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Selection and network effects—Migration flows into OECD countries 1990–2000

Peder J. Pedersen[a,1], Mariola Pytlikova[b,2], Nina Smith[c,*]

[a]*CIM, IZA, Department of Economics, University of Aarhus, Building 1322, DK-8000 Aarhus C, Denmark*
[b]*CIM, CCP, Department of Economics, Aarhus School of Business, Aarhus University, Prismet, Silkeborgvej 2, DK-8000 Aarhus C, Denmark*
[c]*CIM, IZA, DIW, Department of Economics, Aarhus School of Business, Aarhus University, Prismet, Silkeborgvej 2, DK-8000, Aarhus, Denmark*

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Abstract

This paper presents empirical evidence on immigration flows into the OECD countries during the period 1990–2000. Our results indicate that network effects are strong, but vary between different groups of welfare states and between countries according to the type of immigration policy being applied. Network effects seem to be less important in the Nordic countries which also seem to attract immigrants from the lowest income level source countries. We do not find clear evidence that selection effects measured by migration flows being sensitive to differences in public social expenditures have had a major influence on the observed migration patterns until now. This may partly be explained by restrictive migration policies which may have dampened the potential selection effects.

JEL-code: J61; F22; O15

Keywords: International migration; Selectivity effects; Network effects; Migration policy

*Corresponding author. Tel.: +45 89 48 64 13; fax: +45 89 48 61 97.
E-mail addresses: ppedersen@econ.au.dk (P.J. Pedersen), marp@asb.dk (M. Pytlikova), nis@adm.au.dk (N. Smith).
[1]Tel.: +45 89 42 15 81.
[2]Tel.: +45 89 48 61 79.

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1. Introduction

In the near future, many rich OECD countries expect to face the problem of declining and ageing populations. Demographic projections by the United Nations suggest that during the next five decades Europe and Japan might lose 12% and 17% of their population, respectively, United Nations (2000). This will impose an increasing pressure on the welfare systems as public pension payments will absorb a growing share of total national incomes. Immigration of young people to these ageing OECD countries is one of the possible solutions that have been discussed in relation to this problem. However, the opponents of immigration as a solution to the ageing problem fear negative impacts on labour market, public finances and social conditions. Recent studies on immigrants' economic performance in a number of European countries show that they actually tend to be more welfare dependent than natives. Thus, increasing the immigration flows may not be a solution to the problem of population ageing but might instead impose a higher fiscal burden on the receiving economies, see Storesletten (2003).

During the latest decades, immigration flows into the OECD countries have changed. While in earlier decades, labour migration flows were dominating, refugee immigrants and family union migration from Non-Western or less developed countries are now the main sources of net immigration in many OECD countries, see Chiswick and Hatton (2003). The average skill level for these new migrant flows is often fairly low compared to the skill level in destination countries, see Borjas (1994) and Chiswick (1986, 2000). According to SOPEMI (2003), the employment rate for Non-Western immigrants has so far been much lower than for natives in many European countries. The low employment rates are the main reason for the higher welfare dependency of Non-Western immigrants, see Wadensjö and Orrje (2002).

Why have the immigration flows changed compared to a few decades ago, and why do many developed countries seem to attract groups of immigrants with lower skills? The classical explanation is that relative real wages and employment opportunities are some of the main driving factors of international migration. Other more recent explanations focus on effects of the different welfare state regimes. Generous social services and benefit levels and high tax levels are nowadays characteristics of many OECD countries. According to Borjas (1987, 1999a, b), the generosity of the welfare state may play an important role in migrants' decision when choosing country of destination, the so-called "welfare magnet effect".

On the other hand, a number of non-economic factors are also highly important regarding the migration decision (Zavodny, 1997). Beside classic factors such as "love and wars", these include random events, environment, climate, language and aspects of "cultural distance". Regarding the last factor, it is a standard result that the more "foreign" or distant the new culture is and the larger the language barrier is, the less likely an individual is to migrate. However, changes and improvements in communication, continued globalisation and declining costs of transportation may imply that the effect of "distance" has been reduced during the latest decades. Further, network effects may also counteract "distance". If the concerned ethnic group is already present in the destination country, this may induce further immigration from the ethnic group concerned. Networks may play an important role in immigration because they may reduce costs of acquiring information on policies and institutions in destination country, the network may help finding a job, etc. see Munshi (2003). Thus, an interesting question is: How much do the

"pure" economic factors like relative wages or incomes, employment opportunities, taxes and social expenditure level explain migration behaviour, and how much is explained by other factors like immigration policies, social networks, cultural and linguistic distance, threat to own freedom and safety, random events or love?

Until now, the empirical evidence concerning international migration has been fairly scarce, and most studies have only focused on the migration flows into one country, see for instance, Brücker et al. (2004). In this paper, we add to the empirical evidence by analysing the migration flows into a large number of OECD countries. We estimate a number of regression models on the flow of migrants from 129 countries to 22 OECD countries annually for the period 1990–2000. The large number of destination countries included in the analysis allows us to analyse the migration patterns for groups of OECD countries which are alike with respect to welfare state regimes or migration policy, and in this way we are able to identify patterns which may not be easy to document empirically in the more country-specific studies. As we are not able to observe individual characteristics, we look at "country based selection effects", i.e. we are not able to analyse selection within countries, but our analyses shed some light on the selection between countries. We test whether immigrants from low-income countries, where the educational level is relatively low, tend to go to countries with higher welfare, and whether immigrants from high-income countries tend to go to countries with a lower level of welfare expenditures and a higher variance in the income distribution.

Our results indicate that traditional factors such as cultural and linguistic distance are important. Network effects are also strong, but vary between source countries. Specifically we find that networks are most important for immigrants coming from poorest source countries. We do not find clear evidence that selection effects have had major influence on the observed migration patterns until now. This may partly be explained by restrictive migration policies in many OECD countries which may have dampened the potential selection effects.

The rest of the paper is organised as follows: Section 2 shortly describes the database collected for this study, and Section 3 describes immigration development and trends into the OECD countries. Section 4 presents the basic model on international migration we are estimating. Results from the econometric analyses are given in Section 5. Finally, Section 6 offers some concluding remarks.

2. Data

It is not an easy task to collect data on international migration flows because a number of problems arise with respect to availability, variations of definitions of immigrants and migrations flows, and difficulties in obtaining comparable data from many countries on variables which may contribute to explain migration flows. In order to have more precise data on immigration, we have contacted the statistical offices in the 26 selected destination OECD countries and asked them for detailed information on immigration (gross) flows and stocks in their respective country during the period 1989–2000.[3] This

[3]The model does not take into account potential out-migration or return migration. Since the stock of immigrants is the net result of in- and outflow mechanisms, and since out-migration is non-negligible for many immigrant groups, this topic is also very important when explaining the composition of immigrant groups in different countries. However, in this study we only focus on gross immigration.

information is supplemented by published OECD statistics from "Trends in International Migration" publications.[4] Besides flow and stock information, we have collected a number of other time-series variables, which are used in the estimation of migration behaviour. These variables are collected from different sources, e.g. OECD, World Bank, UN, ILO and IMF publications. Appendix contains a list of all the variables used in the estimated models, including definitions and data sources for each variable.

In total, the data set contains information on immigration flows and immigration stocks in 26 OECD countries from 129 countries of origin, see Pedersen et al. (2004).[5] Although our data set presents substantial progress over what has been used in earlier research, there are still some problems related. First of all, the data set is unbalanced, i.e. there are missing observations in the panel. For the majority of destination countries, we have information on migration flows and the stocks of immigrants for most of the years, but with different numbers of observation for each destination country. In Appendix, Table A1, means and standard deviations for all flows, stock and other variables and information for each destination country on the number of years for which we have information are shown. There are missing observations in explanatory variables for some countries of origin as well.

Another important problem is that, different countries use different definitions of an "immigrant" and different sources for their migration statistics.[6] In definitions of immigration flows some countries like Australia, Canada, the Netherlands, New Zealand, Poland, the Slovak Republic and the United States define an "immigrant" by country of origin or country of birth, while some countries like Austria, the Czech Republic, Denmark, Finland, Greece, Iceland, Italy, Norway and Sweden define an immigrant by citizenship and finally some countries like Belgium, France, Hungary, Germany, Japan, Luxembourg, Portugal, Spain, Switzerland and the United Kingdom define an immigrant by self-reported nationality. For immigration stock, the definition of immigrant population differs among countries as well.[7] The differences in definition of immigrant population in the case of immigration stock are important. The first one, by country of origin/birth, takes into account the foreign-born population, i.e. the first generation of immigrants, and thus it contains also immigrants

[4]Unfortunately, we are not able to distinguish whether the immigrants are job- or study-related people, tied movers in relation to family re-unions or refugees and asylum seekers.

[5]We had to exclude Ireland because we do not have country specific information on the immigrant stock. In the estimations, we exclude four Eastern European countries from the group of destination countries because these countries have a very different migration history during the period 1990–2000 because of the breakdown of the communist regimes. Thus, we end up estimating models of migration flows for 22 OECD countries. Appendix Table A.1 gives summary statistics for the 22 OECD countries used in this study.

[6]For example, Belgium, Germany, Luxembourg, the Netherlands, Switzerland and the Scandinavian countries use data based on population registers, the majority of Southern and Eastern European countries use data based on issuing residence permits, Australia, Canada, New Zealand and Poland use data from censuses, some countries like Greece, the United Kingdom and the United States use labour force surveys and others have information based on social security systems or other sources.

[7]The majority of countries, especially Australia, Austria, Canada, Denmark, Iceland, the Netherlands, New Zealand, Poland, the Slovak Republic, Sweden, the United Kingdom and the United States define immigrant population by country of origin or country of birth, some countries like the Czech Republic, Finland, Greece, Italy and Norway define immigrant population by citizenship and finally some countries like Belgium, France, Hungary, Germany, Japan, Luxembourg, Portugal, Spain and Switzerland define immigrant population by self-reported nationality.

that have obtained citizenship. The second and third definitions, by citizenship and nationality, include second and higher generation of foreigners, but do not cover naturalised citizens. Thus, the nature of legislation on citizenship and naturalisation plays a role.

