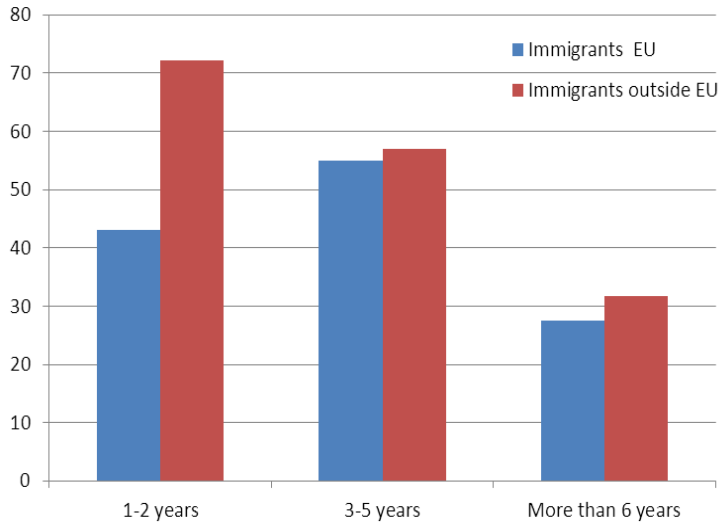
Data: AES 2007

Figure 3. Percentage of horizontal mismatch



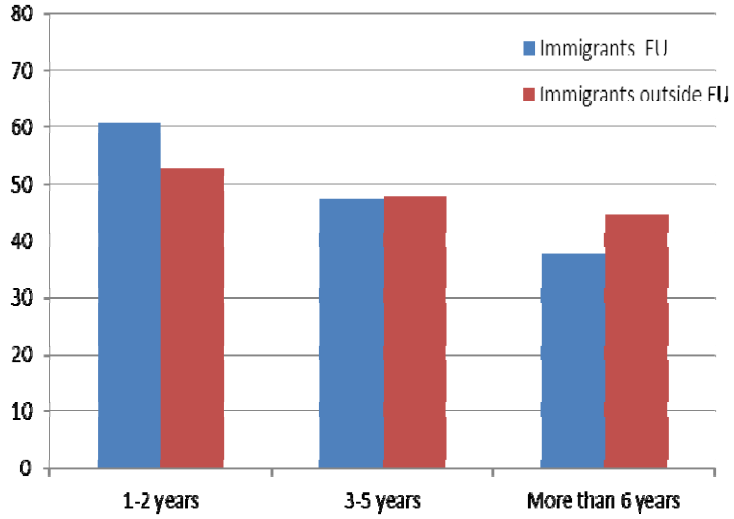
Data: AES 2007

Figure 4. Percentage of immigrants with vertical mismatch by years of residence in the host country



Data: AES 2007

Figure 5. Percentage of immigrants with horizontal mismatch by years of residence in the host country



Data: AES 2007

Table 1: Marginal effects of the probability to be overeducated

VARIABLES	(1)	(2)	(3)	(4)	(5)
Immigrant	0.445***				
	[0.0524]				
Immig. UE		0.352***	0.348***	0.294***	0.290***
		[0.0865]	[0.0859]	[0.0867]	[0.0862]
Immig. no-UE		0.515***	0.515***	0.461***	0.463***
		[0.0631]	[0.0625]	[0.0667]	[0.0663]
Male	0.00286	0.00279	-0.0133	0.00307	0.00322
	[0.00776]	[0.00776]	[0.00930]	[0.00961]	[0.00961]
Age	-0.00413***	-0.00413***	-0.00385***	-0.00197***	-0.00197***
	[0.000398]	[0.000398]	[0.000399]	[0.000479]	[0.000479]
Years of residence	-0.0304***				
	[0.00460]				
Years of residence x immig. UE		-0.0239***	-0.0241***	-0.0212***	-0.0206***
		[0.00711]	[0.00702]	[0.00697]	[0.00693]
Years of residence x immig. no-UE		-0.0354***	-0.0354***	-0.0319***	-0.0316***
		[0.00606]	[0.00597]	[0.00586]	[0.00584]
Household size (nº of people)	0.00972**	0.00972**	0.00932**	0.00856*	0.00731
	[0.00469]	[0.00470]	[0.00466]	[0.00461]	[0.00463]
Children at home	-0.00413	-0.00427	-0.00383	-0.00528	-0.00647
	[0.00818]	[0.00818]	[0.00815]	[0.00822]	[0.00824]
Educational level (ref. ISCED3)					
ISCED4	0.696***	0.696***	0.703***	0.705***	0.706***
	[0.0114]	[0.0114]	[0.0112]	[0.0111]	[0.0111]
ISCED5&6	0.134***	0.135***	0.157***	0.166***	0.169***
	[0.00972]	[0.00972]	[0.0104]	[0.0106]	[0.0106]
Non formal education	-0.0399***	-0.0396***	-0.0327***	-0.0203**	-0.0209***
	[0.00820]	[0.00819]	[0.00811]	[0.00812]	[0.00812]
Field of education (ref. education)					
Humanities			0.229***	0.203***	0.206***
			[0.0320]	[0.0321]	[0.0322]
Social science			0.194***	0.158***	0.159***
			[0.0254]	[0.0259]	[0.0260]
Science			0.135***	0.105***	0.108***
			[0.0319]	[0.0315]	[0.0317]
Engineering			0.193***	0.156***	0.156***
			[0.0259]	[0.0264]	[0.0264]
Agriculture			0.304***	0.253***	0.249***
			[0.0389]	[0.0410]	[0.0411]
Health			0.127***	0.121***	0.121***
			[0.0283]	[0.0282]	[0.0282]
Services			0.282***	0.244***	0.245***
			[0.0330]	[0.0340]	[0.0340]
Economic activity (ref. industry)					
Agriculture				0.0113	0.00761
				[0.0286]	[0.0284]
Construction				-0.00911	-0.00897
				[0.0174]	[0.0175]
Services				-0.00995	-0.00737
				[0.0113]	[0.0114]
No sale services				-0.0540***	-0.0527***
				[0.0121]	[0.0121]
Tenure				-0.00295***	-0.00298***
				[0.000519]	[0.000518]
Fulltime job				-0.0502***	-0.0502***
				[0.0120]	[0.0120]
Temporary contract				0.0305**	0.0306**
				[0.0135]	[0.0134]
Big company (more than 10 workers)				-0.0444***	-0.0425***
				[0.0100]	[0.0101]
Urban Size	No	No	No	No	Yes
Country F.E.	Yes	Yes	Yes	Yes	Yes
Observations	30901	30901	30901	30901	30901

Note: Robust standard errors are reported between brackets. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 2: Marginal effects of the probability to present horizontal mismatch

VARIABLES	(1)	(2)	(3)	(4)	(5)
Immigrant	0.151***				
	[0.0579]				
Immig. UE		0.130	0.0467	0.0433	0.0434
		[0.0835]	[0.0826]	[0.0862]	[0.0863]
Immig. no-UE		0.161**	0.140	0.110	0.110
		[0.0781]	[0.0889]	[0.0945]	[0.0945]
Male	-0.0545***	-0.0547***	-0.0413***	-0.0103	-0.0103
	[0.00934]	[0.00934]	[0.0146]	[0.0147]	[0.0147]
Age	0.000666	0.000681	0.00133**	0.00441***	0.00441***
	[0.000503]	[0.000503]	[0.000608]	[0.000726]	[0.000727]
Years of residence	-0.0100*				
	[0.00577]				
Years of residence x immig. UE		-0.0118	-0.00704	-0.00819	-0.00820
		[0.00858]	[0.00926]	[0.00963]	[0.00963]
Years of residence x immig. no-UE		-0.00878	-0.00849	-0.00743	-0.00744
		[0.00771]	[0.00889]	[0.00937]	[0.00937]
Household size (nº of people)	-0.00609	-0.00636	-0.000252	0.00502	0.00504
	[0.00595]	[0.00597]	[0.00737]	[0.00748]	[0.00755]
Children at home	-0.0125	-0.0127	-0.0127	-0.0118	-0.0118
	[0.0100]	[0.0100]	[0.0121]	[0.0122]	[0.0122]
Educational level (ref. ISCED3)					
ISCED4	-0.0136	-0.0137	-0.0318	-0.0445	-0.0445
	[0.0231]	[0.0231]	[0.0275]	[0.0274]	[0.0274]
ISCED5&6	0.0227**	0.0228**	-0.0270**	-0.0416***	-0.0416***
	[0.0104]	[0.0104]	[0.0132]	[0.0134]	[0.0135]
Non formal education	0.0243**	0.0251***	0.0234*	0.0194	0.0195
	[0.00972]	[0.00971]	[0.0120]	[0.0120]	[0.0120]
Field of education (ref. education)					
Humanities			0.598***	0.605***	0.605***
			[0.0113]	[0.0107]	[0.0107]
Social science			-0.205***	-0.209***	-0.209***
			[0.0213]	[0.0221]	[0.0221]
Science			0.624***	0.629***	0.629***
			[0.00707]	[0.00714]	[0.00714]
Engineering			-0.101***	-0.0692**	-0.0692**
			[0.0247]	[0.0269]	[0.0269]
Agriculture			0.482***	0.496***	0.496***
			[0.0201]	[0.0190]	[0.0190]
Health			0.0616**	0.0518**	0.0518**
			[0.0251]	[0.0253]	[0.0253]
Services			0.438***	0.427***	0.427***
			[0.0214]	[0.0232]	[0.0232]
Economic activity (ref. industry)					
Agriculture				0.0229	0.0231
				[0.0545]	[0.0546]
Construction				-0.190***	-0.190***
				[0.0206]	[0.0206]
Services				0.104***	0.104***
				[0.0180]	[0.0181]
No sale services				0.103***	0.103***
				[0.0192]	[0.0192]
Tenure				-0.00612***	-0.00612***
				[0.000715]	[0.000714]
Fulltime job				-0.00506	-0.00507
				[0.0171]	[0.0171]
Temporary contract				0.0125	0.0125
				[0.0202]	[0.0202]
Big company (more than 10 workers)				0.000894	0.000854
				[0.0139]	[0.0140]
Urban Size	No	No	No	No	Yes
Country F.E.	Yes	Yes	Yes	Yes	Yes

Observations	30901	30901	30901	30901	30901

Note: Robust standard errors are reported between brackets. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 3: General decomposition of the differences in the probability of being overeducated between immigrants and natives

	Immigrants from EU vs. Natives	Immigrants from non-EU vs. Natives
Diff. in characteristics	0.0364***	0.0188
	(61%)	(19%)
Diff. in coefficients	0.0233	0.0816***
	(39%)	(81%)
Total	0.0597***	0.100***

Note: Percentages of the contribution are reported between parentheses. * Significant at the 10% level ** Significant at the 5% level. *** Significant at the 1% level.

