Universida_{de}Vigo

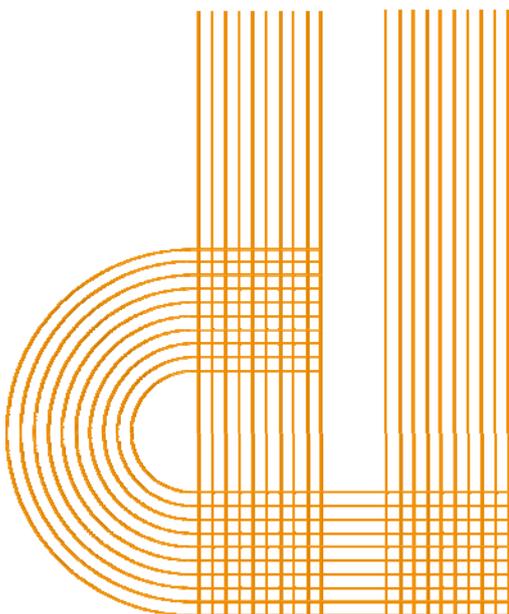# *The causality between economic growth and immigration in EU/EFTA member states*

Manuel González Gómez

Mª Soledad Otero Giráldez

THE CAUSALITY BETWEEN ECONOMIC GROWTH AND IMMIGRATION

IN EU/EFTA MEMBER STATES

Manuel González Gómez* and Mª Soledad Otero Giráldez

Departamento de Economía Aplicada (Universidad de Vigo)

Abstract

The EU/EFTA Member States attract yearly a large population of immigrants. Economists, demographers, historians and sociologists generally agree that the need to fill labor market gaps and the income differences between host and sending countries explain migration into industrialized nations. They also recognize that demographic changes that occur through immigration have important economic effects. However, regarding the existence of economic repercussions of migration, there is no conclusive evidence on the relationship between economic growth and immigration. To this end, the Granger Long-run causality based on the Error Correction Model (ECM) and Johansen cointegration technique and Granger Causality Test were applied to Eurostat database for EU/EFTA nations.

*Author for correspondence: Department of Applied Economics. University of Vigo. Spain. Rua Leonardo Da Vinci s/n. E-36310 Vigo. E-mail: mgonzalez@uvigo.es

1. Introduction

According to the International Migration Report 2015, nearly one third of the migrant population live in Europe and the number of migrants on average has grown 2.3 per cent per year during the period 2000-2015. From the EU/EFTA countries perspective, immigration is seen as a possible solution to tackle both the demographic challenge caused by the ageing of the population and the appetite for high skilled labor in some developed nations. Countries that face labor shortages actively recruit foreign nationals for labor purposes according to their specific needs at each specific moment of time including low-skilled labor force for the agriculture, industrial and service sector and increasingly highly skilled labor. Usually host countries interrupt immigration flow during the economic crisis. On the other hand, from the supply side, the main motivation for workers to move are both to escape unemployment due to the lack of jobs in the sending nations and/or to find better lifestyle opportunities in the receiving countries such as higher wages and more welfare benefits.

The fact that the EU is the economic integration scheme with the highest degree of economic association and loss of national sovereignty by member states affects immigration flows. The establishment of the Common Market in EU countries has abolished migration policies governing the admission and status of migrant workers in EU Member States. The introduction of the "Citizen of the Union" and the creation of an area "without internal frontiers" are two of the objectives of the Treaty of the European Union signed in the Dutch city of Maastricht in 1992. From the labor market perspective, the coordination of regulations seeks to create a free market for labor throughout the EU leading to a more efficient use of this factor. The most important measures are contained

in the European Social Chapter and include greater freedom of movement within the EU for employees, equal pay, maternity/paternity rights, working time etc.

Moreover, as a result of the agreement with the members[1] of the Free Trade Association (EFTA), the EU extended to these countries the free mobility of labor. It implies that EU-nationals have the same benefits as EFTA national workers and employers who want to recruit people from outside need to prove that they cannot find neither domestic nor EU/EFTA workers to fill their vacancies.