3. Description of migration trends

During the 1980s and the beginning of the 1990s, the immigration inflows increased in almost all the rich OECD countries. According to Fig. 1, which shows the development of the total volume of gross immigration flows into 17 OECD countries (see note in Fig. 1) during the period 1990–2000, the immigration flows peaked in 1991 reaching more than 3.7 million this year. The breakdown of the Iron Curtain in 1989 and the Yugoslavian civil war gave rise to a large increase of migration within Europe in the early 1990s, but in the most recent years (legal) migration flows seem to have stabilised, mainly due to immigration restrictions, see Hatton and Williamson (2004) and SOPEMI (2001). According to Fig. 1, the distribution of OECD immigration by source country continents and by source country income levels has also been relatively stable since the early 1990s. We observe a slight increase in migration flows at the end of the decade, especially from South America, Africa and Asia. It should be noted that Fig. 1 describes gross migration flows, not net flows. If there are large differences with respect to out-migration behaviour for the different immigrant groups, the net migration flows may be very different from the gross flows. Non-Western immigrants tend to have a much lower return and out-migration rates than Western immigrants in many countries, and thus the stocks of OECD immigrants from different regions may still be changing despite the apparently quite stable development in Fig. 1.

However, aggregate data tell us relatively little about the migration flows and immigration practices of each country. Fig. 2 digs one step deeper by showing the stock of foreign population as a percentage of total population in 26 OECD countries in the two years 1990 and 2000. The stocks of immigrants in OECD countries vary considerably, in 2000 ranging from 37% in Luxembourg to less than 1% in the Slovak Republic. It is also apparent from Fig. 2 that migration flows have changed in the sense that some of the former major immigration countries, for instance Australia and Canada, have experienced a much smaller growth in their immigrant population during the latest decade compared to relatively new immigration countries like Austria, Denmark, Norway and some of the Southern European countries. These countries were during the 1990s among the ''top 20'' countries with respect to destination of asylum seekers, see Hatton and Williamson (2004).

Fig. 3 shows immigration stocks originating in countries which according to World Bank classifications are categorised as poor or ''medium poor'' (See Appendix for a precise definition of the categories.) As we can see, there are large variations in the composition of immigrant stocks and flows in the OECD countries. In some countries, like Luxembourg and Belgium, the large stock of immigrants mainly stems from other OECD countries (working in EU institutions and the financial sector) while in other countries, to some extent in new immigration countries like Italy, Spain, Austria and Finland, the proportion of immigrants who stem from poor source countries is large. Fig. 3 indicates that the composition of immigrants has changed in many countries during the single decade. In almost all destination countries, the stock of immigrants coming from poor-low-income

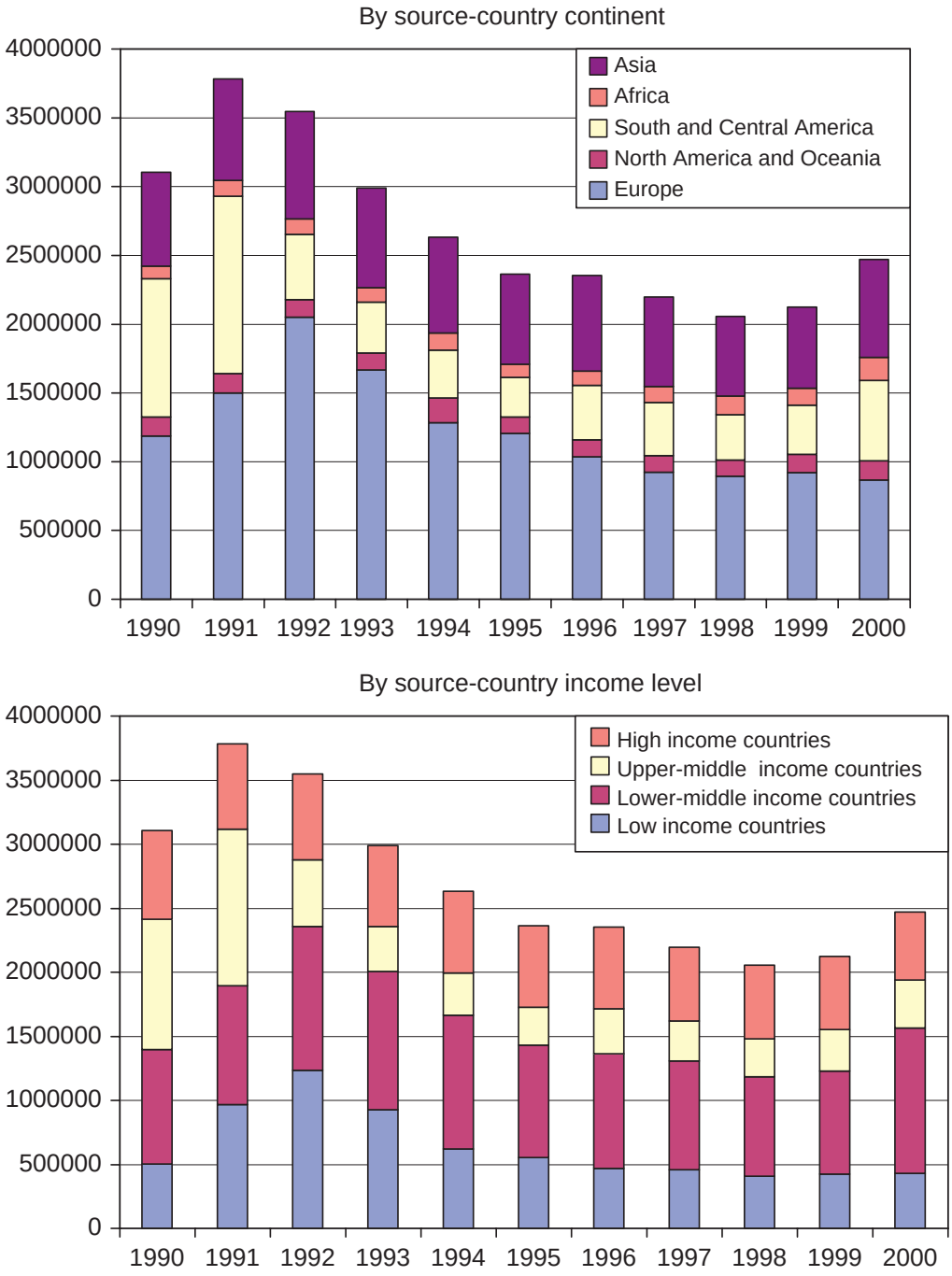

Fig. 1. Total volume of gross immigration inflows to 17 OECD countries, 1990–2000. Note: The included destination countries are: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Hungary, Japan, Luxembourg, New Zealand, Norway, Poland, Spain, Sweden, Switzerland and the United States. These countries are selected because we have annual data for all years, i.e. no missing observations on flows, for these countries. Following countries have been excluded due to missing observations on flows for some years: Austria, the Czech Republic, Greece, Iceland, Ireland, Italy, Netherlands, Portugal, the Slovak Republic and the United Kingdom. Source: Own calculations.

countries has increased but the largest relative increases are found in countries which have experienced the largest relative growth in the aggregate immigrant stock during the period 1990–2000.[8]

[8]The order of the countries with the highest proportion of immigrants coming from poor countries changed during the 1990–2000 decade. The most significant "jump", when comparing years 1990 and 2000, can be

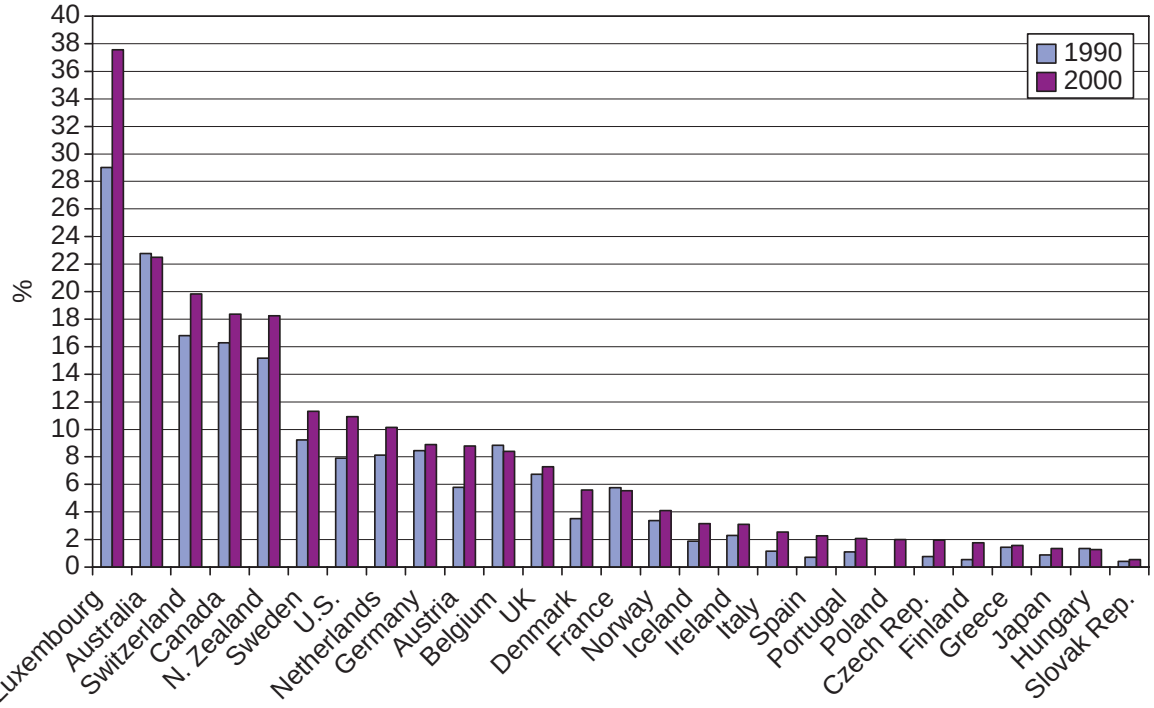

Fig. 2. Stock of foreign population as a percentage of total population in 1990 and 2000 in selected OECD countries. Note: Due to data availability the figure shows information on: 1991 instead of 1990 for Austria, Italy and Spain; 1991 and 2001 instead of 1990 and 2000, respectively, for Canada, Luxembourg and New Zealand; 1998 instead of 2000 for Greece; 1993 instead of 1990 for the Czech Republic; 1994 and 1999 instead of 1990 and 2000, respectively, for Hungary; 1995 instead of 1990 for the Slovak Republic and 1992 instead of 1990 for the United Kingdom. Source: Own calculations.