8. Annex

Table A.1. Descriptive statistics

	Natives		Immigrant from EU		Immigrant from outside EU	
Variable	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Vertical mismatch	0.2489	0.4324	0.3101	0.4628	0.3510	0.4774
Horizontal mismatch	0.3904	0.4878	0.3970	0.4895	0.4521	0.4979
Male	0.5212	0.4996	0.5813	0.4936	0.6064	0.4887
Female	0.4788	0.4996	0.4187	0.4936	0.3936	0.4887
Age	42.0981	9.7277	42.0288	9.5370	41.3213	9.2157
Years of residence	0.0000	0.0000	9.5300	2.8557	9.5134	2.6015
Household size (nº of people)	2.1413	0.8149	2.0994	0.7988	2.2415	0.8786
Children at home	0.3780	0.4849	0.4323	0.4957	0.4590	0.4985
No children at home	0.6160	0.4864	0.5627	0.4963	0.5278	0.4994
Education level ISCED3	0.5391	0.4985	0.5303	0.4994	0.5682	0.4955
Education level ISCED4	0.0711	0.2569	0.0495	0.2170	0.0624	0.2420
Education level ISCED5&6	0.3899	0.4877	0.4202	0.4939	0.3694	0.4828
Non-formal education (NFE)	0.5494	0.4976	0.5281	0.4995	0.3802	0.4856
No NFE	0.4506	0.4976	0.4719	0.4995	0.6198	0.4856
Field of education:						
Education	0.0561	0.2300	0.0372	0.1893	0.0327	0.1779
Humanities	0.0554	0.2288	0.0949	0.2932	0.0575	0.2328
Social science	0.2912	0.4543	0.1868	0.3900	0.2280	0.4197
Science	0.0518	0.2216	0.0597	0.2370	0.0752	0.2639
Engineering	0.3404	0.4739	0.4667	0.4992	0.4062	0.4913
Agriculture	0.0265	0.1606	0.0178	0.1324	0.0243	0.1540
Health	0.1072	0.3093	0.0676	0.2511	0.0776	0.2676
Services	0.0715	0.2577	0.0693	0.2541	0.0984	0.2980
Economic activity:						
Agriculture	0.0124	0.1109	0.0049	0.0696	0.0099	0.0989
Industry	0.2301	0.4209	0.2225	0.4162	0.2669	0.4425
Construction	0.0616	0.2404	0.0982	0.2977	0.0873	0.2824
Services	0.3191	0.4661	0.4061	0.4914	0.3604	0.4803
No sale services	0.3768	0.4846	0.2684	0.4434	0.2755	0.4469
Tenure	13.0985	10.1193	9.9585	8.3261	8.7355	7.9138
Full time job	0.8220	0.3825	0.8140	0.3893	0.8374	0.3691
Part time job	0.1780	0.3825	0.1860	0.3893	0.1626	0.3691
Temporary contract	0.0784	0.2688	0.1401	0.3473	0.1795	0.3839
Permanent contract	0.8981	0.3025	0.8115	0.3914	0.8173	0.3865
Firm size						
Big company	0.7906	0.4069	0.7784	0.4156	0.7499	0.4332
Small company	0.2094	0.4069	0.2216	0.4156	0.2501	0.4332

Observations	28409	28409	894	894	1598	1598

Table A.2. Detailed Yun decomposition of the probability of being overeducated between immigrants and natives (continues)

	Immigrants from EU countries vs. natives		Immigrants from non-EU countries vs. natives	
VARIABLES	E	C	E	C
Total dif. between groups	0.0597***		0.100***	
	[0.0192]		[0.0141]	
Total	0.0364***	0.0233	0.0188	0.0816***
	[0.0119]	[0.0193]	[0.0135]	[0.0178]
Male	-0.00393***	0.636	-0.00317	-0.0244*
	[0.00147]	[11.19]	[0.00234]	[0.0141]
Female	-0.00393***	-0.584	-0.00317	0.0224*
	[0.00147]	[10.28]	[0.00234]	[0.0129]
Age	-0.000475***	-6.817	-0.00319	0.336***
	[0.000173]	[120.6]	[0.00206]	[0.125]
Isced3	0.00224***	0.215	-0.0154***	-0.112***
	[0.000369]	[3.808]	[0.00525]	[0.0269]
Isced4	-0.00844***	-0.0758	-0.00645***	0.0207***
	[0.00143]	[1.336]	[0.00230]	[0.00559]
Isced5_6	-0.00409***	0.261	0.00442**	-0.0325*
	[0.00120]	[4.586]	[0.00189]	[0.0184]
NFE	-7.76e-05	-0.138	0.00147	0.00384
	[0.000421]	[2.467]	[0.00375]	[0.0132]
No NFE	-7.76e-05	0.113	0.00147	-0.00315
	[0.000421]	[2.023]	[0.00375]	[0.0109]
Household size	-0.00112	-0.822	0.00362	0.0655
	[0.000974]	[14.66]	[0.00222]	[0.0530]
Children at home	0.000785	-0.117	-0.00104	-0.00300
	[0.00104]	[2.082]	[0.00183]	[0.00861]
No children at home	0.000770	0.191	-0.00114	0.00489
	[0.00102]	[3.393]	[0.00200]	[0.0140]
Field of education:				
Education	0.00223	-0.00719	0.00346	0.00167
	[0.00177]	[0.156]	[0.00220]	[0.00527]
Humanities	0.00269	-0.0307	4.94e-05	-0.00150
	[0.00262]	[0.545]	[0.000125]	[0.00356]
Social Science	0.00633	0.368	-0.00115	-8.90e-05
	[0.00504]	[6.442]	[0.00298]	[0.0144]
Science	0.000179	-0.0587	0.00135	0.00631
	[0.000670]	[1.046]	[0.00164]	[0.00387]
Engineering	-0.00771	0.442	-0.00167	-0.0161
	[0.00653]	[7.848]	[0.00302]	[0.0160]
Agriculture	-0.00162	-0.0580	-0.000363	0.00226
	[0.00101]	[1.023]	[0.000236]	[0.00266]
Health	0.00451**	0.171	0.00403	-0.0118
	[0.00228]	[3.030]	[0.00246]	[0.00826]
Services	-0.000168	-0.0111	0.00117	-0.00373
	[0.000119]	[0.203]	[0.00195]	[0.00538]

Note: Robust standard errors are reported between brackets. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Table A.2. Detailed Yun decomposition of the probability of being overeducated between immigrants and natives (continuation)

	Immigrants from EU countries vs. natives		Immigrants from non-EU countries vs. natives	
VARIABLES	E	C	E	C
Economic activity:				
Agriculture	-0.00136	-0.0340	1.45e-07	-0.000364
	[0.000873]	[0.600]	[0.000277]	[0.00142]
Industry	-3.86e-05	0.0245	0.00104	0.00295
	[0.000369]	[0.467]	[0.00186]	[0.0125]
Construction	0.00458**	-0.147	0.00265	0.00779**
	[0.00227]	[2.598]	[0.00173]	[0.00387]
Services	-0.00817**	0.559	0.00109	0.00484
	[0.00370]	[9.904]	[0.00177]	[0.0141]
No sale services	0.0234***	1.229	0.0160**	-0.0472**
	[0.00595]	[21.67]	[0.00738]	[0.0223]
Tenure	0.0224***	1.070	0.0339***	-0.0599
	[0.00858]	[18.81]	[0.0113]	[0.0441]
Fulltime job	4.52e-05	-0.231	-0.000616	-0.00735
	[0.000212]	[4.119]	[0.000560]	[0.0274]
Part time job	4.52e-05	0.0501	-0.000616	0.00159
	[0.000212]	[0.892]	[0.000560]	[0.00593]
Temporary contract	-6.54e-05	0.0124	0.00734*	0.00492**
	[0.00174]	[0.224]	[0.00378]	[0.00241]
Permanent contract	-9.18e-05	-0.142	0.00587*	-0.0564**
	[0.00245]	[2.564]	[0.00302]	[0.0277]
Big company	0.000441	0.232	-8.29e-05	0.0234
	[0.000308]	[4.158]	[0.00108]	[0.0225]
Small company	0.000441	-0.0614	-8.29e-05	-0.00620
	[0.000308]	[1.101]	[0.00108]	[0.00596]
Urban size:				
Big degree urb.	-0.000326	-0.0728	-0.00522	-0.00445
	[0.00429]	[1.282]	[0.00672]	[0.0140]
Medium degree urb.	0.00277	0.136	0.00382	-0.0188
	[0.00349]	[2.395]	[0.00301]	[0.0133]
Small degree urb.	-0.000750	-0.0552	-0.01000	0.0153
	[0.00101]	[0.986]	[0.00712]	[0.0104]

Note: Robust standard errors are reported between brackets. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Table A.2. Detailed Yun decomposition of the probability of being overeducated between immigrants and natives (end)

	Immigrants from EU countries vs. natives		Immigrants from non-EU countries vs. natives	
VARIABLES	E	C	E	C
Countries:				
Austria	-0.000571	0.0396	0.00138**	0.00935***
	[0.000564]	[0.703]	[0.000588]	[0.00262]
Belgium	9.70e-05	-0.0162	-0.00171	0.00449
	[0.000979]	[0.281]	[0.00167]	[0.00313]
Cyprus	0.000244***	-0.00346	1.03e-05**	0.000445*
	[9.48e-05]	[0.0605]	[4.71e-06]	[0.000247]
Czech Republic	0.000377	0.0281	-0.00853	0.00814
	[0.00205]	[0.503]	[0.00766]	[0.00712]
Germany	-0.00208	0.272	-0.0130*	-0.0558**
	[0.00291]	[4.731]	[0.00727]	[0.0251]
Denmark	-0.000356	0.0238	-0.00339	0.00250
	[0.00140]	[0.426]	[0.00458]	[0.00524]
Estonia	0.000799*	0.0118	-0.00148*	-0.000129
	[0.000412]	[0.209]	[0.000756]	[0.000318]
Spain	0.00504***	-0.434	0.0125***	0.0299***
	[0.000979]	[7.670]	[0.00471]	[0.00796]
France	-0.00491	0.0435	-0.00468	-0.00372
	[0.00491]	[0.778]	[0.00346]	[0.0139]
Lithuania	0.00236	-0.0154	0.000397***	-0.0108***
	[0.00312]	[0.288]	[0.000150]	[0.00276]
Latvia	0.000728	0.0172	-0.00317**	-0.00256**
	[0.000695]	[0.304]	[0.00136]	[0.001000]
Portugal	0.00192**	-0.0214	0.00103*	0.000615
	[0.000779]	[0.376]	[0.000606]	[0.00101]
Sweden	0.00137	0.0181	6.56e-06**	0.00282
	[0.00120]	[0.329]	[2.85e-06]	[0.00329]
Constant		3.814		-0.0186
		[67.54]		[0.127]
Observations	29303	29303	30007	30007

Note: Robust standard errors are reported between brackets. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

WP3/09 SEARCH WORKING PAPER

Crisis, immigration and job loss

Elisabet Motellón, Enrique López-Bazo

January 2013

SEARCH
SHARING KNOWLEDGE ASSETS: INTERREGIONALLY COHESIVE NEIGHBORHOODS

EUROPEAN COMMISSION
European Research Area

SEVENTH FRAMEWORK PROGRAMME

Funded under Socio-economic Sciences & Humanities

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Crisis, Immigration and Job Loss

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Abstract
The profound crisis that is affecting the Spanish economy has been characterized by significant job losses, and the resulting increase in the unemployment rate. Although unemployment has affected all population groups, there are differences across them in the intensity of its impact. Compared to natives, immigrant workers were the first and hardest hit by job losses. In this context, this paper studies the differences between immigrants and natives in the probability of job loss in a period of deep economic crisis. To do this, we apply a methodology to decompose the difference between natives and immigrants in the propensity to lose their jobs in, on the one hand, the differences in the individual, job, and firm observable characteristics and, on the other, in the differences in the impact of these characteristics. To ensure the robustness of the results we use a decomposition based on a probabilistic model that controls for likely differences between natives and immigrants in the probability of participation in the labour market. The results show that the observable characteristics do not explain all the differences between natives and immigrants in the probability of job loss in a period of crisis and, therefore, point to some discrimination against the latter. However, in the particular case of immigrants from countries of the European Neighbourhood Policy this seems not to be the case, since the lower endowment of education, and the particular occupational and sectoral distribution of this group explains almost completely its higher rate of job loss.