Furthermore, with the intent to attract highly educated migrants and lay down common criteria requirements, the EU Blue Card Directive grants entry of third country nationals for the purposes of highly qualified employment that enjoy freedom of movement in the territory of the EU Member States issuing the card (UK, Ireland and Denmark opted-out its application). Many countries, such as Netherlands, Austria, Denmark, United Kingdom and Germany, adopted specific systems of national residence permits for highly educated migrants and the EU does not prevent EU countries to adopt their systems of permits but such national permits do not allow entry and residence in other EU-Member States than the Member State which granted the permit.

Consequently, migration is together with investment and trade a key driver of economic integration and globalization within the EU/EFTA (Glyn, 2004). The EU imposes more constraints on migration policy, making more difficult any change in order to control the recruitment of foreign labor force within the Member states and third countries nationals.

---

[1] Iceland, Lichtenstein, Norway and Switzerland.

There is consensus among experts that immigration cause important effects on the labor market. Researchers have analyzed the effects of immigration on productivity wages, activity rate, value added and adoption of technology in different host countries (Lewis, 2004; Kangasniemi et al., 2012; Nickell and Saleheen, 2015; Wadsworth et al, 2016)

Furthermore, pieces of research have pointed out the importance of selective migration policies and the ability of host countries to avoid that immigration impede structural change and technological development (Kangasniemi et al., 2012; Stadler at al., 1994; Liebig, 2002). On the other hand, the free mobility of labor between EU and EFTA countries and the common external migration policy could have reduced the damages that the specific migration policy in some countries had on economic growth in the past (Stadler at al., 1994; Liebig, 2002) or increasing it due to the existence of cheaper labour force that impede structural change and technological development. On the one hand, immigration policy, including the development of free movement of labor throughout the EU/EFTA, and its public acceptance is a major issue in many EU/EFTA[2] member state and often appears with both the *UK Referendum* decision to leave the European Union (BREXIT) and the fear of an anti-establishment ascendant far right in other EU countries.

Different research studies have been carried out to analyze the relationship between immigration and GDP per capita using time series. Morley (2006) makes use of an

---

[2] For instance Switzerland accepted by a very small majority the referendum that aimed to go back to the system of permits to control the total number immigrants limit prior to the bilateral treaties between Switzerland and the EU of 2002 (http://www.spiegel.de/politik/ausland/schweiz-svp-niederlage-bei-debatte-um-masseneinwanderungsinitiative-a-1125780.html)

autoregressive distributed lag (ARDL) to examine the presence of a statistical relationship between both variables for Australia, Canada and the USA. He finds evidence of unidirectional causality running from economic growth to immigration but not the reverse for the period 1930-2002.

González-Gómez and Otero-Giráldez (2011) analyze the existence of a statistical relationship for Switzerland and Germany. The analysis covers the period from 1970 to 2005 and shows that there exists bidirectional relationship for Germany They report a response of immigration to economic growth in Switzerland but lower than Germany due to the more restrictive Swiss migration policy.

There is no conclusive evidence in the empirical literature and therefore the relationship may or may not run from immigration to GDP per capita or vice versa (Tapinos, 1993). Better understanding of economic impact of immigration can be of great assistance for both public debate and planning development strategies in order to improve the economic effects of immigration in host countries. If for example there is a unidirectional causality running from immigration to GDP per capita, possible pieces of legislation to control the number of foreign people is likely to damage economic growth. On the contrary, the inexistence of causality would suggest that changes in migration could improve the contribution to economic growth.

The presence of causality running from GDP per capita to immigration could suggest that selective migration policies have not been effective as means of control of the number of foreigners. Higher levels of GDP per capita imply expectance of higher wages and standard of living in the host country that encourage people to migrate. No causality from GDP per capita to immigration is either the result of a lack of attractiveness for foreigners

despite economic growth or the result of an effective and restrictive immigration policy. If this is the case and shortage of labor acts as a bottleneck in the economy, it is likely to damage economic growth.