4. Empirical model

The potential migrants are assumed to have a utility-maximising behaviour and compare alternative potential destination countries and choose the country, which provides the best opportunities, all else being equal. Immigrants' decision to choose a specific destination country depends on many factors, which relate to the characteristics of the individual, the individual's country of origin and all potential countries of destination. Under certain conditions, see Zavodny (1997), the number of individuals migrating to country j, i.e. whose utility is maximised in country j, is given by:

$$m_{ijt} = \beta_1 S_{ijt} + \beta_2 D_{ij} + \beta_3 X_{it} + \beta_4 X_{jt} + u_{ijt}, \tag{1}$$

where M_{ijt} is the number of immigrants moving to country j from country i at time t. S_{ijkt} is a variable that affects an individual's utility of living in country j at time t, given that the individual lived in country i at time $t-1$. For example, an individual may want to move to a country where his friends or family members are, i.e. the variable reflects network effects. Through the "networks" the potential migrants receive information about the immigration country. The immigrants already living in the destination country may reduce the cost of

(*footnote continued*)
observed for Finland (from 15 to 6 position), Austria (from 6 to 3 position), Japan (from 19 to 10 position), Spain (from 17 to 11 position) and Denmark (from 10 to 7 position).

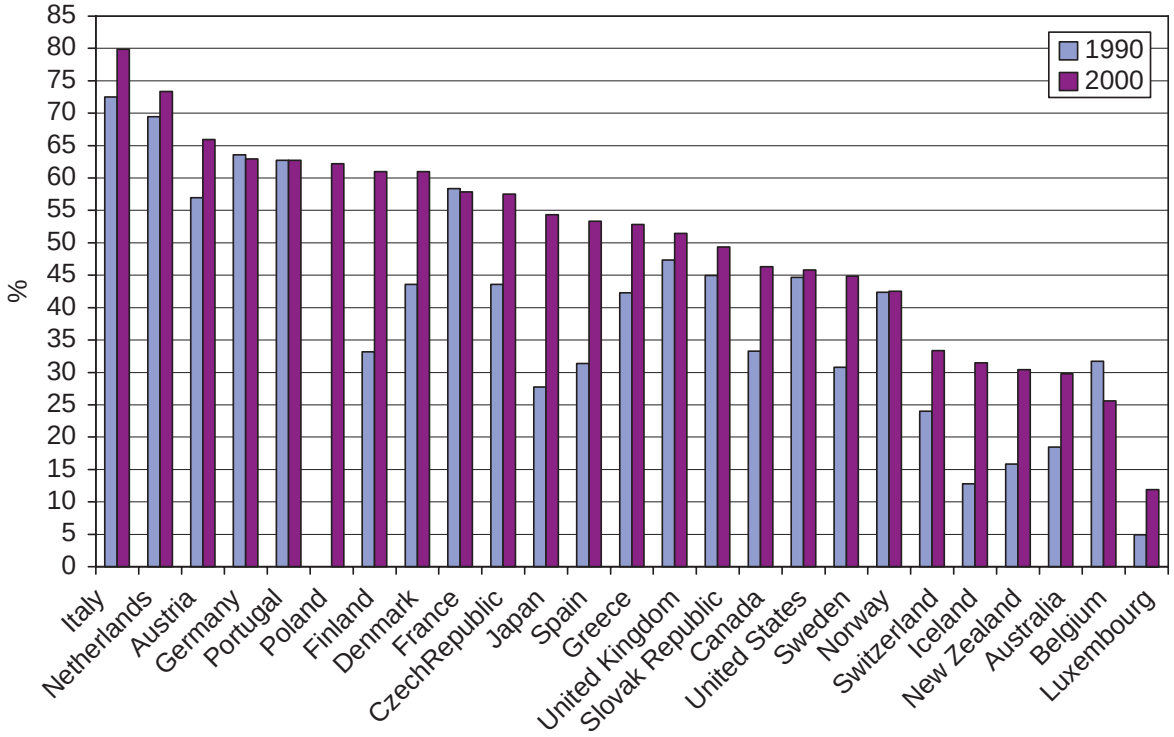

Fig. 3. Proportion of immigration stock in 1990 and 2000 originating from low- and lower-middle-income countries. Note: Definition of low and lower-middle income is given in Appendix. Due to data availability the figure shows information on: 1991 instead of 1990 for Austria, Italy and Spain; 1991 and 2001 instead of 1990 and 2000, respectively, for Canada, Luxembourg and New Zealand; 1998 instead of 2000 for Greece; 1993 instead of 1990 for Czech Republic; 1994 and 1999 instead of 1990 and 2000, respectively, for Hungary; 1995 instead of 1990 for Slovak Republic and 1992 instead of 1990 for the United Kingdom. Source: Own calculations.

acquiring information on how to get a job in the new country, or information on economic and social systems, immigration policy, people and culture, see Munshi (2003). D_{ij} reflects time-independent fixed-out-of-pocket and psychological/social costs of moving from country i to country j. X_{ikt} and X_{jkt} are vectors of push and pull factors that vary across time and affect individual k's choice where i denotes source country and j denotes destination country, ($i = 1, \ldots, 129$, and $j = 1, \ldots, 22$); t is time period ($t = 1, \ldots, 11$). Finally, μ_{ijt} is an error term assumed to be *iid* with zero mean and constant variance.

The model given by (1) contains variables which are difficult to measure in practice. The dependent variable, M_{ijt}, represents an "ex ante" measure of the migration flows, while only the resulting and observed "ex post" flow is observed. The "ex post" flow may be affected by migration policy and illegal immigration is usually not included in observed migration flow statistics. Another variable which is difficult to measure is S_{ijkt} which ideally should measure network effects. Zavodny (1997) uses the lagged stock of immigrants from country i already living in country j as an indicator for these network effects. However, since the stock of immigrants in a given year represents the total number of individuals remaining from the flows of migrants in previous years or decades, one should be careful with the interpretation of this variable. The stock of immigrants at a given time reflects the impact from observed and unobserved factors behind previous immigration flows between country i and j. If these unobserved factors are time constant, a fixed effect estimator may partly correct for the problem. There is a big variation over time

and across countries in migration policies and asylum rules. Further, previous migration flows reflect to some extent the impact from imperfectly correlated cyclical variations across countries and policy changes regarding taxation and benefit levels and eligibility to benefit programs. Overall, these arguments lend support to the lagged stock variable being weakly exogenous. Further, we normalise the lagged stock of immigrants from country i by population in source country i, i.e. we include a relative measure, s_{ijt-1}, in order to avoid that the absolute size of the source countries is driving the estimation results.

When estimating model (1) we also normalise the immigration flows by population size in source country, i.e. we use the emigration rate, m_{ijt}, instead of immigration flow in absolute numbers as the dependent variable. All time-varying explanatory variables are lagged by one year in order to account for information on which the potential immigrants base their decision to move. In some of the models, we have further experimented with the inclusion of destination and/or source country fixed or random effects (c_j, c_i and c_{ij}) in order to capture unobserved time constant factors influencing immigration flows, for instance differences in national immigration policy, see Fertig and Schmidt (2000). Thus, the overall model to be estimated is:

$$m_{ijt} = \beta_1 S_{ijt-1} + \beta_2 D_{ij} + \beta_3 X_{it-1} + \beta_4 X_{jt-1} + c_i + c_j + c_{ij} + u_{ijt} \quad (2)$$

D_{ij} contains variables reflecting costs of moving to a foreign country. First, we include a variable describing cultural similarity denoted *Neighbouring Country*. It is a dummy variable assuming the value of 1 if the two countries are neighbours, 0 otherwise. The variable *Colony* is a dummy variable assuming the value of 1 for countries ever in colonial relationship, 0 otherwise. This variable is included because past colonial ties may have some influence on cultural distance: Provide better information and knowledge of potential destination country and thus lower migration costs, which could encourage migration flows between these countries. Further, we include a variable *Linguistic Distance*, which is a dummy variable equal to 1 for common language in two countries, 0 otherwise. In order to control for the direct costs (transportation costs) of migration, we use *Log Distance in Kilometres* between the capital areas in the sending and receiving countries. We also include *Log Trade Volume*, which is defined as the (log) total trade values (both imports and exports) for all country pairs.[9] We expect that the business ties represented by the volume of trade could have (positive) effects on international migration. Moreover, this variable is often considered as an indicator of globalisation.

The explanatory variables included in X_{it-1} and X_{jt-1} cover a number of push and pull factors such as the relative size of the populations in source and destination countries ($population_j/population_i$), economic development measured by (log) *GDP per capita* in destination and source countries (which are supposed to catch relative income opportunities in the two countries), employment opportunities in the sending and receiving countries, measured by unemployment rates, and demographic and political factors. The hypothesis is that a higher (lower) level of economic development in the destination country will lead to higher (lower) immigration rates because potential immigrants expect to experience better (worse) income opportunities.[10] The effect of GDP

[9]Import and export values from Direction of Trade Statistics are expressed in nominal US dollar prices. Values in constant prices would be more suitable for our analysis, but we decided to use the nominal ones as it is quite a complex task to get suitable export and import deflators.

[10]The causality may also run the other way around, i.e. more immigration implies increased growth. Mayda (2004) analyses whether this type of reverse causality is important and rejects that it is of any significant size.

per capita growth in the source country may be non-linear. Earlier studies have found an inverted "U" relationship between source country GDP and emigration, see Hatton and Williamson (2002). At very low levels of GDP, emigration is low because people are too poor to pay the migration costs. At higher income levels, migration increases, and when GDP levels increase further, migration may again decrease because the economic incentives to migrate to other countries decline. Therefore, in most of the specifications, we allow for non-linear effects of GDP in source countries by using indicators for low, lower middle, upper-middle and high-income source countries according to World Bank classifications, see Appendix.