Keywords
Immigration, labour market segregation, nonlinear decomposition, ENP

JEL classification
C25, J61, J64, J70

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1. INTRODUCTION

The Spanish economy experienced an intense flow of immigration throughout the period of economic expansion since the mid-90's to the early effects of the current crisis in the second half of 2008. The magnitude and impact of the phenomenon sparked social and academic interest, especially in relation to the impact on the labour market.

A simple observation of the aggregate data available reveals how Spain in a few years reached immigration levels than other countries, with more experience in this type of processes, took decades to achieve. In about fifteen years the immigrant population in Spain grew from just over 2% in 1996 to reach 14% in 2009. And virtually all of this increase resulted from the large influx of what is known as economic immigrants, largely from developing countries. Such immigrants represented in the time immediately prior to the current crisis about 80% of all foreigners in Spain. It should be mentioned that the group of immigrants from countries of the European Neighbourhood Policy (ENP)[1] is the second most abundant, after that of Latin American countries with which Spain shares linguistic and historical ties. Among the ENP countries (ENC), was particularly intense immigration from North Africa, especially from Morocco.

The sudden and intense immigration boom in Spain has motivated several studies that have attempted to determine its effect on labour market issues, including the impact on wages, working conditions, segmentation, and return to schooling. Given the connection to our goal in this paper we want to highlight those referring to the process of the labour market assimilation of immigrants. Overall, the evidence suggests some assimilation in terms of employment and unemployment among natives and immigrants after a certain period of residence, which could be about five years (Amuedo-Dorantes and De la Rica, 2007; Fernández and Ortega, 2008; Silva and Vázquez-Grenno, 2011). However, these studies, like those who have addressed other issues relating to the impact of recent migration on the Spanish labour market, agree as to the consideration of the phenomenon under study only during the expansion of the Spanish economy. Obviously

[1] The ENP was developed in 2004, with the objective of avoiding the emergence of new dividing lines between the enlarged EU and its neighbours and instead strengthening the prosperity, stability and security of all. This is proposed to ENP framework of the EU's 16 closest neighbours - Algeria, Armenia, Azerbaijan, Belarus, Egypt, Georgia, Israel, Jordan, Lebanon, Libya, Moldova, Morocco, Occupied Palestinian Territory, Syria, Tunisia and Ukraine.

this can be explained by the scarcity of immigration in Spain in previous economic downturns.

In any case, the impact of the current crisis in the Spanish economy, which began in late 2008, is an ideal scenario for assessing the response in terms of employment of migrant workers and, especially, for comparison with the impact of the crisis on employment of native workers. A simple inspection of aggregated data provided by the Labour Force Survey (LFS) shows that job losses since the start of the crisis has not occurred evenly to all groups of workers. Specifically, the employment figures show that immigrants have been clearly more affected than natives. It is this difference in the rate of job loss between natives and immigrants in the period of crisis that motivates our analysis in this paper.

In a nutshell, the question we ask ourselves is whether the pattern of assimilation observed along the growth period remained after the impact of the crisis. And therefore, if a native and an immigrant worker with similar characteristics showed the same chances to maintain or lose their jobs or if, on the contrary, immigrants suffered further the impact of the crisis on the labour market. One would expect that job losses were greater for immigrants if they were less productive due to, for example, a lower endowment of human capital, and/or because they were employed in activities more sensitive to the business cycle. But it may be that for individuals endowed with similar characteristics and working in similar jobs and firms, the rate of job loss was greater for immigrants than for natives. In that case, the evidence would suggest that given the need to reduce their workforce as a result of the recession, companies fired first immigrant workers simply because of their status as foreigners, implying a form of discrimination against this group. It would be a sort of *"last in - first out"* decision process.

Moreover, our study analyses whether there are differences depending on the origin of immigrants, distinguishing between those from the countries of the ENP and the rest. This distinction is relevant to the assessment of labour migration from ENC to an EU country, since it complements the evidence from other studies whose focus is on wage

differentials between EU natives and immigrants from ENC, or those studying the role played by remittances to these countries by their emigrants.[2]

The empirical analysis in this paper exploits the information contained on micro-data from the LFS in the early years of the current economic crisis, when its impact on job losses was more sudden and of virulent intensity. The difference in the probability of job loss between immigrants and natives is decomposed into two components. A first one corresponding to the contribution of differences in the observable characteristics of native and immigrant workers and, a second one, to differences in the impact of these characteristics on the probability of job loss. To do so we apply a decomposition method designed for the case of a probabilistic model such as the one specified to model the probability of job loss. It should be mentioned that the method also takes into account the likely differences between immigrants and natives in the probability of participating in the labour market (providing robust results even under sample selection).

The rest of the paper is organized as follows. Section 2 presents the database and the procedure used to construct the main variable under analysis, that is if each worker in the sample maintained or lost job, which allow us to compute the rate of job loss for natives and immigrants. The description of the job loss rate for these two groups of individuals as well as the comparison of their observable characteristics is presented in section 3. Then, section 4 describes the specifications used for estimating the impact of the characteristics on the probability of job loss for natives and immigrants, and the method for decomposing the native-immigrant gap in this probability. The corresponding results are discussed in section 5 for the entire group of immigrants, while section 6 gives especial attention to those corresponding to immigrants from ENC. Finally, section 7 concludes.

2. DATABASE

In this study we used the data included in the Spanish wave of the LFS during the period between the first quarter of 2008 and the first quarter of 2009. We selected this

[2] See Wesselink and Boschma (2011) for a review the literature on the impact of labour migration in the context of the ENP.

period with the aim of comparing the probabilities of job loss just before the impact of the crisis in the Spanish labour market, in mid-2008, and when it started to exert a strong effect, from the last quarter of 2008. The LFS, produced by the Spanish National Office for Statistics (INE), provides information on the personal characteristics of individuals as well as of the jobs and firms where they were employed. In addition, the LFS includes information that allows identifying immigrants by country of origin (and thus select those from developing countries and the ENC), irrespective of their legal status in Spain. This means that the sample we used in this study potentially represents both immigrants with legal status, and those in irregular legal situation. Thus, despite the limitations of this database in measuring the immigrant population (likely underestimating the number of immigrants) is probably the most appropriate one for the type of analysis we intended to do.[3]

The sample includes individuals aging between 16 and 60 years, in the Spanish territory with the exception of Ceuta and Melilla (two Spanish city regions in North Africa), whose main occupation was not military, business management, or public administration, and who did not have dual nationality.[4, 5] Since our focus in this paper is on immigrants from developing countries, those foreign nationals from North America, Oceania and other states members of the EU-15 were excluded from the sample.

The object of study in this work lies in the probability that individuals in the sample had of losing or maintaining their jobs for a given quarter at the start of the crisis. This requires building job transitions (from employment to a different status in the labour market) by linking the information contained in the responses of individuals to some of the questions in the LFS questionnaire.[6] The process begins by taking as reference a given quarter of the LFS (quarter *t*), and classify individuals as employed or not. An

[3] See Pérez-Infante (2006) for further details of the limitations of the EPA regarding the immigrant population.
[4] The sample was restricted to individuals aging less than 60 years to homogenize the groups, as the immigrant population older than this age was still limited in the period analysed.
[5] Given their particularities, these occupations have been excluded from the analysis to guarantee consistency.
[6] An alternative would have been to use the continuous LFS. However, this database has two major drawbacks for the type of analysis that interests us. First, it does not identify the group of immigrants from developing countries, as it only provides information on whether the individual is a Spanish or foreign. The second problem stems from the statistical significance, because as its sample is much smaller, the number of immigrants included in various quarters is very limited.

individual would have kept her job during the quarter if being employed at *t* declares seniority higher than three months. By contrast, an individual would have lost her job during the quarter if not being occupied at *t,* the time since her last job indicates that the job loss took place not later than the previous quarter. To be included in the category of individuals that lost job, the individual has to meet two requirements: i) to have been a wage earner, and ii) not have stopped the job voluntarily.[7] We therefore consider that lost their jobs only those individuals who were employed in quarter t-1 but not in quarter t, either because they were unemployed, affected by an employment regulation order (the so-called ERE), or looking for a job but did not meet some of the conditions to be officially classified as unemployed.

As a result of the process, we define a binary variable, *job-loss*, which is equal to 1 if the individual lost his job during the quarter, moving from being employed at time *t-1* to not occupied at time *t,* and 0 otherwise, i.e. when the individual was employed in period *t-1* and period *t.*[8]

3. DESCRIPTIVE ANALYSIS

The analysis of the variable *job-loss,* which as mentioned above indicates if a wage earner maintained or lost employment in a given quarter, shows that 4.8% of all the employees in Spain lost their jobs in the first quarter of 2008 (Figure 1). It can also be observed that the rate of job loss increased over the period under analysis up to 7.2% in the first quarter of 2009. That is, the rate of job loss almost doubled in just one year. Beside the rate corresponding to the entire working population, Figure 1 shows the rate of job loss for natives and immigrants, confirming our hypothesis regarding the existence of substantial differences in the rate between these two groups. The rate of job loss for both groups was increasing as the recession deepened, but the impact was considerably higher for immigrant workers. As a result, the gap between immigrants and natives in the rate grew. In the first quarter of 2008, 4.3% of the natives lost the job whereas the rate was at 10% for immigrants (a gap lower than 6 percentage points –pp.).

[7] Our study aims to analyse whether reducing the workforce, employers chose to delete first jobs filled by immigrant workers. Therefore, the self-employed and voluntary layoffs fall outside the category of workers who lost their jobs.

[8] It should be noticed that individuals who changed job within the quarter are classified as not job-losers, because our focus is on the chance of moving from having a job to having no job.

After the initial impact of the crisis, in the first quarter of 2009, the rate for immigrants was nearly ten points higher than that of natives (16% vis-á-vis 6%). Therefore, using the rate of job loss as a proxy of the average probability of losing the job for any individual in the sample, we believe that the gap between immigrants and natives is large enough to motivate its detailed analysis in this paper.