2. Migration in EU/EFTA Member States

There are different definitions of migrants. Therefore, when counting migrants and analyzing the consequences of migration, who counts as a migrant is of crucial importance[3]. Migrants might be defined by foreign birth, by foreign citizenship, or by their movement into a new country to stay temporarily (one year) or to settle for the long-term.

There are 54.4 million foreign born people and 37 million foreign nationals in the EU-28 Member States that represent 11.5 % and 7.8% of the population, respectively. Since the ratio foreign population to total population is higher for EFTA countries than for EU-28 Member States, the share of foreign nationals to total population in the EU&EFTA rise to 11.9 % and the share of foreign born to 8.2% . The number of foreign born people increases to 57.6 million and the number of foreign nationals to 39.6 million. There are large differences across countries. Small size countries such as Luxemburg or Liechtenstein show the highest share of both foreign born and foreign nationals. They are followed by Switzerland (37% of the population are foreign born), Belgium, Cyprus etc. The share of immigrants in the five countries that concentrate approximately two thirds of the stock of immigrants, i.e. France, Italy, Germany, Spain and UK, is closer to the EU-28 and EU&EFTA averages shown in table 1, with values that lie between 7.1

---

[3] Eurostat and other migration statistics do not include asylum seekers. However, in some countries such as Germany the aim of the authorities is to integrate them in the labor market. http://www.spiegel.de/wirtschaft/soziales/angela-merkel-will-fluechtlinge-integration-in-arbeitsmarkt-erleichtern-a-1079587.html. If this is the case refugee flows can substitute economic migrants.

% for France and 11,8% for Germany in case of the ratio foreign nationals to total population and between 10.6% for Italy and 14.8% for Germany in case of share of foreign born to number of inhabitants. Interestingly only three countries show a higher share of foreign nationals than foreign born in the total population (Czech Republic, Latvia and Luxemburg). It means that there are more native born who are foreign nationals than people born abroad that naturalized. Possible explanations are native-born people that are descendants from immigrants from close neighbor countries (Luxembourg) or minorities that in some cases shared citizenship before the constitution of the new states (Latvia, Czech Republic). Table 1 shows that the opposite happens for the rest of countries. The difference can be of 12 points for Croatia and is around 4-5 points in 4 out of the 5 major immigration countries (France, Italy, Germany, Spain and UK).

Table 1 : Foreign born, Foreign nationals, EU nationals and EU born in EU/EFTA Member States (2015)

	Foreign nationals to population	EU nationals to foreign nationals	Foreign born to pupulation	EU born to foreign born
EU&EFTA	8.2	44.7	11.9	36.6
EU-28	7.8	43.3	11.5	35.5
Belgium	13.4	65.7	18.5	47.0
Bulgaria	1.1	16.8	1.9	35.6
Czech Republic	4.7	41.0	4.3	39.7
Denmark	8.8	40.9	12.1	34.1
Germany	11.8	43.9	14,8	39,9
Estonia	17,7	7,8	17,3	9,9
Ireland	14,2	65,4	19,3	68,6
Greece	8	25,9	12,2	28,7
Spain	10,5	43,8	14,1	33,1
France	7,1	34,7	12,7	27,9
Croatia	1	31,1	13,2	12,5
Italy	9	30,2	10,6	30,9
Cyprus	21	74,1	24,6	63,9
Latvia	17.2	2.1	15.4	10.7
Lithuania	0.7	26.5	4.5	16.1
Luxembourg	87.7	85.3	84.9	74.8
Hungary	1.6	54.4	5.2	63.6
Malta	7.7	50.2	11.4	45.2
Netherlands	5.6	50.9	12.8	27.0
Austria	16.9	49.0	21.2	45.2
Poland	0.4	16.1	1.7	34.5
Portugal	3.9	27.1	8.8	26.6
Romania	0.5	44.8	1.8	42.3
Slovenia	5.5	16.3	12.3	27.8
Slovakia	1.2	76.6	3.4	82.9
Finland	4.4	41.0	6.3	36.1
Sweden	8.6	38.8	18.5	31.6
United Kingdom	9.5	56.4	14.6	37.4
Iceland	8.7	82.4	13.7	67.2
Liechtenstein	51.4	52.4	97.6	34.0
Norway	10.3	63.0	16.6	45.2
Switzerland	32.6	66.3	37.0	60.0