The GDP variable is supplemented by a variable reflecting the educational level of the source country, measured by the adult *Illiteracy Rate*. According to Harris and Todaro (1970), it is expected that a low (high) unemployment rate in the destination (source) country will cause higher immigration flows. We also include a variable capturing population pressure, e.g. population in the source country i divided by population in destination country j. The higher the relative population in the source country is, the larger migration pressure is expected. A more appropriate measure, that we are not able to include because of data limitations, would be the proportion of the population in the younger adult age groups because a large proportion of migration flows has been driven by these age groups, see Fertig and Schmidt (2000).

The political situation in the source country may also influence migration. Therefore, we include the variable *Freedom House Index* which is intended to measure the degree of freedom, political rights and civil liberties in the countries. The variable is in the form of a discontinuous variable assuming values from one to seven, with one representing the highest degree of freedom and seven the lowest. Violated political rights and civil liberties are expected to increase migration flows.[11]

We include some variables which are assumed to capture potential pull factors relating to the "welfare magnet" theories, as presented by Borjas (1987, 1999b). We have experimented with different variables: The public social expenditure and the tax revenue, both expressed as a percentage of GDP in the potential destination countries, and measures of the income distribution (Gini coefficients). The tax revenue and social expenditure variables are highly correlated, and we have had difficulties in getting comparable and reliable information for the majority of countries on the Gini coefficient. Thus, in the estimations presented in Section 5, only the social expenditure variable is included. According to the welfare magnet theory, we expect higher migration flows from low-income countries into countries with higher levels of public social expenditure.

5. Results

5.1. Choice of preferred econometric specification

In Table 1 we analyse the robustness of the results with respect to the choice of different econometric specifications. The fact that the migration stock in (2) basically consists of the

[11]The variables representing illiteracy rate and the Freedom House Index are only included as source country variables and not as destination country variables since these variables do not show much variation between destination countries. We are not able to get reliable information on public social expenditure for a large number of the source countries, and therefore this variable does not enter as a source country variable.

Table 1
Estimation of migration flows from 129 source countries (i) to 22 (OECD) destination countries (j), 1990–2000

Independent variables	Dependent variable: m_{ijt} = gross flows per 1000 inhabitants of the source							
	WLS (1)	WLS (2)	FE (c_j) (3)	FE (c_j) (4)	GEE (c_j) (5)	GEE (c_j) (6)	GEE (c_{ij}) (7)	GEE (c_{ij}) (8)
S_{ijt-1}								
Stock of Foreigners/Pop.(j)	–	0.040 [0.005]***	–	0.038 [0.001]***	–	0.038 [0.008]***	–	0.036 [0.010]***
D_{ijt-1}								
Neighbouring Country (0/1)	0.200 [0.107]*	0.157 [0.090]*	0.095 [0.030]***	0.054 [0.023]**	0.094 [0.084]	0.054 [0.071]	0.115 [0.119]	0.087 [0.077]
Linguistic Distance (0/1)	0.066 [0.063]	−0.010 [0.050]	0.257 [0.032]***	0.079 [0.024]***	0.259 [0.119]**	0.078 [0.079]	0.505 [0.248]**	0.177 [0.107]*
Colony (0/1)	0.072 [0.059]	−0.084 [0.063]	0.138 [0.044]***	0.016 [0.033]	0.129 [0.194]	0.012 [0.211]	−0.205 [0.210]	−0.177 [0.170]
Log Distance in Kilometres	−0.071 [0.009]***	−0.050 [0.007]***	−0.085 [0.009]***	−0.035 [0.007]***	−0.082 [0.033]**	−0.035 [0.020]*	−0.066 [0.020]***	−0.043 [0.012]***
Log Trade Volume	0.033 [0.004]***	0.014 [0.005]***	−0.005 [0.006]	−0.003 [0.004]	−0.001 [0.013]	−0.002 [0.010]	0.015 [0.008]**	0.002 [0.008]
[Pop.(j)/Pop.(i)]/1000	0.007 [0.001]***	0.004 [0.001]***	0.006 [0.000]***	0.005 [0.000]***	0.006 [0.001]***	0.005 [0.000]***	0.006 [0.001]***	0.005 [0.001]***
X_{jt-1}								
Log GDP per cap PPP, j	0.043 [0.038]	−0.049 [0.025]*	−0.050 [0.143]	−0.071 [0.108]	−0.003 [0.120]	−0.073 [0.136]	0.014 [0.054]	−0.089 [0.051]*
Unemployment Rate, j	−0.001 [0.003]	0.000 [0.003]	−0.008 [0.005]	−0.007 [0.004]**	−0.004 [0.005]	−0.006 [0.004]	−0.002 [0.003]	−0.005 [0.002]**
Soc Expendit. in j/GDP, j	−0.001 [0.002]	0.003 [0.001]**	0.0002 [0.005]	−0.0005 [0.004]	−0.003 [0.003]	0.000 [0.002]	−0.005 [0.003]	0.002 [0.003]
X_{it-1}								
Log GDP per cap PPP, i	−0.185 [0.024]***	−0.112 [0.020]***	−0.061 [0.018]***	−0.025 [0.013]*	−0.069 [0.071]	−0.028 [0.039]	−0.086 [0.027]***	−0.040 [0.023]*
Unemployment Rate, i	0.003 [0.003]	0.003 [0.002]	−0.001 [0.001]	0.0003 [0.001]	−0.001 [0.002]	0.0003 [0.002]	0.001 [0.002]	0.001 [0.001]
Illiteracy Rate, i	−0.004 [0.001]***	−0.003 [0.001]***	−0.002 [0.001]**	−0.001 [0.001]**	−0.002 [0.001]	−0.001 [0.001]	−0.003 [0.001]**	−0.002 [0.001]***
Freedom House Index, i	−0.022 [0.008]***	−0.005 [0.007]	−0.006 [0.006]	0.004 [0.005]	−0.007 [0.012]	0.003 [0.008]	0.014 [0.013]	0.012 [0.008]
Constant term included	yes	yes	yes	yes	yes	yes	yes	yes
Fixed effects	no	no	Destination	Destination	no	no	no	no
Random effects	no	no	no	no	Destination	Destination	Country pair	Country pair
No of observations	6722	6722	6722	6722	6722	6722	6722	6722
Adjusted R^2	0.25	0.50	0.38	0.65				

Notes: 10%, 5% and 1% levels of confidence are indicated by (*), (**) and (***), respectively. Standard errors are in parentheses.

previous migration flows and having migration stock on the right hand side may imply that the least squared estimators are subject to simultaneous equation bias, see Alvarez-Plata et al. (2003). In the presence of unobserved country-specific effects in the error term, the lagged migration stock variable will be correlated with the error term. This leads to biased and inconsistent results, especially in short panels.

One solution is to employ instrumental variable techniques such as Arellano and Bond's (1991) difference GMM estimator or Arellano and Bover's (1995) system GMM estimator, see Blundell and Bond (1998). The difference GMM estimator is based on using lagged levels as instruments in differenced equations. The method has been widely criticised for generally weak performance of used instruments, see Blundell and Bond (1998). The difference GMM estimator has been extended to system GMM estimators but since these estimators have also been criticised for a number of weaknesses we prefer not to show the results from these estimators.[12] One important problem in this study is that the GMM estimator is not well suited to cope with unbalanced panels (Arellano, 2003).

Therefore, we end up using an alternative panel data approach, which is more flexible when having unbalanced data. One obvious choice is to use a population averaged generalised estimating equations (GEE) estimator that allows us to add the time-invariant variables and to specify the within-group correlation structure for the panels (it accounts for correlated observations in each group, e.g. flows into the same destination country). GEE with the assumed Gaussian distribution and exchangeable correlation structure is equivalent to random effects maximum likelihood estimator, but allowing the standard errors to be adjusted for clustering.[13] In the estimations presented in Tables 2–4, we include the most general form of the GEE estimator where we control for both destination and source country time constant effect (c_{ij}). The results from these estimations are generally less significant than the results where only destination specific effects are included. Thus, the results presented below are conservative in the sense that alternative specifications tend to give more significant results.

Further, in Table 1, we show the results from estimations with and without the lagged stock of immigrants from country i in country j for all estimators and for the different models which are analysed in order to compare the robustness of the results with respect to the lagged stock variable. Since we miss information for a large number of observations on the stock of immigrants from source country i living in destination country j, we restrict all estimations to include only observations where we have information on all variables included in (2) in order to avoid that changes in the estimated coefficients reflect changes in number of included variables, and not changes in the included explanatory variables.

Columns 1–2 show the estimates using pooled weighted least square (WLS) regressions where the weighting accounts for the fact that we use an unbalanced panel, i.e. for some source and destination countries we do not have full information on either the dependent or some of the independent variables. The WLS estimates indicate that the existing stock of immigrants of a given ethnic origin is an important factor explaining future migration flows. The explanatory power (R^2) of the model increases from 25% to 50% and the

[12]See for instance, Alvarez-Plata et al. (2003). We have estimated different versions of the GMM models, including the extended system GMM model. The results were in general less significant but sign and relative size of coefficients did not deviate from the results presented in the preferred GEE estimations in Table 1. The estimations not shown are available upon request from the authors.

[13]We use the XTGEE procedure in STATA and we use the function "robust" that denotes using the Huber/White sandwich estimator.