Once the data from the LFS has confirmed the extent of the gap in the rate of job loss between natives and immigrants, the next step is to analyse the reasons behind the different impact of the crisis on the chances of losing the job for immigrant and natives. More precisely, we want to check if the gap can be simply explained by differences between natives and immigrants in the endowment of observable personal, job, and firm characteristics, or if differences in the effects of these characteristics between the two groups play also a role when explaining the gap in the probability of losing job. A significant contribution of the latter would mean that at least part of the gap responds to a sort of discriminatory treatment against the immigrants. This is because in such a case a migrant worker would have been more likely to have lost job in the initial period of the crisis in relation to a native worker with similar personal characteristics and occupied in the same type of job and firm.

As a first stage of the study, in the rest of this section we provide a descriptive analysis that allows comparing the endowment of the observable characteristics for immigrants and native workers. Results in Table 1 show how different are the individuals in each group as regards their personal, job, and firm observable characteristics in each quarter under analysis.[9] A priori one would expect that immigrants had been endowed with characteristics that made them more prone to loss of employment, such as lower human capital and a greater presence in industries most sensitive to the crisis, especially construction. The information contained in Table 1 confirms this suspicion. It can be observed that while the gender distribution is very similar between natives and immigrants, the latter have lower endowment of human capital. First, the average age for immigrants is lower than that for natives which, assuming the usual relationship between age and general experience in the labour market, means that they have less work experience. While about 50% of the natives have over 40 years or more, only 30%

[9] To save space, we only include results for the first and third quarters of 2008 and the first of 2009. Results for the other quarters are available upon request.

of immigrants exceeded that age. Second, educational attainment for immigrants is also lower than the one for natives, in around a year. Given the connection between these two measures of human capital and labour productivity, one would expect that when a firm had to reduce its workforce, the less productive workers were the first to be fired, so that immigrants would have fewer options to maintain their jobs because of lower human capital.

Beside the differences in the observed personal characteristics, immigrants and natives also differed in the characteristics of the jobs and firms where they were employed. Table 1 shows how migrant workers were more represented than natives in the construction, retail and hospitality, and agriculture. These were precisely the sectors that accumulated higher numbers of job losses in the early stages of the current crisis. Nonetheless, figures in Table 1 reveal that the difference in the occupational distribution is even more intense than sectorial segregation. The data shows how the distribution of occupations for natives and immigrants is very uneven. About 60% of the immigrants were in unskilled occupations (40%) and retail and catering (20%), while in the case of natives the percentage in these occupations was limited to 30%. In turn, about 30% of the natives were employed in skilled technical and professional occupations, while those occupations among immigrants only accounted for 5%.

Finally, it is worthwhile to highlight the geographic distribution of immigrants, as they tended to be concentrated in certain regions, which made that there was no correspondence with the spatial distribution of natives. As shown in Table 1, immigrants were concentrated in economically dynamic regions, such as Aragon, Balearic Islands, Catalonia, Valencia and Madrid. By contrast, the presence was lower in traditionally less economically advanced regions like Andalusia, Extremadura, Castile-Leon and Galicia. Regional differences in the initial impact of the crisis, and the above-mentioned features of the spatial distribution of immigration, could also explain some of the differences in the probability of job loss between natives and immigrants.

Summing up, a simple comparison of the description of the characteristics of immigrants and natives in the sample confirms that substantial differences between the two groups existed. Actually, figures indicate that immigrants possessed personal characteristics and were employed in occupations and firms that were more sensitive to

the loss of employment when the crisis began to strike with force to the Spanish economy. However, this comparison does not allow us to say that the entire difference in the rate of loss of employment between immigrants and natives (and therefore on the individual probability of job loss between the two groups) can be attributed to differences in the endowment of the observable characteristics.

In fact, another simple analysis provides evidence that it may not have been the case. Table 2 shows the rate of job loss for each of the categories of the main characteristics observed in immigrants and natives. The fact that the rate was higher for immigrants within all categories suggests that the difference between both groups of workers could not be due only to differences in the distribution of personal, job, and firm characteristics. Nevertheless, it is obvious that the difference between natives and immigrants could be caused simultaneously by several characteristics, so we should consider them all together. That is, conditioning on all observable characteristics simultaneously.

In the next sections we present the methodology to perform this type of analysis, and the results of its application to the present case in this work. The decomposition of the difference in the probability of job loss between natives and immigrants will determine how much of this discrepancy is attributable to differences in observable characteristics of natives and immigrants. The remainder can then be attributed to possible discrimination against immigrants in the dismissal decisions in the crisis period.

4. METHODOLOGY

This section describes the methodology used to analyse in detail the difference in the probability of job loss between natives and immigrants. To do this, first, we present the specification used to approximate the probability of job loss for natives (the group that we assume suffers no discrimination) and for immigrants (the discriminated group).[10]

[10] The model is specified for the probability of job loss for convenience in interpreting the results of both the probabilistic model and the decomposition of the gap between natives and immigrants. Symmetric results are obtained when the likelihood of maintaining employment is the event being analysed.

Then, we describe the procedure used to decompose the gap in this probability between the two groups.

4.1. Empirical model

We start from the latent variable $emp*$ which captures the individual's propensity to be employed:

$$emp* = Z\gamma + \mu, \qquad \mu \sim N(0,1) \tag{1}$$

where Z represents a set of observable characteristics, γ is the coefficient vector, and μ the error term that is distributed as a standard normal. The result of the process in equation (1), $emp*$, is unobservable in practice. We can only observe whether the individual was or was not employed. Thus, we define the indicator emp that takes value 1 if the latent variable is positive, and 0 otherwise:

$$emp = 1(emp* > 0) = 1(Z\gamma + \mu > 0) \tag{2}$$

$$emp = 0(emp* \leq 0) = 0(Z\gamma + \mu \leq 0) \tag{3}$$

In turn, those who were employed ($emp* > 0$) were able to keep their jobs or to lose them during the corresponding quarter. So we define $job-loss*$ as a latent unobservable variable for the individual's probability of job loss by:

$$job-loss* = X\beta + \varepsilon, \qquad \varepsilon \sim N(0,1) \tag{4}$$

where X contains the set of observable characteristics related to the likelihood of an individual to lose or to maintain employment, β is the parameter vector that captures the effect of these variables and ε is the error term with standard normal distribution. Although $job-loss*$ is not observable, we can use the indicator *job-loss*, described in section 2, to know if each individual in the sample kept her job during the corresponding quarter or, conversely, if she lost it. Therefore, the link between *job-loss** and *job-loss* is given by:

$$job-loss = 1(job-loss* > 0) = 1(X\beta + \varepsilon > 0) \tag{5}$$

$$job-loss = 0(job-loss* \leq 0) = 0(X\beta + \varepsilon \leq 0) \tag{6}$$

Assuming $corr(\mu,\varepsilon)=0$, a consistent estimate of the parameters of the process associated with the probability of job loss in (4) can be obtained through a univariate probit model for the event of job loss versus maintaining it, using the set of observable characteristics of workers, the workplaces and firms:

$$prob(job-loss=1)=\Phi_u(X\beta) \tag{7}$$

where $prob(job-loss=1)$ represents the probability of job loss, and Φ_u denotes the cumulative distribution function of the univariate standard normal.

But in the case where $corr(\mu,\varepsilon)=\rho\neq 0$, then $(\mu,\varepsilon)\sim N_b(0,0,1,1,\rho)$, so that estimates based on (7) will not guarantee the consistency of the estimation of the parameters of interest. The correlation between the error terms might be caused by unobservable factors (e.g. innate ability of individuals) that simultaneously affect the probability of being employed and the probability of job loss. A consistent estimate of the coefficients in such a framework can be obtained by estimating the so-called Heckman Probit model by maximum likelihood.[11]

Since we observe if the individual lost or kept the job only for those that were employed, the scenario of our analysis is one of sample selection, in which individuals in the sample faced three alternative situations: i) the individual was not employed, ii) the individual was employed and kept the job and, iii) the individual was employed but lost job during the quarter.

Therefore the joint probability of being employed and job loss is:

$$prob(emp=1,job-loss=1)=\Phi_b(X\beta,Z\gamma,\rho) \tag{8}$$

where Φ_b is the cumulative distribution function of the bivariate normal. The matrix of characteristics Z may contain any or all variables in X, though to prevent the

[11] See for instance, Cameron and Trivedi (2005). We used the *heckprob* command in Stata to obtain the estimates.

identification for estimating the parameters based solely on the nonlinearity of the functional form, it is required that at least one of the variables included in *Z,* which determines the probability of being employed, is excluded from X, which means that it is assumed not to exert a direct effect on the probability of job loss.

The probability of loss of employment conditional on being employed is obtained through the joint probability of being employed and job loss, and the probability of being employed, as:

$$prob\left(job-loss=1 \mid emp=1\right)=\frac{prob\left(emp=1, job-loss=1\right)}{prob(emp=1)}=\frac{\Phi_b(X\beta, Z\gamma, \rho)}{\Phi_u\left(Z\gamma\right)} \quad (9)$$

In addition, the impact of the characteristics on the unconditional probability of job loss can be obtained using the estimated parameters in the sample selection specification, $\hat{\beta}$, from:

$$prob\left(job-loss=1\right)=\Phi_u\left(X\hat{\beta}\right) \quad (10)$$

The impact of the characteristics on the conditional probability is informative on their effect on the probability of job loss for the employed, while that on the unconditional probability allow us to make an assessment of the effects for the entire population, regardless of whether they were employed or not. This is an important distinction because there may be effects on the probability of losing or maintaining job that wholly or partly manifested through its influence on the likelihood that an individual was employed.

4.2. Decomposition of the gap in the probability of job loss

We apply the generalization of the traditional decomposition of Oaxaca-Blinder (Oaxaca, 1973; Blinder, 1973) proposed in Yun (2004) to quantify the contribution of differences in observable characteristics and those that can not be attributed to them, to the native-immigrant gap in the probability of job loss. The generalized method proposed by Yun provides a valid methodology for nonlinear functional forms having as argument a linear combination of variables.