Source: Authors' own calculations

Figure 1 provides some comparatives EU/EFTA insight into immigration stock showing the distribution of foreign nationals by major source regions. It can be seen that all EU/EFTA nations share the EU-28 as the source of the largest flows of immigrants,

except Bulgaria, Estonia, Latvia, Lithuania and Slovenia, where non-EU European nationals are the largest source of immigrants[4]. Interestingly, EU-28 nationals in three EFTA member States, Iceland, Norway and Switzerland represent approximately two thirds of the total number of immigrants and thus the highest percentage of EU-28 immigrants among all EU/EFTA nations. It can be seen as a result of the rising importance of the EU in both European and world affairs. However, there are differences among countries concerning the second largest flow. Whilst in Czech Republic, Austria, Germany, Romania and Italy non–EU European countries, including Turkey, shows the second largest percentage of participation in the immigration flows; in Norway, Denmark, Sweden, Hungary, Finland and Netherlands is Asia; in Spain is North Africa and in Portugal is Latin America .

Figure 1: Major citizenship regions of immigrants in EU/EFTA (2016)
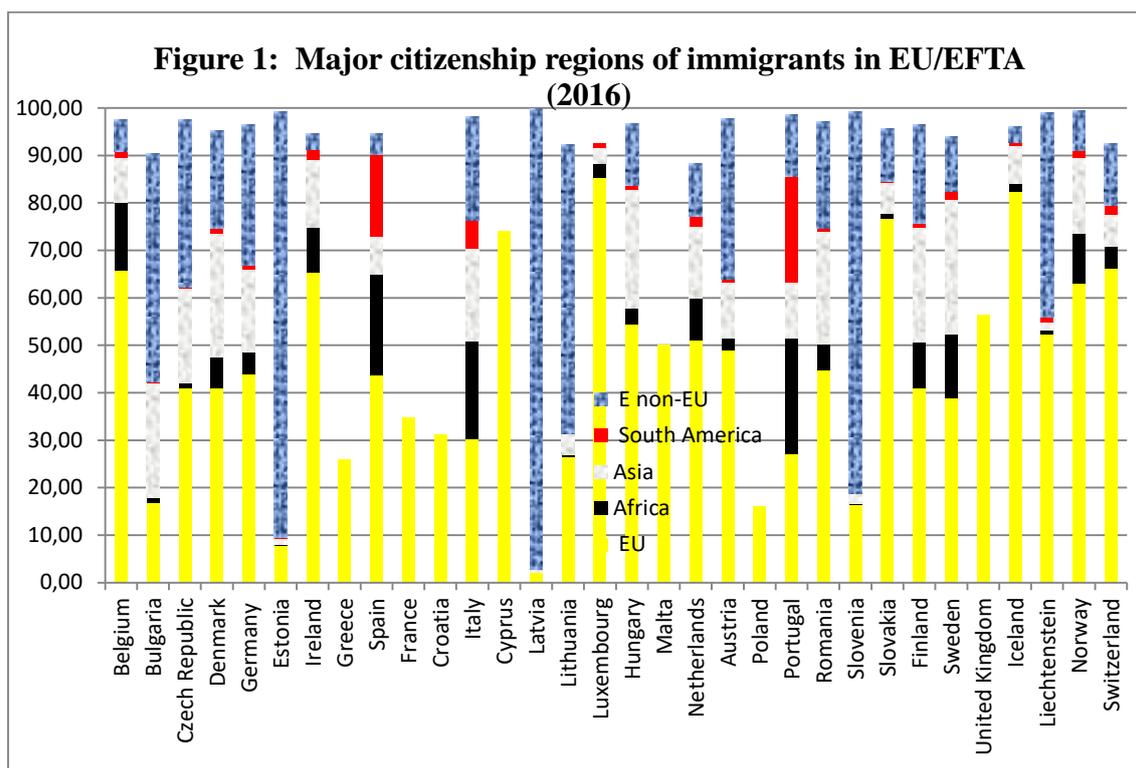
Source: Authors' own calculations