Table 2
Interactions with GDP-level in source country

Independent variables	Dependent variable: m_{ijt} = gross flows per 1000 inhabitants of the source			
	WLS (1)	GEE (c_{ij}) (2)	WLS (3)	GEE (c_{ij}) (4)
S_{ijt-1}				
Stock*Lowest Income level, i	–	–	0.063 [0.008]***	0.063 [0.016]***
Stock*Lower-middle Income level, i	–	–	0.012 [0.006]**	0.002 [0.000]***
Stock*Upper-middle Income level, i	–	–	0.050 [0.009]***	0.030 [0.014]**
Stock*High Income level, i	–	–	0.021 [0.005]***	0.013 [0.007]*
D_{ijt-1} variables	m_{ijt}	m_{ijt}	m_{ijt}	m_{ijt}
[Pop.(j)/Pop.(i)]/1000	m_{ijt}	m_{ijt}	m_{ijt}	m_{ijt}
X_{jt-1}				
Log GDP per cap PPP, j	yes	yes	yes	yes
Unemployment Rate, j	yes	yes	yes	yes
Soc Exp,j*Lowest Income level, i	0.015 [0.005]***	0.008 [0.023]	0.002 [0.002]	0.006 [0.022]
Soc Exp,j*Lower-middle Inc. level, i	−0.009 [0.004]**	−0.018 [0.012]	−0.008 [0.004]**	−0.017 [0.011]
Soc Exp,j*Upper-middle Inc. level, i	0.005 [0.005]	0.001 [0.017]	0.011 [0.004]***	0.008 [0.017]
Soc Exp,j*High Inc. level, I	0.005 [0.002]**	0.005 [0.011]	0.006 [0.002]***	0.007 [0.011]
X_{it-1}				
Lowest Income level, i (0/1)	−0.049 [0.106]	−0.154 [0.643]	0.184 [0.069]***	−0.120 [0.618]
Lower-middle Income level, i (0/1)	0.614 [0.105]***	0.792 [0.391]**	0.605 [0.105]***	0.840 [0.377]**
Upper-middle Income level, i (0/1)	0.128 [0.129]	0.120 [0.501]	−0.061 [0.090]	−0.013 [0.490]
Highest Income level, i (excluded)	–	–	–	–
Unemployment Rate, i	yes	yes	yes	yes
Illiteracy Rate, i	yes	yes	yes	yes
Freedom House Index, i	yes	yes	yes	yes
Constant term included	yes	yes	yes	yes
Random effects	no	Country pair	no	Country pair
No of observations	6845	6845	6845	6845
Adjusted R^2	0.05		0.26	

Selected coefficients from estimations of migration flows from 129 source countries (i) to 22 (OECD) destination countries (j), 1990–2000.
Notes: 10%, 5% and 1% levels of confidence are indicated by (*), (**) and (***), respectively. Standard errors are in parentheses.

Table 3
Interacting by immigration policy regime in destination country (i) and income level in source country (j)

Independent variables	Dependent variable: m_{ijt} = gross flows per 1000 inhabitants of the source			
	Main effects (EU15 + NOR, CH, JP, US)	Interaction with indicator for selective migration policy (CAN, AU, NZ)	Main effects (EU15 + NOR,CH, JP, US)	Interaction with indicator for selective migration policy (CAN, AU, NZ)
S_{ijt-1}				
Stock*Lowest Income level, i	–	–	0.064 [0.017]***	0.027 [2.089]
Stock*Lower-middle Income level, i	–	–	−0.000 [0.000]	0.058 [0.006]***
Stock*Upper-middle Income level, i	–	–	0.027 [0.015]*	−0.015 [0.101]
Stock*High Income level, i	–	–	0.003 [0.009]	0.036 [0.021]*
D_{ijt-1} variables	m_{ijt}	m_{ijt}	yes	m_{ijt}
[Pop.(j)/Pop.(i)]/1000	m_{ijt}	m_{ijt}	yes	m_{ijt}
X_{jt-1}				
Log GDP per cap PPP, j	0.274 [0.205]	0.219 [0.535]	0.280 [0.207]	−0.527 [0.451]
Unemployment rate, j	−0.012 [0.009]	0.104 [0.063]*	−0.011 [0.010]	0.035 [0.125]
Soc Exp in j/GDP, j	m_{ijt}	m_{ijt}	yes	m_{ijt}
X_{it-1}				
Lowest Income level, i (0/1)	−0.136 [0.314]	−0.936 [1.789]	−0.214 [0.673]	1.145 [5.398]
Lower-middle income level, i (0/1)	0.706 [0.253]***	−0.535 [2.506]	0.706 [0.408]*	−1.866 [2.507]
Upper-middle income level, i (0/1)	0.125 [0.292]	−0.107 [0.783]	−0.053 [0.534]	0.458 [3.374]
Highest income level, i (excluded)	–	–	–	–
Unemployment rate, i	0.002 [0.002]	−0.002 [0.015]	0.000 [0.006]	−0.002 [0.033]
Illiteracy rate, i	0.004 [0.007]	−0.032 [0.017]*	0.006 [0.004]	−0.010 [0.015]
Freedom house index, i	−0.012 [0.019]	0.250 [0.136]*	−0.018 [0.026]	0.050 [0.129]
Constant term included	yes		yes	
Random effects	Country pair		Country pair	
No of observations	6845		6845	

Selected coefficients from GEE (c_{ij}) estimations of migration flows to OECD destination countries, 1990–2000.
Notes: 10%, 5% and 1% levels of confidence are indicated by (*), (**) and (***), respectively. Standard errors are in parentheses.

numerical size and significance of the coefficients is smaller when including the stock variable. The same tendency is observed in most of the different regressions results shown in Table 1.

In Columns 3–4, destination country fixed effects estimations of (2) are presented. When comparing the pooled WLS results with the panel models treating destination country in Columns 3–4 as fixed effects, the overall impression is that the results regarding sign and statistical significance are quite robust across the different specifications. As expected, the absolute sizes of the coefficients are generally larger when applying WLS on the pooled

Table 4
Interacting by welfare state regime in destination country (*i*) and income level in source country (*j*)

Independent variables	Dependent variable: m_{ijt} = gross flows per 1000 inhabitants					
	Main Effects: Continental + Southern Europe (AT, BE, FR, DE, NL, CH, GR, IT, PT, ES)	Interaction: Liberal Indicator (NZ, UK, US)	Interaction: Soc-Dem. Indicator (DK, NO, SE, FI, IS)	Main Effects: Continental + Southern Europe (AT, BE, FR, DE, NL, CH, GR, IT, PT, ES)	Interaction: Liberal Indicator (NZ, UK, US)	Interaction: Soc-Dem. Indicator (DK, NO, SE, FI, IS)
S_{ijt-1}						
Stock*Lowest Income level, *I*	–	–	–	0.072 [0.010]***	−0.089 [0.035]**	−0.042 [0.007]***
Stock*Lower-middle Income level, *I*	–	–	–	−0.001 [0.001]**	0.024 [0.008]***	0.027 [0.004]***
Stock*Upper-middle Income level, *i*	–	–	–	0.065 [0.011]***	−0.060 [0.016]***	−0.034 [0.016]**
Stock*High Income level, *i*	–	–	–	0.006 [0.037]	−0.003 [0.036]	0.051 [0.046]
D_{ijt-1} variables	m_{ijt}	m_{ijt}	yes	m_{ijt}	yes	yes
[Pop.(j)/Pop.(i)]/1000	m_{ijt}	m_{ijt}	yes	m_{ijt}	yes	yes
X_{jt-1}						
Log GDP per cap PPP, *j*	m_{ijt}	m_{ijt}	yes	m_{ijt}	yes	yes
Unemployment Rate, *j*	m_{ijt}	m_{ijt}	yes	m_{ijt}	yes	yes
Soc Exp, j*Lowest Income level, *i*	0.048 [0.041]	−0.071 [0.055]	−0.043 [0.040]	0.025 [0.032]	−0.035 [0.045]	−0.021 [0.031]
Soc Exp, j*Lower-middle Inc. level, *i*	0.046 [0.047]	−0.163 [0.066]**	−0.042 [0.045]	0.051 [0.049]	−0.127 [0.068]*	−0.048 [0.047]
Soc Exp, j*Upper-middle Inc. level, *i*	0.071 [0.064]	−0.150 [0.081]*	−0.065 [0.062]	0.061 [0.060]	−0.125 [0.082]	−0.056 [0.058]
Soc Exp, j*High Income level, *i*	0.018 [0.019]	−0.044 [0.034]	−0.009 [0.018]	0.018 [0.021]	−0.032 [0.033]	−0.013 [0.020]
X_{it-1}						
Lowest Income level, *i* (0/1)	−1.288 [1.256]	1.351 [1.424]	1.340 [1.257]	−0.907 [1.070]	0.858 [1.206]	0.883 [1.070]
Lower-middle Income level, *i* (0/1)	−0.658 [0.872]	2.929 [1.257]**	0.712 [0.875]	−0.791 [0.872]	2.141 [1.201]*	0.769 [0.874]
Upper-middle Income level, *i* (0/1)	−1.474 [1.448]	2.772 [1.722]	1.500 [1.448]	−1.293 [1.308]	2.424 [1.691]	1.238 [1.309]
Highest Income level, *i* (excluded)	–	–	–	–	–	–
Unemployment Rate, *i*	m_{ijt}	m_{ijt}	yes	m_{ijt}	yes	yes
Illiteracy Rate, *i*	0.012 [0.015]	−0.020 [0.017]	−0.012 [0.015]	0.015 [0.016]	−0.020 [0.017]	−0.015 [0.015]
Freedom House Index, *i*	0.003 [0.022]	0.018 [0.039]	−0.003 [0.022]	−0.010 [0.024]	0.043 [0.039]	0.009 [0.024]
Constant term included		yes			yes	
Random effects		Country pair			Country pair	
No of observations		6558			6558	

Selected coefficients from GEE (c_{ij}) estimations of migration flows to OECD destination countries, 1990–2000.
Notes: 10%, 5% and 1% levels of confidence are indicated by (*), (**) and (***), respectively. Standard errors are in parentheses.

samples of countries while the panel data estimators which controls for destination country-specific fixed effects are generally smaller in numerical magnitude.

Finally, in Columns 5–8 we show the results from four GEE random effects estimations of the two models, with and without the lagged stock variable and with either destination country effects (c_j) or destination–source country effects (c_{ij}) included.[14] When including destination and source country time constant effects, any problem related to the lagged stock variable is reduced, since the c_{ij} term captures unobserved time constant factors which also affected past migration patterns. Therefore, we prefer to show the results from GEE (c_{ij}) estimations where we also include the lagged stock variable since this is a key variable when the ambition is to analyse network effects based on macro data. However, we also show results from simple WLS estimations since the GEE (c_{ij}) estimator may be criticised for controlling for too much in the sense that also observed variables (for instance, public social expenditures) which do not vary much over time within a given country tend to be "eaten" by the country effect.