In the case of the unconditional probability from the probit model specified in (7), the decomposition based on a consistent estimate of the parameters, can be written as:

$$\begin{aligned}\overline{prob(job-loss)_N} - \overline{prob(job-loss)_I} = &\left[\overline{\Phi_u\left(X_N\hat{\beta}_N\right)} - \overline{\Phi_u\left(X_I\hat{\beta}_N\right)}\right] \\ &+\left[\overline{\Phi_u\left(X_I\hat{\beta}_N\right)} - \overline{\Phi_u\left(X_I\hat{\beta}_I\right)}\right]\end{aligned} \tag{11}$$

The term on the left of equation (11), $\overline{prob(job-loss)_N} - \overline{prob(job-loss)_I}$, corresponds to the gap between natives (*N*) and immigrants (*I*) in the average unconditional probability of job loss. This difference can be decomposed into the sum of two terms. The first term of the right side of the equation, $\left[\overline{\Phi_u\left(X_N\hat{\beta}_N\right)} - \overline{\Phi_u\left(X_I\hat{\beta}_N\right)}\right]$, reflects the effect attributable to differences in the observable characteristics of natives and immigrants, while the second term, $\left[\overline{\Phi_u\left(X_I\hat{\beta}_N\right)} - \overline{\Phi_u\left(X_N\hat{\beta}_N\right)}\right]$, corresponds to the difference in the impact of the characteristics. The latter term is the one that may point to the existence of discrimination against immigrants, as indicates that immigrants with similar characteristics to those of the natives have different probability of job loss. In the absence discrimination, this term equals zero.[12]

The decomposition in (11) does not allow us to isolate the contribution of each characteristic or set of characteristics to the gap in the probability between natives and immigrants. To overcome this drawback, we follow the proposal in Yun (2004) and use:

$$\begin{aligned}&\overline{prob(job-loss)_N} - \overline{prob(job-loss)_I} = \\ &\sum_{i=1}^{k} P_{\Delta X}^{i}\left[\Phi_u\left(\bar{X}_N\hat{\beta}_N\right) - \Phi_u\left(\bar{X}_I\hat{\beta}_N\right)\right] + \sum_{i=1}^{k} P_{\Delta\beta}^{i}\left[\Phi_u\left(\bar{X}_I\hat{\beta}_N\right) - \Phi_u\left(\bar{X}_I\hat{\beta}_I\right)\right] = \\ &\sum_{i=1}^{k} P_{\Delta X}^{i}\left[\Phi_u\left(\left(\bar{X}_N - \bar{X}_I\right)\hat{\beta}_N\right)\right] + \sum_{i=1}^{k} P_{\Delta\beta}^{i}\left[\Phi_u\left(\bar{X}_I\left(\hat{\beta}_N - \hat{\beta}_I\right)\right)\right]\end{aligned} \tag{12}$$

[12] However, note that the omission of relevant characteristics for the probability of job loss in the empirical model would cause the second term would be different from zero, even in the absence of discrimination. Consequently, as is usual in this type of exercise, the results are contingent on the proper specification of the empirical model.

where: $$P^i_{\Delta X} = \frac{\left(\overline{X}^i_N - \overline{X}^i_I\right)\hat{\beta}^i_N}{\left(\overline{X}_N - \overline{X}_I\right)\hat{\beta}_N}, \quad P^i_{\Delta X} = \frac{\overline{X}^i_I\left(\hat{\beta}^i_N - \hat{\beta}^i_I\right)}{\overline{X}_I\left(\hat{\beta}_N - \hat{\beta}_I\right)}, \quad \sum_{i=1}^{k} P^i_{\Delta X} = \sum_{i=1}^{k} P^i_{\Delta\beta} = 1$$

$P^i_{\Delta X}$ and $P^i_{\Delta\beta}$ denote, respectively, the weights that allow to distribute the total contribution of differences in the endowment, and in the impact, among each of the observable characteristics.

For the bivariate probit model with selection described above, the decomposition of the gap in the conditional probability is obtained from the expression for the probability in (9):

$$\overline{prob(job-loss=1 \mid emp=1)}_N - \overline{prob(job-loss=1 \mid emp=1)}_I = \left[\overline{\frac{\Phi_b(X_N\hat{\beta}_N, Z_N\hat{\gamma}_N, \hat{\rho}_N)}{\Phi_u(Z_N\hat{\gamma}_N)}} - \overline{\frac{\Phi_b(X_I\hat{\beta}_N, Z_I\hat{\gamma}_N, \hat{\rho}_N)}{\Phi_u(Z_I\hat{\gamma}_N)}}\right] + \left[\overline{\frac{\Phi_b(X_I\hat{\beta}_N, Z_I\hat{\gamma}_N, \hat{\rho}_N)}{\Phi_u(Z_I\hat{\gamma}_N)}} - \overline{\frac{\Phi_b(X_I\hat{\beta}_I, Z_I\hat{\gamma}_I, \hat{\rho}_I)}{\Phi_u(Z_I\hat{\gamma}_I)}}\right] \quad (13)$$

where $\overline{\frac{\Phi_b(X_I\hat{\beta}_N, Z_I\hat{\gamma}_N, \hat{\rho}_N)}{\Phi_u(Z_I\hat{\gamma}_N)}}$ denotes the sample mean of the counterfactual conditional probability for immigrants using the estimated coefficients ($\hat{\beta}_N$, $\hat{\gamma}_N$) and the estimate of the correlation ($\hat{\rho}_N$) of natives. The interpretation of the terms in (13) is similar to that made for the decomposition in (11). The comparison of the decomposition of the gap in this conditional probability with that based on the univariate probit model in (7) allows us to assess the robustness of the decomposition to the likely existence of sample selection.[13]

A final methodological issue we have to mention is on the treatment of the various dummy variables included in the model. The inclusion of categorical variables related to the characteristics of the individual, job, and firm makes difficult to quantify their effects on the decomposition. The usual estimation process, based on the exclusion of a category to avoid the so-called *dummy variable trap,* that normally poses no problem, represents a serious dysfunction in applying decomposition techniques required for the study of discrimination. In order to avoid this problem we have used the identification

[13] Note that in this case it is not possible to apply straightforwardly the detailed decomposition outlined above for the unconditional probability.

restriction proposed in Gardeazabal and Ugidos (2004) to estimate the coefficients to be used to compute the decomposition. This restriction allows to obtain estimates of the effects attributable to each category that are robust to the excluded category. Briefly, it consists in imposing the following restriction on the coefficients of the dummy variables for a given characteristic:

$$\sum_{j=1}^{J} \pi_j = 0 \tag{19}$$

where $j = 1, \ldots J$ are the J categories of the variable and π_j the parameter associated with category j.

5. RESULTS

5.1. Estimated impact of observable characteristics

This section summarises the results obtained in the estimation of the probability models described in section 4.1, considering as determinants of the probability of job loss a set of personal characteristics (nationality, gender, age and educational attainment), and household environment (marital status, living with spouse, number of household members, number of children, if there are children under 10 years, and region of residence), and characteristics of the job and the firm (occupation and sector). As indicated above, we also aim at accounting for observable and unobservable factors that affect the probability of job loss indirectly through their effect on the probability of being employed.

The results of the probit model with sample selection, defined in section 4.1, for all individuals in the sample –both immigrants and natives, and the various quarters of the period under analysis, are summarized in Table 3. First at all, it must be stressed the overall significance of the model and the reasonably good adjustment. It is observed as well the high level of significance of each of the parameters, and that the signs correspond to those expected a priori. Finally, it is worthwhile noting that the estimate of ρ is statistically significant, indicating that unobserved factors affecting the probability of being employed conditioned the probability of job loss, indeed confirming the need to control for sample selection.

As for the net impact associated with being an immigrant, the estimated marginal effect confirms that a migrant worker had higher probability of job loss than other native worker with similar characteristics. And the results for the different quarters indicate that the gap between them increased after the impact of the crisis. While in the first quarter of 2008, when the crisis had not seriously affected the Spanish economy, being an immigrant did increase the probability of job loss in 2.6pp, in the same quarter of 2009, the gap increased to 5pp.

With respect to other characteristics, the estimated marginal effects show that age and education decreased the likelihood of job loss. Meanwhile, men were less likely to lose job than women, while as expected, less skilled occupations faced a higher risk of job loss. As for the impact of the sector, the results confirm the evidence from aggregate statistics, which indicate that job loss was higher for workers in construction and agriculture. Finally, household characteristics appear to have had some effect only before the impact of the crisis, since the estimated coefficients for most of them are not statistically significant from the third quarter of 2008.

The results discussed above correspond to a specification that imposes the same impact of the observable characteristics on the probability of loss of employment for immigrants and natives. However, the existence of discrimination against immigrants would be manifested in an impact on the characteristics of immigrants differently than the natives, so that the probability of expected job losses for natives and immigrants with similar characteristics would differ. To assess such differences, Table 4 shows the marginal effects estimated from the probit model with selection for the subsamples of the immigrants and the natives.

The results show substantial differences between immigrants and natives in the impact of the observed characteristics. For example, while for the natives, men were less likely to job loss than women, both before and during the initial impact of the crisis, in the case of immigrants does not seem to be gender differences before crisis, while during the first stages of the crisis, women were less likely to job loss than men. There are also differences in the effect of age, as it is not relevant to explain the loss of employment among immigrants until the first quarter of 2009. As for the estimated impacts for education and occupation, they are significant for natives before and during the crisis,

while the estimated effects for immigrants are rather volatile over time. In any case, immigrant workers in skilled occupations do show consistently lower probability of job loss than immigrants in less skilled occupations. Finally, the sector's impact was considerably greater for immigrants, while cannot be deduced a clear pattern in the case of household characteristics.

These results suggest that differences between immigrants and natives in the rate of job loss could not have been caused solely by differences in observable characteristics. As noted in section 4.2, the decomposition of the gap between natives and immigrants in the probability of job loss will allow us to conclude on the contribution of, on the one hand, differences in the endowment of observable characteristics and, on the other, that corresponding to differences in their impact.

5.2. Decomposition of the gap in the probability of job loss

The estimate of the coefficients of the probit model with selection for natives and immigrants described above is used in this section for implementing the decomposition of the gap between the two groups in the probability of job loss. Table 5 summarizes the results obtained for the case of the conditional probability, i.e. for individuals actually employed. The first column shows the difference in the probability of job loss that, as noted in Section 2, rose steadily throughout the period analysed. In the first quarter of 2008 the gap was 5.7pp, while in the same quarter of 2009 reached almost 10pp. The figures in the second and third columns of results in Table 5 show that the differences between natives and immigrants in observable characteristics do not explain the entire gap, neither before the crisis nor even when it began to show its effects on the labour market. In fact, the portion attributable to differences in the impact is as high as the one of the endowments. Therefore, both contributed equally to the increase in the gap after the impact of the crisis.

Further to the above results based on the gap in the conditional probability, we have also decomposed the gap in the unconditional probability, as defined in section 4.2. The results are summarized in Table 6. In this case, the first column of results corresponds to the gap between natives and immigrants in the unconditional probability of job loss. As indicated above, this probability would be that of a randomly selected individual from the population (either the native or immigrant), regardless of her employment status

(employed or not) in the corresponding quarter. It can be observed how the gap in the unconditional probability differs from the one previously discussed for the conditional probability. While at the beginning of 2008, when the crisis had not affected yet the labour market, the gap in the unconditional probability was less than the difference in the conditional probability in just over 2 pp, after the impact of the crisis the situation is reversed, with a greater gap in the unconditional probability, over 3pp. In any case, the figures clearly show the substantial increase in the unconditional probability gap throughout the period under analysis (10pp from the first quarter of 2008 to the first of 2009).

Results of the decomposition reveal that the increase in the unconditional probability gap is largely attributable to the increasing contribution of differences in the impact of characteristics, i.e. to what might be considered as a sort of discrimination against immigrants as regards job loss. In fact, the situation at the end of the period, characterized by high job loss, is in sharp contrast to that deduced from the decomposition for the first quarter of 2008, in which it can be even observed some preference for immigrant workers (as deduced from the positive sign of the component corresponding to differences in the impact of the characteristics in the first quarter of 2008).