5.2. Aggregate results

Table 1 indicates that the estimated coefficients of key variables like the lagged stock of immigrants, and GDP per capita in source countries are fairly robust across specifications, except for the differences which exist between pooled WLS versus panel estimators and difference estimators, which is partly due to unobserved time constant factors. The estimations in Table 1, Columns 2, 4, 6 and 8 show highly significant (and stable) effects on gross migration flows from the lagged stock variable. As discussed above, the coefficient may reflect network effects but also unobserved factors which affected former immigration as well as present immigration. To the extent that these unobserved effects are captured by the GEE random effects estimator, and since we control for other country-specific factors, our result may be an indicator of the existence of network effects. Similar results are found in Zavodny (1997) and Hatton and Williamson (2002).

In the regressions estimated using WLS and fixed effects techniques the dummy variable for source and destination countries being neighbours is found to be positively significant, while it is insignificant in the GEE estimations. The dummy variable capturing linguistic distance is mostly found to have the expected positive impact on migration flows while no impact is found from a dummy for the source country having in the past been a colony to the destination country. Finally, in this group of variables, the distance between countries measured in kilometres is significant in all cases while the pair wise trade volume between source and destination countries are with expected signs when significant. Increasing distance and smaller trade volume imply lower migration flows and vice versa.

The simple pair wise population ratio between destination- and source country populations has a significantly positive coefficient in all specifications in Table 1, implying that immigrants tend to flow to larger countries, cet. par.

[14]If the unobserved term c_j is correlated with the explanatory variables in relation (2), the fixed effects estimator should be preferred to the random effects estimator. A Hausman test does not reject the assumption of zero correlation between explanatory variables and destination country-specific effects. However, the Hausman test rejects the assumption of zero correlation in regressions accounting for country pair specific effects. But as we do not want to "loose" interesting results regarding cultural and linguistic distance variables, we prefer to show the results from the more robust GEE specification of the random effects model.

The next block of variables in Table 1 contains the pull factors in destination countries. GDP per capita in destination country has a (surprisingly) negative effect in two of the estimations where we control for the lagged stock of immigrants, else the effect of destination GDP is insignificant. Higher unemployment in destination countries has a significantly dampening impact on migration in only two cases. Direct welfare state attractors among the pull factors are measured by the public social expenditures as a percentage of GDP. In the WLS estimation, Column 2, the effect is found to be significantly positive, but the effect is insignificant in all models where we control for other country-specific time constant factors. Zavodny (1997) also found that controlling for country-specific factors and network effects resulted in welfare state variables becoming insignificant regarding immigration to the USA.

Finally, the last block of variables in Table 1 represents push factors in source country. GDP per capita has a negative and in most cases significant effects, while unemployment in source country tends to have no significant impact on emigration. Countries with a high illiteracy rate tend to have lower emigration flows, given that we already control for GDP per capita in source country. The results concerning the effects of low income are discussed in more details below. The coefficient of the Freedom House Index is insignificant in all, except one of the regressions.

5.3. *Income level in source country*

In Table 2, Columns 1–2, we show results from WLS and GEE (c_{ij}) estimations where the income level in source country is represented by four indicators (highest level is excluded) instead of a continuous source country GDP variable in order to allow for non-linear effects of GDP in source countries.[15] Further, the variable public social expenditure level is interacted with income level in source country. In Columns 3–4, we add interaction effects between source country income level and the stock of immigrants from source country i living in destination country j.

The results in Columns 1–2 indicate that the effect of GDP in source country is non-linear. We find the expected inverted U-curve, migration flows are higher from source countries with middle-low income levels compared to the countries with the lowest or highest income levels, see Hatton and Williamson (2002). This indicates that migration costs are important and in the poorest source countries they may be a barrier to emigration. When interacting the public social expenditure level in destination country with source country income level we find more significant effects, contrary to Table 1 where this variable was not significant in most cases. If migration flows are selective in the sense that immigrants tend to flow from low-income countries to countries with a high social welfare level, we expect to find that the coefficient is positive and numerically largest for low-income source countries. In Column 1 where the lagged stock variable is not included, we do find a significantly positive and numerically large effect for migration flows from the poorest countries, but in Column 1 we do not see a monotonically decreasing effect when source country income levels increases. Further, the effect disappears in the GEE estimations (Columns 2 and 4) and the pattern changes when including the lagged stock variable in Column 3. Overall, however, the results seem to indicate that public social

[15]The indicator for income levels is available for slightly more observations than the variable representing exact GDP level, see definitions in Appendix. Therefore, the number of observations increases between Tables 1 and 2.

expenditures in destination countries interacted with source country GDP per capita tentatively have a U-shaped impact on migration flows.

In Columns 3–4, we add the lagged stock of immigrants interacted with income level in source country. If the lagged stock variable represents network effects, and if these network effects are more important for immigrants from poor countries and low skilled immigrant groups, we expect the coefficient of the lagged stock variable to be positive and numerically largest for source countries with low-income levels. This hypothesis is partly confirmed, especially in the GEE estimation where we control for source and destination time constant effects. The lagged stock variable coefficient is largest and highly significant for immigrant source countries with the lowest income level and smaller for the other source countries. But the positive effect is not decreasing with income level in source country, since source countries in the lower-middle income level group have the lowest stock coefficient.

5.4. *Migration policy in destination countries*

One important potential criticism of the results above is that the observed migration flows may be highly influenced by differences in migration policy among countries and over time. Thus, the observed patterns may not reflect the underlying "true migration pressure" which OECD countries face from the relatively poor countries. Hatton and Williamson (2004) document, that the EU15 countries have been the main destination region for the large refugee flows from mainly poor countries which took place during the 1990s. We are not able to control directly for "migration policy" which may act through a number of parameters. Instead, we select two groups of destination countries. The first group consists of Western European countries (EU15, Norway, and Switzerland), Japan and USA. The other group consists of Canada, Australia and New Zealand. The three countries in the second group are to a larger extent than the rest of OECD countries characterised by selective immigration policies where immigrants are supposed from the beginning to provide for themselves either by work or by being provided for by their family. The impact from these policies shows up very clearly in the ratios between immigrant and native unemployment rates, cf. OECD (2001), which are close to 1 for the countries with selective migration policies. For the Western European countries, on the other hand, the ratios are high which may reflect that immigration policies are characterised by entry of tied movers and refugees from less developed countries who are difficult to integrate in labour markets. A comprehensive discussion of these differences can be found in Boeri et al. (2002).

If the different migration policy regimes affect the observed migration flow patterns, we expect to find differences regarding the sign to the welfare state proxy variable and differences regarding the importance of destination country unemployment rates and the illiteracy rates in source countries between the two groups of destination countries. The prior expectation is that the selective migration policy countries attract immigrants from source countries with more educational skills as approximated by the illiteracy rate and income levels and further attract immigrants when unemployment is relatively low.

In Table 3, we show the results from estimating a model parallel to Columns 3–4 in Table 2, but now also interacting with an indicator variable for being a selective migration policy country (Canada, Australia and New Zealand), i.e. the estimated coefficients in

Columns 1 and 3 are the coefficients for the rest of OECD countries, and Columns 2 and 4 show the difference in coefficients for the three selective migration policy countries in relation to the main effects shown in Columns 1 and 3. We actually find quite large differences between the two groups of countries for some variables. For Western Europe, USA and Japan, the lagged stock effect is positive and numerically largest for the group of source countries with the lowest income level. The interaction term for the selective migration countries is significantly positive in the case of lower-middle- and high-income level source countries.

When focusing on the main effect from source country GDP level, the results in Table 3 seem to indicate that an inverted U pattern is present in the non-selective migration policy countries and that the selective migration policy countries do not deviate significantly from this pattern. Australia, Canada and New Zealand tend to attract fewer immigrants from countries with a high illiteracy rate, indicating that the selective migration policy actually seems to work. The destination country variables (public social expenditure, unemployment and GDP) are, however, all insignificant.[16]

5.5. *Welfare state regimes and migration patterns*

The hypotheses concerning potential selection effects in international migration flows may also be analysed by splitting the destination countries into subgroups according to type of welfare state. The hypothesis is that immigration flows may be affected by the generosity of the different welfare state regimes, and different rules with respect to obtaining rights to the welfare schemes for immigrants. It is not straightforward to do this grouping of destination countries since there are a number of parameters which may be relevant to use. We have applied a grouping of the destination countries inspired by Esping-Andersen (1990): Social democratic welfare states (Denmark, Finland, Iceland, Norway and Sweden); liberal or residual welfare states (UK, USA and New Zealand); continental/conservative and Southern European welfare states (Austria, Belgium, France, Germany, Luxemburg, the Netherlands and Switzerland, Greece, Italy, Portugal and Spain).[17] We are not able to allocate Japan, Australia and Canada to any of these categories of welfare state regimes, and therefore, these countries are not included in the estimations presented in Table 4.

The idea behind this division is to capture the fact that the level of social expenditure only tells something about the level of public sector services in general, but not whether, or on which conditions, immigrant groups are eligible to different benefits or services. In some welfare state regimes (mainly the conservative European continental countries), the social services are generous, but many public income transfers and services are only available for

[16]We have made another set of estimations where we only look at the flows from 102 non-OECD countries into the 19 OECD countries. This does not change the findings presented in Table 3. WLS estimations (not shown) of the models presented in Table 3, i.e. estimations which do not include (pairs of) country specific terms, in general tend to give more significant results for the social expenditure level. However, the structure of the coefficients do not confirm a hypothesis on selective migration from relatively poor countries to countries with a high social expenditure level, and there is no indication that this pattern should be more pronounced for countries which do not pursue a selective migration policy.

[17]Countries like UK and the Netherlands are difficult to classify. Since the general level for the universal services and income transfers are quite low in the UK, we classify the UK as a liberal or residual welfare state, despite it has in principle the same universal schemes as the social democratic countries. The Netherlands is also sometimes categorised in the group of 'social democratic' welfare states.

individuals who have earned their rights to the system for instance, by being in the labour force, i.e. newly arrived immigrants are not eligible to a number of social services and transfers. In the Southern European welfare states, the church and the family play a major role with respect to social services, and thus in these countries the individual immigrant does not get access to many of the features of these welfare states. This is contrary to the social democratic welfare states which are characterised by high social welfare levels, fairly universal rules and welfare schemes that to a large extent are collectively financed by high income and consumer taxes. In these countries, many immigrant groups have almost the same rights as native citizens as soon as they get permanent residence permit.[18]

Table 4 like Table 3 contains the main effects for the Continental and Southern European welfare states in Columns and 4, and the interaction effects for the two other welfare states groups in Columns 2, 3, 5 and 6. According to the results in Table 4, the inverted U effect from the income level in source countries seems mainly to be an effect relating to the group of liberal welfare states which seem to attract relatively large migration flows from lower-middle income countries (Turkey, Ex-Yugoslavia, Iran, Iraq and many former Eastern European countries, see Appendix) and upper-middle countries (however not significant), contrary to the other group of welfare states where we do not find significant effects of the source country income variable.[19]

The coefficients of the lagged stock of immigrants have a very different pattern of variation across the welfare state regimes. For the Continental and Southern European type of welfare states, the stock or network effect are high for the source countries with lowest income level (which includes many African countries) and the upper-middle income levels (South American countries, the more rich Eastern European countries among others), while migrants networks in both the liberal and the social democratic welfare states tend to attract more immigrants from the lower-middle income level source countries.

When splitting into the different types of welfare state regimes, the coefficients of the public social expenditure variable do not support a hypothesis regarding the existence of a ''welfare magnet pattern'' in migration flows.[20] Again, one should note that the lack of support to the selection theory may reflect that potential migration flows have been ''distorted'' by migration policy restrictions.

6. Conclusions

Based on the database and the model structure, we present the results from empirical work on the migration flows into OECD countries during the years 1990–2000. The

[18]However, it should be noted that during the latest decade, partly as a political reaction to the immigration pressure, the eligibility rules and other conditions for receiving welfare services have been tightened, also in the social democratic welfare states, see Hatton and Williamson (2004).

[19]The same result is found in WLS estimations (not shown here) which in general have more significant results.

[20]In order to test for the robustness of our results, in alternative estimations not shown here, we have disaggregated the regressions into groups of source countries (low, lower-middle, upper-middle and high income), instead of destination countries. If selection effects were strong and worked as predicted by the 'welfare magnet' hypothesis, we should expect that a high public social expenditure level in destination countries had a more negative effect for immigration flows from rich countries compared to the more poor countries. We do not find this pattern in our data, i.e. we do not find that the immigrant flows from more poor countries are less negatively affected by a high public social expenditure level compared to the flows from more rich countries. The tendency seems to be the opposite. The results are available from the authors upon request.

approach is to test a number of hypotheses regarding migration flows between a large number of countries. We test the potential importance of network effects and the effects from a measure of welfare benefits in destination countries, push and pull factors consisting of income and employment indicators for source and destination countries and measures of the costs of migration. Finally, we test the importance of a number of demographic and political factors.

A very robust result of our econometric analysis is that the network effects measured as the coefficient of the stock of immigrants of own national background already resident in a country have a large positive effect on immigration flows, and thus networks play an important role in explaining current immigration flows. This is confirmed also when using estimation methods which are relevant when the lagged stock of immigrants is used as the network indicator. Further, linguistic closeness, countries being neighbours and current business ties are important factors, although the magnitude of the impact on migration flows varies for different groups of destination countries. Geographic distance, on the other hand, has a negative impact on migration flows as expected suggesting that the costs of migration play an important role.

The impact from economic factors is measured by entering GDP per capita (PPP adjusted) and unemployment rates in both destination and source countries and public social expenditure relative to GDP. We find a clear non-linearity in the effect of source country GDP level in the form of an inverse U-shape, i.e. lower migration from the poorest and the richest source countries. Further, we have tested the simple welfare magnet hypotheses by allowing the effect of public social expenditures in destination country on migration flows to vary with source countries GDP per capita. We find no strong results in this area but our results indicate the existence of a U-shaped effect, i.e. the biggest effects exist for the most poor and the richest source countries. We find some importance of unemployment in destination countries, but no impact from source countries' unemployment which may reflect a lack of reliable or valid unemployment measures in poor countries. Further, this part of the analysis finds tentatively the strongest network effect for immigrants from the poorest source countries.

We estimate separate models where we divide destination countries into two groups according to whether their immigration policies are selective or not. Source country GDP per capita is again found to have a clear inverted U-shaped effect for both country groups. For destination countries having a selective immigration policy we tend to find stronger network effects at higher levels of source countries income while for the other group of destination countries, network effects are relatively strongest for the poorest source countries. The explicit welfare magnet indicators are, however, insignificant for both groups of destination countries.

Finally, separate models have been estimated where destination countries are split into a number of groups according to the type of welfare state: The liberal or residual welfare state type and the more universal Social-Democratic or Continental/Southern European type of welfare state. The impact from source countries' income per capita is again found to have an inverse U-shaped effect, but only for the flows to the liberal type of welfare states. Regarding network effects, we find a U-shaped impact for the "Western European" type of welfare states, with an especially strong impact from the stock of immigrants from the poorest source countries.

Overall, network effects dominate our results compared with only weak indicators of selection effects of the welfare magnet type. We emphasise again that we study "country

based selection effects'' as micro data have not been available for the analyses. The results might to some extent reflect that due to data availability, migration flows in the present approach are based on aggregate measures, i.e. no distinction can be made between the three main flows of migrants, being job- or study-related people (mostly intra-OECD), tied movers in relation to family re-unions and finally refugees. In the long run, welfare magnet mechanisms might influence these flows in the direction pointed out in Borjas (1999b). In the short to intermediate run, however, job-related movers are only in incomplete ways entitled to social benefits in destination countries, the flows of tied movers are by nature strongly influenced by the stock of immigrants in a destination country, i.e. the network effect, and finally the flow of refugees consists of convention refugees, where entry depends on political decisions, and spontaneous individual asylum seekers, where the conditions for granting a residence permit depend on national immigration policies.

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Appendix. Description and definitions of the basic variables and sources

FLOWS_ij: Gross flow of migrants from country *i* to country *j* per 1000 inhabitants in country *j*
Source: National statistical offices and ''Trends in International Migration'' SOPEMI 2000 OECD.
STOCK_ij: Stock of foreigners from country *i* in country *j*
Source: National statistical offices and ''Trends in International Migration'' SOPEMI 2000 OECD.
POPi,POP_j: Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship—except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin.
Source: World Bank.
GDP_i, GDP_j: GDP per capita (constant 1995 international $), PPP: GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant **international** dollars.
Source: World Bank.
U_i, U_j: Unemployment, total (% of total labour force): Unemployment refers to the share of the labour force that is without work but available for and seeking employment. Definitions of labour force and unemployment differ by country.

Table A1
Descriptive statistics of basic variables for OECD destination countries (means, standard deviations and number of years observed in the data set)

Mean (S.D.) Numb. of Obs.	Australia	Austria	Belgium	Canada	Denmark	Finland	France	Germany	Greece	Iceland	Italy
Immigration flows[a]	733	480	906	2021	206	65	824	15 823	184	25	3432
	(2064)	(1311)	(1690)	(4257)	(560)	(264)	(1604)	(31 095)	(458)	(96)	(6292)
	308	632	646	1052	1520	1524	1143	551	1129	630	144
Sum of immigration flows[b]	79 987	25 287	48 762	177 196	26 104	8262	78 465	726 569	17 297	1325	41 182
	(25 739)	(29 873)	(14 187)	(55 758)	(6408)	(2136)	(20 171)	(1 91 946)	(11 208)	(1514)	(62 830)
Immigration stock[c]	46 222	6020	15 756	50 787	1777	649	41 416	55 135	1188	82	15 034
	(236 324)	(20 802)	(38 087)	(1 595 564)	(3918)	(1758)	(113 211)	(200 674)	(2613)	(272)	(22 491)
	406	304	656	377	1520	1085	159	1418	1136	1528	519
Sum of immigration stock[d]	1 563 843	152 517	861 306	1 157 930	225 023	58 698	548 757	6 515 127	112 498	10 457	650 211
	(1 598 617)	(296 143)	(16 602)	(1 620 004)	(38 322)	(23 093)	(1 222 297)	(779 781)	(65 207)	(3145)	(401 031)
Population (in thousands)	18 000	7959	10 100	29 100	5227	5088	57 700	78 400	10 400	266	57 300
	(725)	(153)	(99)	(1089)	(69)	(68)	(7387)	(7058)	(166)	(8)	(342)
	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548
GDP per capita PPP (constant 1995 int.$)	21 219	22 591	21 632	22 480	23 899	19 864	21 095	30 047	13 225	22 866	20 989
	(1757)	(1597)	(1259)	(1451)	(1529)	(1529)	(948)	(1287)	(906)	(1584)	(953)
	548	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548
Unemployment rate (% of the labour force)	8.153	5.013	8.431	9.142	7.146	11.007	10.794	7.592	9.509	3.044	10.624
	(1.472)	(0.602)	(1.264)	(1.432)	(1.647)	(4.495)	1.180)	(1.146)	(1.506)	(1.336)	1.186)
	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548
Trade volume between two countries *j* and *i* (in thousands)	782	890	2325	2765	635	484	4177	7197	293	36	3195
	(2521)	(4190)	(8332)	(23 942)	(2044)	(1309)	(13 302)	(18 123)	(845)	(96)	(9118)
	1434	1445	1448	1448	1445	1451	1447	1444	1369	1180	1432
Tax revenue (% of GDP)	29.073	42.533	44.575	37.167	48.892	45.642	44.158	36.800	32.142	32.633	41.633
	(1.096)	(1.342)	(1.159)	(0.711)	(1.151)	(1.194)	(1.059)	(1.782)	(3.210)	(2.068)	(1.952)
	1419	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548
Social expenditures	16.591	25.373	27.733	19.450	30.742	28.867	28.333	26.508	21.383	18.364	23.733
	(1.699)	(0.960)	(1.182)	(1.608)	(1.306)	(3.654)	(1.301)	(1.667)	(1.617)	0.946)	(0.730)
	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548