Finally, it must be stressed that the detailed decomposition of the unconditional probability gap between natives and immigrants (Table 7) reveals that the increase since the impact of the crisis is entirely attributable to the difference in the constant terms of models for natives and immigrants. Since we can assume that this term includes intrinsic characteristics that are similar for all individuals within each of these groups, that are independent from the observable characteristics that determine the individual probability of job loss, this result can be used to confirm the existence of a bias against immigrants in their chances of job losses during the economic crisis.

6. RESULTS FOR IMMIGRANTS FROM THE ENC

As mentioned in the introduction, the immigrants from the ENC are the largest group in Spain after those from South American countries. Salient among them are North Africans, especially Moroccans. A fundamental difference between immigrants from

ENC and the South Americans is the knowledge of the Spanish language, and greater social and cultural proximity of the latter with the natives. Therefore, a priori one would expect that the integration in the labour market were higher for South Americans than for immigrants from the ENC. Moreover, the literature shows how knowledge of the language is related to worker's productivity and the type of occupation and activity developed in the host country (e.g. Dustmann and Van Soest, 2002; Peri and Sparber, 2009), which could have led to greater probabilities of losing their jobs when the crisis began to seriously affect the Spanish labour market.

Therefore, in this final section we show the results obtained by comparing the probability of loss of employment of natives with that of immigrants from the ENC. An important issue to mention is that for this analysis we can not exploit the quarterly data from the LFS used in the previous sections –which are available on the INE website, since these do not allow us to know the country of origin of immigrants. Instead we used annual data from the LFS (containing information of the four quarters of each year), which in addition to the information previously used in reference to individuals, firms and jobs, allows us to identify individuals from any of the ENC. Since this database contains each of the quarters of the year, we applied the same strategy as defined in section 2 to identify employees which either lost their jobs or maintained them during the corresponding quarter.

Figure 2 shows the rates of job loss for natives, immigrants from LDC, and the ENC immigrants in 2006 (growth period), 2008 (year of slowdown) and 2010 (the year when the crisis hit strongly the labour market). Additionally, the solid line represents the rate for all workers. Broadly speaking, Figure 2 reproduces the features discussed for Figure 1, but now showing how the impact of the crisis on the labour market was more intense in the case of immigrants from the ENC. In fact, there were no significant differences between the rate for ENC immigrants and all immigrants before the crisis. But from 2008 a substantial gap emerged unfavourable to immigrants from those countries, which compared with natives was as large as 10pp in 2010.

The description of the observable characteristics of the ENC immigrants, and their comparison with those of natives and immigrants from other countries confirms that they had an endowment of human capital, and were employed in occupations and

activities that made them more likely of losing their jobs in the crisis. Table 8 shows the descriptive results of some of these characteristics for the three groups of individuals. First at all, it needs to be indicated that, on average, immigrants from the ENC had two years less education than immigrants from other countries, and three less than natives. Accordingly, it is observed that they were more intensely employed in unskilled blue-collar jobs, and that they had greater presence in the primary sector, in construction and industry. Instead its presence in the service sector, including those related to retail, hospitality and personal services (for which the language is an important factor), was less than that of immigrants from other countries. Finally, Table 8 shows that the spatial patterns of localization ENC immigrants differed from those observed for natives and immigrants from other countries. Catalonia, Andalusia and Murcia accounted for 50% of all ENC immigrants in Spain, while the percentage of non-ENC immigrants in these three regions was 30%. In turn, only 9.6% of all ENC immigrants were located in Madrid, while this region concentrated almost 30% of the non-ENC immigrants in the country.

As for the differences between natives and ENC and non-ENC immigrants in the impact of observable characteristics on the probability of job loss, it must be said first that models similar to those described in the previous section were estimated. To save space, we do not report the results here.[14] In any case, they reveal significant differences in the responses between natives and immigrants from ENC as well as differences between immigrants from ENC and non-ENC. We combined the estimated coefficients with the values of the variables in the model for each group of individuals to decompose the gap in the conditional probability of job loss between natives and ENC immigrants. The results for the 3 years under analysis are summarised in Table 9. The first column of results corresponds to the probability gap, while the second and third columns contain the figures of the contribution of, respectively, differences in observable characteristics, and differences in their effect (or the unexplained part of the gap). As we mentioned above, in 2006, before the crisis, the gap was relatively narrow. Actually, it is statistically significant at 95% but not at 99%. Most of the gap unfavourable to ENC immigrants was not explained by differences in observable characteristics. In fact, the part attributable to those differences is not statistically significant, whereas the

[14] They are available from the authors upon request.

unexplained part it is only at 90%. However, as the gap became wider with the impact of the crisis, the unfavourable characteristics of the ENC immigrants emerged as responsible of their higher chances of losing jobs. As a result, the gap observed in 2010 can be almost fully explained by differences in characteristics; the contribution of differences in the impact being not statistically significant.

Summing up, the probability of job loss for the ENC immigrants was even higher than that for immigrants from other countries as a result of their lower endowment of human capital and, accordingly, because they were employed in jobs and activities that were more exposed to the negative consequence of the crisis on the Spanish labour market.

7. CONCLUSIONS

The aim of this study was to provide evidence on the impact of the current economic crisis on employment of immigrants, specifically, if they had less chance of keeping their jobs than natives after the impact of the crisis. Although previous literature did not analyse this issue, our results confirm the economic and social impact of studying it.

Using microdata from the LFS for natives and immigrants, we have shown that there were no substantial differences between them in the rate of job loss before the crisis. However, after the impact of the crisis in late 2008, there was a continued widening of the gap between natives and immigrants. The results confirm that for all immigrants from developing countries, differences in human capital and occupational and sectoral segregation can not explain fully the gap. In other words, that there were differences in the probability of job loss between immigrants and natives of similar personal characteristics, working in analogous occupations and firms. The explanation for this fact can be found in the existence of some kind of discrimination against immigrant workers, so that companies tended first to dismiss immigrants workers rather than natives with similar characteristics. However, it can be argued as well that the differences could be due to the effect of unobservable characteristics, such as the imperfect transferability of human capital (e.g. Friedberg, 2000; Sanromà et al, 2008). In any case, it is worthwhile stressing that discrimination or unobserved characteristics (or both together) only contributed to the existence of a significant gap between natives and immigrants after the impact of the crisis. Or what is the same, it does not appear

that such mechanisms played any role in the expansionary period, characterised by the massive creation of new jobs and not by their destruction.

This conclusion for all immigrants in Spain is not immediately extrapolated to the specific case of immigrants from the ENC. We have provided evidence showing that the impact of the crisis on job loss was greater for immigrants from the ENC. And also that the difference in education attainment, and occupational and sectoral distribution with respect to natives was even greater than that observed for non-ENC immigrants. In fact, in this case, almost all of the gap in the rate of job loss can be attributed to differences in observed characteristics, thus ruling out discrimination against ENC immigrants. In any case, one could argue that what might be behind the results is a phenomenon of segregation, in which discrimination actually takes place through the real possibilities of occupying certain jobs.

Some implications can be derived from the evidence obtained for the Spanish economy. First, the loss of employment for immigrants is an added cost to their own displaced status, especially for recent immigrants. Even for those who are entitled to receive the unemployment benefit, the difficulty of finding another job in a prolonged recession may lead to limited financial resources at its disposal to meet basic needs. Against a backdrop of cuts in social services caused by the budgetary situation in many EU Member States, and in the absence of family support in the host country, the higher chance to lose the job and the fewer options to find another one (as reflected in an unemployment rate for immigrants around 35%) could force immigrants to return to their countries. Even if staying in the host country, a long period without an employment erodes both real social integration and assimilation into the labour market.

In turn, for the host country, and by extension to the whole EU, the presence of a large number of unemployed immigrants has obvious costs. Despite the above, it is possible that a high percentage of unemployed immigrants decide to stay in the host countries, among other reasons because they have no better alternative in their countries of origin and, even without a job in the EU, they can continue enjoying higher levels of security as well as of social protection (including unemployment benefits, and health and education services). In that case, at least temporarily, immigrants stop contributing to

the system and, consequently, do not help to counteract the effects of aging of the native population.

The reduced ability to maintain employment by immigrants can be seen as a cost also for the countries of origin. First, in terms of volume of remittances, which in the case of the countries of North Africa (especially Morocco and Algeria) are an important source of external financing. Secondly, because they have to deal with the return of those who decide to return home, despite suffering many of the countries of origin high unemployment (as in the case of North African countries), especially for the young more skilled population. Finally, because the high rates of job loss may discourage potential future immigrants, and thereby hinder the correction of macroeconomic imbalances in sending countries, and the lack of opportunities for a significant portion of its population.

We believe that these circumstances must be considered when designing and assessing the instruments of the EU migration policy in the context of the ENP. Despite the obvious difficulties that would have the implementation of an action of this type, the results we obtained suggest that, in the context of the ENP, resources should be allocated to improve the human capital of immigrants, and even of potential immigrants in their countries of origin. Among other effects, the increase in the educational level of immigrants would improve their employability and the pace of assimilation into the European labour market.

REFERENCES

Amuedo-Dorantes C and de la Rica S (2007) Labour market assimilation of recent immigrants in Spain, *British Journal of Industrial Relations* 45: 257-284

Blinder A S (1973) Wage discrimination: reduced form and structural estimates, *The Journal of Human Resources* 8: 436-455

Cameron A C and Trivedi P K (2005) *Microeconometrics: Methods and applications*, Cambridge University Press, New York

Dustmann C and Van Soest A (2002) Language and the earnings of immigrants, *Industrial and Labor Relations Review* 55: 473-492

Fernández C and Ortega C (2008) Labor market assimilation of immigrants in Spain: employment at the expense of bad job-matches?, *Spanish Economic Review* 10: 83-107

Friedberg R M (2000) You can't take it with you? Immigrant assimilation and the portability of human capital, *Journal of Labor Economics* 18: 221-251

Gardeazabal J and Ugidos A (2004) More on identification in detailed wage decompositions, *The Review of Economics and Statistics* 86: 1034-1036

Oaxaca R (1973) Male-female wage differentials in urban labour markets, *International Economic Review* 14: 693-709.

Pérez-Infante J I (2006) *Las estadísticas del mercado de trabajo en España*, Ministerio de Trabajo e Inmigración, Gobierno de España, Madrid.

Peri G and Sparber C (2009) Task specialization, immigration and wages, *American Economic Journal: Applied Economics* 1: 135–69

Sanromà E, Ramos R and Simon H (2008) The Portability of Human Capital and Immigrant Assimilation: Evidence for Spain, *IZA Discussion Paper* No. 3649.

Silva J and Vázquez-Grenno J (2011) The ins and outs of unemployment and the assimilation of recent immigrants in Spain, *Journal of Population Economics* 24: 1309-1330

Wesselink E and Boschma R (2011) Taking stock of research projects on the European Neighbourhood Policy, *SEARCH Working Paper* WP1/01

Yun M (2004) Decomposing differences in the first moment, *Economics Letters* 82: 275-280

Table 1. Descriptive of individual, job, and firm characteristics for natives and immigrants.