Mean (S.D.) Numb. of Obs.	Japan	Luxembourg	Netherlands	New Zealand	Norway	Portugal	Spain	Sweden	Switzerland	United Kingdom	United States
Flows of immigrants to the country[a]	15 423	886	938	3962	529	209	1190	365	889	879	7566
	(16 862)	(814)	(1754)	(4944)	(936)	(534)	(5030)	(1216)	(3088)	(1473)	(35 316)
	163	93	823	106	638	238	525	1440	1460	707	1463

Sum of immigration	209 494	6867	64 350	34 996	28 101	4153	52 047	43 821	108 145	51 805	922 410
flows to the country[b]	(36 018)	(394)	(18 716)	(4373)	(4969)	(5928)	(86 327)	(11 941)	(35 081)	(29 475)	(332 837)
Stock of immigrants	34 548	3825	10 792	11 330	2802	6172	11 997	9056	10 356	51 590	299 726
in the country[c]	(110 834)	(9460)	(31 109)	(35 080)	(4074) 662	(8300)	(19 930)	(23 666)	(40 218)	(90 234)	(788 606)
	246	387	773	125		264	447	1155	1456	655	625
Sum of immigration	708 234	123 348	695 195	118 018	154 599	135 780	446 883	871 670	1 256 522	2 815 967	15 600 000
stock in the country[d]	(720 044)	(17 246)	(620 880)	(206 090)	(16 952)	(34 750)	(243 560)	(75 939)	(91 264)	(1 452 974)	(11 200 000)
Population	1 25 000	409	15 400	3617	4350	9894	39 200	8744	697	58 500	262 000
(in thousands)	(1155)	(18)	(327)	(165)	(83)	(59)	(217)	(125)	(168)	(703)	(8789)
	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548
GDP per capita PPP	22 476	35 351	21 770	16 568	27 812	13 460	15 214	19 930	25 670	20 020	28 069
(constant 1995 int$)	(964)	(6780)	(1745)	(1121)	(2912)	(1228)	(1262)	(1124)	(422)	1467)	(1872)
	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548
Unemployment rate	3.12	2.417	5.591	7.698	4.709	5.464	18.868	5.675	3.048	7.552	5.574
(% of the labour	(0.928)	(0.787)	(1.503)	(1.499)	(0.965)	(1.180)	(3.171)	(2.418)	(1.638)	1.709)	(1.054)
force)	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548
Trade volume	5351	189	2549	200	571	417	1544	1025	1173	3879	10 432
between two	(18 454)	(742)	(8809)	(686)	(1751)	(1402)	(4841)	2788)	(4239)	(10 402)	(33 280)
countries *j* and *i*	1369	376	1409	1299	1429	1421	1433	1436	1434	1413	1441
(in thousands)											
Tax revenue	28.158	41.100	42.892	36.900	41.492	32.058	33.692	50.925	32.717	35.492	26.942
(% of GDP)	(1.350)	(1.188)	(1.423)	(1.012)	(0.846)	(1.679)	(0.831)	(1.984)	(1.759)	(1.210)	(2.118)
	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548
Social expenditures	13.208	22.375	25.575	20.283	25.408	17.183	20.692	32.167	22.108	22.108	14.417
	(1.518)	(1.036)	(2.282)	(1.283)	(1.066)	(2.505)	(1.096)	(2.449)	(3.339)	(1.478)	(0.766)
	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548	1548

[a]Mean and S.D. for each particular migration flow from country *j* to country *i*.
[b]Mean and S.D. for the sum of migration flows to country *i*.
[c]Mean and S.D. for stock of immigrants originating from country *j* residing in country *i*.
[d]Mean and S.D. for the sum of stocks of immigrants in country *i*.

Source: World Bank: International Labour Organisation, Key Indicators of the Labour Market database.

ILR_i, ILR_j: Illiteracy rate, adult total (% of people ages >15): Adult illiteracy rate is the percentage of people ages 15 and above who cannot, with understanding, read and write a short, simple statement on their everyday life.

Source: World Bank (United Nations Educational, Scientific, and Cultural Organization).

PSEP_i, PSEP_j: Public social expenditure as a percentage of GDP (SNA93): Social expenditure is the provision by public institutions of benefits to, and financial contributions targeted at, households and individuals in order to provide support during circumstances which adversely affect their welfare, provided that the provision of the benefits and financial contributions constitutes neither a direct payment for a particular good or service nor an individual contract or transfer. Such benefits can be cash transfers, or can be the direct (''in-kind'') provision of goods and services.

Source: OECD Social Expenditure Database (SOCX).

TAXR_i, TAXR_j: Tax revenue (% of GDP): Tax revenue comprises compulsory transfers to the central government for public purposes. Compulsory transfers such as fines, penalties, and most social security contributions are excluded. Refunds and corrections of erroneously collected tax revenue are treated as negative revenue. Data are shown for central government only.

Source: World Bank: International Monetary Fund, Government Finance Statistics Yearbook and data files, and World Bank and OECD GDP estimates.

Dist_ij: Distance between countries—distance between capitals in km.

Source: MapInfo, own calculations.

FREE_i, FREE_j: Freedom House Index—represents scores of political rights, civil liberties, and freedom. These are measured on a one-to-seven scale, with one representing the highest degree of freedom and seven the lowest.

Source: Annual Freedom in the World Country Scores 1972–1973 to 2001–2002.

Ld2: *The index of common language* in two countries. This index has value 1 for common language in two countries and 0 for no common language.

Source: Ethnologue: Languages of the World, 14th edition. http://www.ethnologue.com/web.asp

Colony: Colony index—in the form of dummy for countries ever in colonial relationship—value 1, 0 otherwise.

Source: The dataset freely available at the web page of Andrew K. Rose and used for the paper: Rose, A. (2002): ''Do We Really Know that the WTO Increases Trade?'' NBER Working Paper No. 9273.

Neighb: Neighbouring index—in the form of dummy for neighbouring countries—value 1, 0 otherwise.

Trade **Volume: Trade Volume** represents bilateral trade flows that are based on IMF Direction of Trade data; the IMF data lists total trade values (both imports and exports) for all country pairs for all years, 1989–2000.

Source: IMF.

Dummies for low-, lower-middle, upper-middle and high-income countries

World Bank definitions of low-income countries, lower-middle-income countries, upper-middle-income countries and high-income countries: Economies are divided according to

2002 GNI per capita, calculated using the World Bank Atlas method. The groups are: *Low income*, $735 or less; *lower middle income*, $736–$2935; *upper middle income*, $2936–$9075; and *high income*, $9076 or more.

1. High-income countries
   Andorra; Aruba; Australia; Austria; Bahamas; Bahrain; Belgium; Bermuda; Brunei; Canada; Cayman Islands; Channel Islands; Cyprus; Denmark; Faeroe Islands; Finland; France; French Polynesia; Germany; Greece; Greenland; Guam; HongKong, China; Iceland; Ireland; Israel; Italy; Japan; Korea, Rep.; Kuwait; Liechtenstein; Luxembourg; Macao, China; Monaco; Netherlands; Netherlands Antilles; New Caledonia; New Zealand; Northern Mariana Islands; Norway; Portugal; Qatar; San Marino; Singapore; Slovenia; Spain; Sweden; Switzerland; United Arab Emirates; United Kingdom; United States and Virgin Islands (US).
2. Upper-middle-income countries
   American Samoa; Antigua and Barbuda; Argentina; Barbados; Botswana; Brazil; Chile; Costa Rica; Croatia; Czech Republic; Dominica; Estonia; Gabon; Grenada; Hungary; Isle of Man; Latvia; Lebanon; Libya; Lithuania; Malaysia; Malta; Mauritius; Mayotte; Mexico; Oman; Palau; Panama; Poland; Puerto Rico; Saudi Arabia; Seychelles; Slovak Republic; St. Kitts and Nevis; St. Lucia; Trinidad and Tobago; Uruguay; Venezuela and RB.
3. Lower-middle-income countries
   Albania; Algeria; Armenia; Belarus; Belize; Bolivia; Bosnia and Herzegovina; Brazil; Bulgaria; Cape Verde; China; Colombia; Cuba; Dominican Republic; Djibouti; Ecuador; Egypt, Arab Rep.; El Salvador; Fiji; Guatemala; Guyana; Honduras; Iran, Islamic Rep.; Iraq; Jamaica; Jordan; Kazakhstan; Kiribati; Macedonia, FYR; Maldives; Marshall Islands; Micronesia, Fed. Sts.; Morocco; Namibia; Paraguay; Peru; Philippines; Romania; Russian Federation; Samoa; Serbia and Montenegro; South Africa; Sri Lanka; St. Vincent and the Grenadines; Suriname; Swaziland; Syrian Arab Republic; Thailand; Tonga; Tunisia; Turkey; Turkmenistan; Ukraine; Yugoslavia, Fed. Rep.; Vanuatu; West Bank and Gaza.
4. Low-income countries
   Afghanistan; Angola; Azerbaijan; Bangladesh; Benin; Bhutan; Burkina Faso; Burundi; Cambodia; Cameroon; Central African Republic; Chad; Comoros; Congo, Dem. Rep.; Congo, Rep.; Côte d'Ivoire; Equatorial Guinea; Eritrea; Ethiopia; Gambia; Georgia; Ghana; Guinea; Guinea-Bissau; Haiti; India; Indonesia; Kenya; Korea, Dem. Rep.; Kyrgyz Republic; Lao PDR; Lesotho; Liberia; Madagascar; Malawi; Mali; Mauritania; Moldova; Mongolia; Mozambique; Myanmar; Nepal; Nicaragua; Niger; Nigeria; Pakistan; Papua New Guinea; Rwanda; São Tomé and Principe; Senegal; Sierra Leone; Solomon Islands; Somalia; Sudan; Tajikistan; Tanzania; Timor-Leste; Togo; Uganda; Uzbekistan; Vietnam; Yemen, Rep.; Zambia and Zimbabwe.
   Source: World Bank.

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