	1 quarter 2008		3 quarter 2008		1 quarter 2009	
	Natives	Immigrants	Natives	Immigrants	Natives	Immigrants
Gender						
Male	55.11%	52.41%	54.80%	52.54%	53.53%	50.56%
Female	44.89%	47.59%	45.20%	47.46%	46.47%	49.44%
Age						
16-19 years	1.64%	2.17%	1.57%	2.01%	1.36%	1.84%
20-24 years	8.03%	9.59%	7.49%	10.97%	7.14%	9.23%
25-29 years	12.16%	17.94%	11.91%	17.28%	11.59%	16.83%
30-34 years	13.39%	21.87%	13.66%	21.44%	13.70%	20.18%
35-39 years	14.01%	18.00%	14.03%	18.31%	14.25%	18.37%
40-44 years	15.28%	13.00%	15.18%	13.14%	15.19%	15.25%
45-49 years	14.42%	8.84%	14.68%	8.65%	14.92%	9.87%
50-54 years	12.35%	5.89%	12.54%	5.69%	12.79%	5.85%
55-59 years	8.72%	2.69%	8.95%	2.50%	9.06%	2.59%
Education (years of schooling)	10.84	9.66	10.86	9.76	10.98	9.89
Occupation						
Technicians and professionals	30.06%	4.80%	29.95%	5.39%	31.13%	5.77%
Accontancy, admin and other office empl.	11.54%	4.05%	11.90%	4.41%	11.67%	3.96%
Catering, protection serv, and salepersons	17.00%	19.45%	17.13%	21.90%	17.87%	21.71%
Skilled workers in agric, manuf, and constr	16.78%	23.98%	16.75%	23.05%	15.57%	21.49%
Instalation and machinery operators	11.07%	8.15%	10.90%	8.05%	10.49%	8.95%
Elementary occupations	13.55%	39.58%	13.37%	37.20%	13.27%	38.13%
Sector of activity						
Agriculture, lifestock, forestry and fishing	1.98%	6.21%	1.97%	5.12%	2.16%	6.69%
Food, textile, wood, and paper	5.54%	5.09%	5.49%	5.22%	5.28%	5.57%
Extractive, energy and water	7.78%	4.74%	7.84%	4.90%	7.45%	4.40%
Machinery and transport material	5.34%	2.92%	5.29%	3.56%	5.28%	2.90%
Construction	11.08%	22.54%	10.55%	21.12%	8.94%	18.12%
Retail and hostelery	19.06%	23.69%	19.12%	24.35%	19.34%	24.64%
Transport	6.81%	3.93%	6.87%	4.16%	6.96%	4.79%
Financial serv, real state, and other professional	10.87%	7.60%	11.05%	7.51%	11.52%	7.66%
Public Adm, education and health, other soc ser	31.55%	23.29%	31.83%	24.05%	33.08%	25.22%
Region (NUTS2)						
Andalusia	16.78%	9.04%	16.88%	8.73%	16.41%	9.23%
Aragon	4.70%	5.49%	4.85%	5.25%	4.90%	5.91%
Asturias	2.75%	1.04%	2.61%	1.25%	2.77%	0.92%
Balearic Isl	2.39%	4.05%	2.51%	4.84%	2.44%	4.71%
Canary Isl	5.37%	4.05%	5.44%	4.54%	5.04%	3.96%
Cantabria	2.85%	1.70%	3.00%	1.88%	2.93%	1.78%
Castile-Leon	9.69%	5.81%	9.63%	6.10%	9.58%	5.57%
Castile-La Mancha	6.97%	6.56%	6.95%	6.07%	7.01%	6.10%
Catalonia	11.35%	17.68%	11.26%	17.66%	11.30%	18.51%
Valencia	8.67%	14.10%	8.45%	13.12%	8.29%	11.82%
Extremadura	3.67%	0.52%	3.46%	0.68%	3.58%	0.98%
Galicia	6.47%	2.60%	6.60%	2.56%	6.61%	3.12%
Madrid	5.86%	13.49%	5.86%	13.61%	6.04%	12.46%
Murcia	3.12%	5.52%	3.11%	6.07%	3.16%	6.02%
Navarra	2.41%	2.80%	2.48%	2.37%	2.70%	2.93%
Basc Country	5.17%	2.57%	5.25%	2.48%	5.44%	2.81%
La Rioja	1.78%	2.98%	1.68%	2.80%	1.81%	3.18%
Observations	43729	3461	42950	3675	42733	3588

Table 2. Rates of job loss within characteristics for natives and immigrants.

	1 quarter 2008		3 quarter 2008		1 quarter 2009	
	Natives	Immigrants	Natives	Immigrants	Natives	Immigrants
Gender						
Male	4.00%	10.47%	4.92%	14.40%	6.89%	21.39%
Female	4.75%	9.47%	5.26%	7.45%	6.01%	10.88%
Age						
16-19 years	19.53%	9.33%	25.96%	25.68%	24.44%	36.36%
20-24 years	10.68%	16.27%	13.74%	9.93%	15.80%	13.90%
25-29 years	6.17%	10.79%	6.96%	13.54%	9.53%	17.22%
30-34 years	4.10%	7.66%	4.84%	10.03%	6.51%	16.85%
35-39 years	3.52%	9.47%	4.15%	9.81%	5.94%	15.33%
40-44 years	3.64%	9.33%	3.90%	11.39%	5.17%	15.72%
45-49 years	2.76%	8.17%	3.35%	10.38%	4.50%	19.49%
50-54 years	2.15%	11.76%	2.36%	10.53%	3.86%	9.05%
55-59 years	1.70%	10.75%	2.11%	8.70%	2.45%	10.75%
Education						
University (2 & 3 levels)	2.01%	7.82%	2.59%	6.78%	2.40%	11.72%
University (1 level)	2.27%	6.94%	2.92%	6.38%	2.94%	10.75%
Secondary (2 level)	3.12%	8.73%	3.47%	8.45%	4.20%	16.01%
Vocational training	4.06%	9.97%	3.91%	8.30%	5.82%	12.38%
Secondary (1 level)	5.68%	11.13%	7.39%	13.61%	9.77%	19.48%
Primary	6.81%	11.01%	7.29%	15.09%	9.81%	17.01%
Illiterate / No schooling	9.57%	13.98%	11.48%	18.62%	13.78%	20.66%
Occupation						
Technicians and professionals	1.86%	4.22%	2.64%	4.55%	2.63%	8.70%
Accountancy, admin and other office emp	3.17%	5.00%	3.52%	3.09%	4.53%	11.27%
Catering, protection serv, and salepersons	5.22%	11.29%	5.11%	8.07%	6.67%	12.58%
Skilled workers in agric, manuf, and const	5.37%	10.00%	7.03%	14.64%	9.91%	22.18%
Instalation and machinery operators	3.53%	6.38%	3.89%	7.77%	6.82%	19.00%
Elementary occupations	9.09%	11.31%	10.40%	13.31%	12.66%	15.86%
Sector of activity						
Agriculture, lifestock, forestry and fishing	19.19%	21.40%	21.37%	21.81%	26.71%	22.50%
Food, textile, wood, and paper	4.09%	7.39%	4.58%	6.77%	6.39%	18.00%
Extractive, energy and water	2.53%	7.32%	3.35%	9.44%	4.56%	15.82%
Machinery and transport material	2.78%	3.96%	3.39%	12.21%	5.32%	14.42%
Construction	7.50%	12.56%	10.82%	19.33%	15.45%	28.31%
Retail and hostelery	5.31%	10.73%	5.38%	8.49%	7.44%	14.25%
Transport	3.33%	5.15%	3.35%	9.80%	5.41%	18.60%
Financial serv, real state, and other profes	3.74%	11.79%	3.96%	8.70%	5.12%	12.36%
Public Adm, education and health, other s	2.88%	5.83%	3.53%	6.33%	3.50%	8.29%

Table 3. Marginal effects from the probit model with selection for the entire sample of workers.

	1 quarter 2008		3 quarter 2008		1 quarter 2009	
Nationality (ref. Native)	Marg. Eff.	Sig.	Marg. Eff.	Sig.	Marg. Eff.	Sig.
Immigrant	0.0264	***	0.0228	***	0.0485	***
Gender (ref. Female)						
Male	-0.0185	***	-0.0159	***	-0.0125	***
Age (ref. 16-19 years)						
20-24 years	-0.0242	***	-0.0302	***	-0.0394	***
25-29 years	-0.0349	***	-0.0415	***	-0.0544	***
30-34 years	-0.0396	***	-0.0478	***	-0.0617	***
35-39 years	-0.0409	***	-0.0501	***	-0.0640	***
40-44 years	-0.0412	***	-0.0516	***	-0.0670	***
45-49 years	-0.0433	***	-0.0529	***	-0.0679	***
50-54 years	-0.0429	***	-0.0532	***	-0.0678	***
55-59 years	-0.0405	***	-0.0492	***	-0.0658	***
Education (years of schooling)	-0.0017	***	-0.0024	***	-0.0032	***
Occupation (ref. Unskilled workers)						
Technicians and professionals	-0.0284	***	-0.0251	***	-0.0403	***
Accountancy, admin and other office empl.	-0.0211	***	-0.0246	***	-0.0302	***
Catering, protection serv, and salepersons	-0.0106	***	-0.0184	***	-0.0192	***
Skilled workers in agric, manuf, and constr	-0.0108	***	-0.0151	***	-0.0151	***
Instalation and machinery operators	-0.0133	***	-0.0193	***	-0.0134	***
Sector of activity (ref. Construction)						
Agriculture, lifestock, forestry and fishing	0.0382	***	0.0208	***	0.0099	***
Food, textile, wood, and paper	-0.0169	***	-0.0267	***	-0.0365	***
Extractive, energy and water	-0.0224	***	-0.0303	***	-0.0428	***
Machinery and transport material	-0.0211	***	-0.0270	***	-0.0386	***
Retail and hostelery	-0.0183	***	-0.0318	***	-0.0433	***
Transport	-0.0143	***	-0.0271	***	-0.0354	***
Financial serv, real state, and other professional serv.	-0.0159	***	-0.0298	***	-0.0428	***
Public Adm, education and health, other soc serv.	-0.0254	***	-0.0364		-0.0623	
Civil status (ref. Single)						
Married	-0.0072	**	-0.0019		-0.0033	
Other	0.0005		0.0004		0.0043	*
Living with spouse (ref. Yes)	0.0149	***	0.0058		0.0068	
Number household members	-0.0019	***	-0.0010		-0.0027	**
Number of children	-0.0012	*	-0.0004		-0.0017	
Children < 10 years (ref. No)	-0.0010		0.0003		0.0024	
Observations	70301		68772		68603	
of which censored	23111		22147		22282	

Notes: Marginal effects computed from the conditional probability. The estimated model included all the characteristics described in the text. The results of some of them are not reported in the table to save space. ***, **, and * denote statistical significance at the 99%, 95%, and 90% respectively.

Table 4. Marginal effects from the probit model with selection for the sample of natives and immigrants.

	1 quarter 2008				3 quarter 2008				1 quarter 2009			
	Natives		Immigrants		Natives		Immigrants		Natives		Immigrants	
	Marg. Eff.	Sig.	Marg. Eff.	Sig.	Marg. Eff.	Sig.	Marg. Eff.	Sig.	Marg. Eff.	Sig.	Marg. Eff.	Sig.
Gender (ref. Female)												
Male	-0.0170	***	-0.0249	*	-0.0169	***	0.0275	**	-0.0138	***	0.0386	**
Age (ref. 16-19 years)												
20-24 years	-0.0108	**	0.0356		-0.0119	**	0.0420		0.0016		-0.1397	***
25-29 years	-0.0191	***	-0.0083		-0.0238	***	0.0903	**	-0.0066		-0.1391	***
30-34 years	-0.0266	***	-0.0353		-0.0318	***	0.0447		-0.0224	**	-0.1442	***
35-39 years	-0.0303	***	-0.0233		-0.0361	***	0.0484		-0.0283	***	-0.1503	***
40-44 years	-0.0311	***	-0.0207		-0.0386	***	0.0731		-0.0351	***	-0.1438	***
45-49 years	-0.0342	***	-0.0330		-0.0408	***	0.0591		-0.0393	***	-0.1247	***
50-54 years	-0.0352	***	0.0053		-0.0430	***	0.0566		-0.0420	***	-0.1517	***
55-59 years	-0.0345	***	0.0005		-0.0406	***	0.0268		-0.0481	***	-0.1335	***
Education (years of schooling)	-0.0018	***	-0.0016		-0.0021	***	-0.0039	***	-0.0033	***	-0.0027	
Occupation (ref. Unskilled workers)												
Technicians and professionals	-0.0254	***	-0.0456	**	-0.0241	***	-0.0470	***	-0.0354	***	-0.0528	**
Accountancy, admin and other office empl	-0.0186	***	-0.0512	***	-0.0222	***	-0.0606	***	-0.0266	***	-0.0301	
Catering, protection serv, and salepersons	-0.0115	***	0.0173		-0.0183	***	-0.0129		-0.0187	***	-0.0172	
Skilled workers in agric, manuf, and consti	-0.0106	***	-0.0186		-0.0146	***	-0.0251	**	-0.0145	***	-0.0255	
Instalation and machinery operators	-0.0125	***	-0.0294		-0.0172	***	-0.0490	***	-0.0138	***	-0.0042	
Sector of activity (ref. Construction)												
Agriculture, lifestock, forestry and fishing	0.0401	***	0.0353		0.0272	***	-0.0232		0.0193	***	-0.0541	***
Food, textile, wood, and paper	-0.0136	***	-0.0392	**	-0.0221	***	-0.0564	***	-0.0303	***	-0.0596	***
Extractive, energy and water	-0.0188	***	-0.0391	**	-0.0261	***	-0.0429	***	-0.0350	***	-0.0814	***
Machinery and transport material	-0.0167	***	-0.0624	***	-0.0239	***	-0.0170		-0.0310	***	-0.0817	***
Retail and hostelery	-0.0146	***	-0.0470	***	-0.0269	***	-0.0589	***	-0.0350	***	-0.0940	***
Transport	-0.0105	***	-0.0449	**	-0.0235	***	-0.0218		-0.0291	***	-0.0580	**
Financial serv, real state, and other profess	-0.0131	***	-0.0144		-0.0256	***	-0.0436	***	-0.0347	***	-0.0923	***
Public Adm, education and health, other so	-0.0182	***	-0.0862	***	-0.0289	***	-0.0748	***	-0.0489	***	-0.1373	***
Civil status (ref. Single)												
Married	-0.0003		-0.0079		-0.0007	**	0.0096	***	-0.0017	***	-0.0107	
Other	-0.0007		-0.0021		-0.0015	**	-0.0001		-0.0026	***	0.0011	
Living with spouse (ref. Yes)	-0.0003		0.0080		-0.0007		-0.0089	***	0.0008		0.0124	
Number household members	0.0001		-0.0007		0.0003	**	0.0013	***	0.0006	***	-0.0009	
Number of children	0.0000		-0.0024		0.0001		0.0016	**	0.0002	*	-0.0019	
Children < 10 years (ref. No)	0.0001		-0.0006		-0.0001		0.0017		-0.0004	*	-0.0037	
Observations	65687		4614		63902		4870		63863		4740	
of which censored	21958		1153		20952		1195		21130		1152	

Notes: Marginal effects computed from the conditional probability. The estimated model included all the characteristics described in the text. The results of some of them are not reported in the table to save space. ***, **, and * denote statistical significance at the 99%, 95%, and 90% respectively.

Table 5. Decomposition of the native-immigrant gap in the conditional probability of job loss.

	Gap	Diff in Characteristics	Diff in Impact
1 quarter 2008	-0.057	-0.024	-0.032
3 quarter 2008	-0.060	-0.032	-0.029
1 quarter 2009	-0.097	-0.040	-0.058

Note: All contributions are statistically significant at the 99%.

Table 6. Decomposition of the native-immigrant gap in the unconditional probability of job loss.

	Gap	Diff in Characteristics	Diff in Impact
1 quarter 2008	-0.035	-0.060	0.025
3 quarter 2008	-0.049	-0.028	-0.021
1 quarter 2009	-0.131	-0.035	-0.096

Note: All contributions are statistically significant at the 99%.

Table 7. Detailed decomposition of the native-immigrant gap in the unconditional probability of job loss.

	1 quarter 2008		3 quarter 2008		1 quarter 2009	
	Diff in Characteristics	Diff in Impact	Diff in Characteristics	Diff in Impact	Diff in Characteristics	Diff in Impact
Gap	**-0.035**		**-0.049**		**-0.131**	
Individual Ch.	-0.011	0.054	-0.014	-0.009	-0.015	0.002
Job & Firm Ch.	-0.049	0.029	-0.014	0.005	-0.020	0.018
Constant		-0.058		-0.016		-0.116
Total	-0.060	0.025	-0.028	-0.021	-0.035	-0.096

Note: All contributions are statistically significant at the 99%.

Table 8. Descriptive of (some) observable characteristics for natives and immigrants from ENC and non ENC (2010).

		Natives	Immigrants	
			Non ENC	ENC
Gender				
	Male	53.72%	47.14%	68.20%
	Female	46.28%	52.86%	31.80%
Age (years)		38.51	35.95	37.15
Education (years of schooling)		11.53	10.43	8.47
Occupation				
	Skilled White	32.38%	9.67%	6.40%
	Non-Skilled White	30.16%	28.74%	15.17%
	Skilled Blue	22.72%	23.56%	32.64%
	Non-Skilled Blue	11.84%	37.31%	45.65%
Sector of activity				
	Primary	2.03%	4.76%	17.16%
	Industry	16.72%	10.22%	14.30%
	Construction	7.53%	12.01%	19.54%
	Distribution, Hotels and Rest.	19.64%	28.32%	24.20%
	Transport and Com.	8.21%	6.41%	3.29%
	Financial and real state	13.13%	9.44%	5.14%
	Health, Educ. and Pub. Serv.	30.94%	9.86%	6.28%
	Personal serv.	1.81%	18.99%	10.08%
Region				
	Andalusia	16.73%	8.66%	14.64%
	Aragon	2.78%	2.75%	1.75%
	Asturias	2.22%	1.17%	1.50%
	Balearic Islands	2.33%	3.62%	3.31%
	Canary Islands	3.96%	4.99%	4.11%
	Cantabria	1.35%	0.96%	0.22%
	Castilla Leon	5.58%	2.60%	3.17%
	Castilla La Mancha	4.32%	3.29%	7.14%
	Catalonia	16.52%	18.84%	32.88%
	Valencia	9.77%	11.39%	9.15%
	Extremadura	2.36%	0.47%	0.86%
	Galicia	5.81%	2.82%	0.95%
	Madrid	15.60%	29.79%	9.66%
	Murcia	2.74%	3.88%	7.22%
	Navarra	1.44%	1.40%	0.52%
	Basque Country	5.49%	2.36%	0.90%
	La Rioja	0.72%	0.99%	0.81%

Table 9. Decomposition of the gap between natives and immigrants from ENC in the conditional probability of job loss.

	Gap	Diff in Charateristics	Diff in Impact
2006	-0.032**	0.018	-0.050*
2008	-0.071***	-0.030***	-0.041**
2010	-0.097***	-0.077***	-0.02

Note: ***, **, and * denote statistical significance at the 99%, 95%, and 90% respectively.

Figure 1. Rates of job loss for natives and immigrants in the period under analysis.

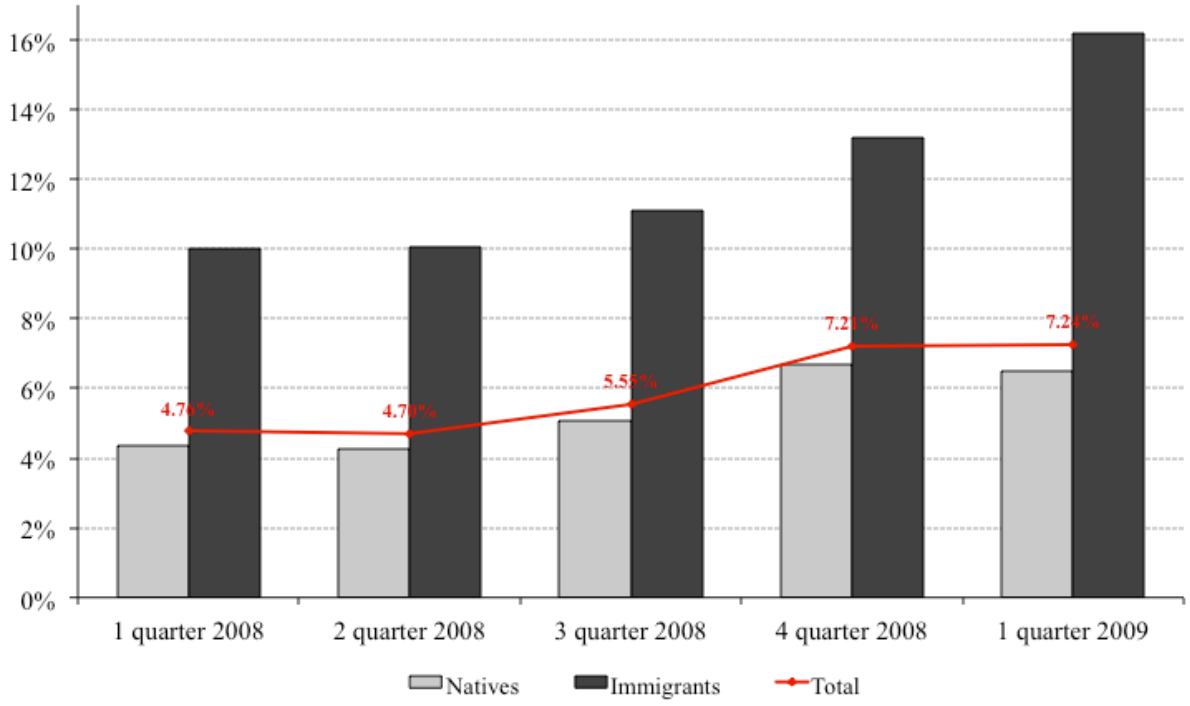

Figure 2. Rates of job loss for natives and immigrants from ENC and non-ENC.