---

[4] For Croatia, France, Greece, Poland and the UK only data for EU citizenship are available. EU immigrants represent more than half of the stock of immigrants in the UK, approximately one third in France and Croatia, one fourth in Greece and 16,1 % in Poland.

Figure 2: Major regions of birth of immigrants in EU/EFTA (2016)

Legend: E non EU, South America, Asia, Afica, EU
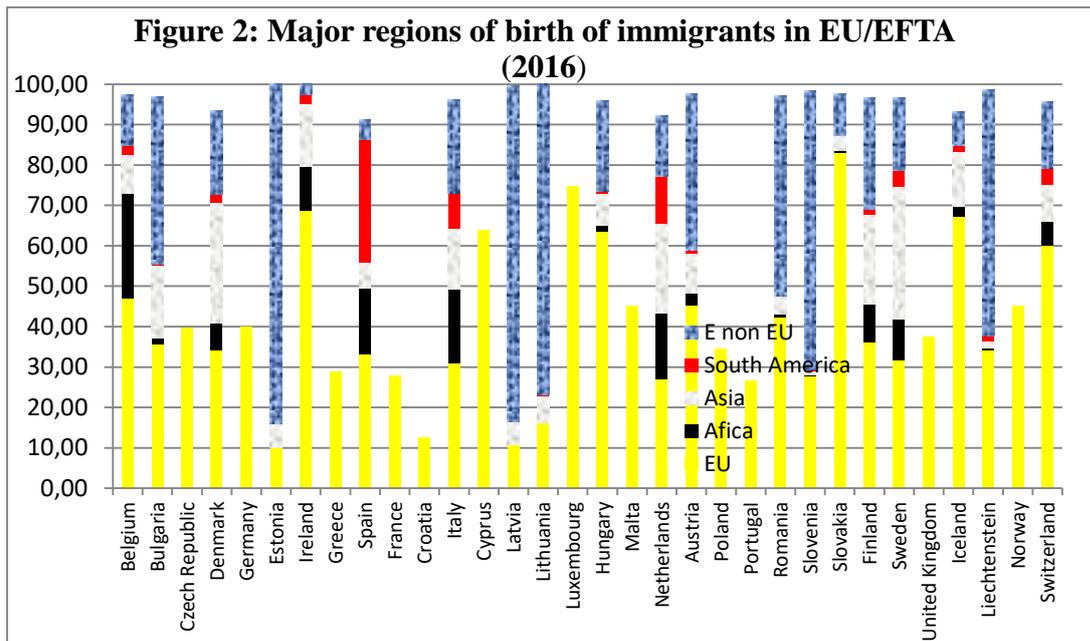
Source: Authors' own calculations

Figure 2 displays the share of regions of birth of immigrants in different EU&EFTA countries. The percentage of foreign born in other EU member states is lower than the percentage of foreign nationals from other EU nations. It is 8 points lower on average for all EU&EFTA Member States. We assume that the explanatory factor for the difference between the share of foreign nationals in the population and foreign born in the population is naturalization. Salt and Miller (2006) report that immigrants from high income countries are less likely to remain in the host country. Consequently, it is also less likely that they ask for naturalization. Furthermore, immigrants from EU nations do not have to naturalized in order to have access to benefits that are limited to nationals and/or EU/EFTA nationals. On the contrary, other nationalities different than EU will apply for naturalization in order to have access to those benefits.

Figutre 3: Participation of major EU/EFTA countries in naturalization of immigrants by regions of origin (%)
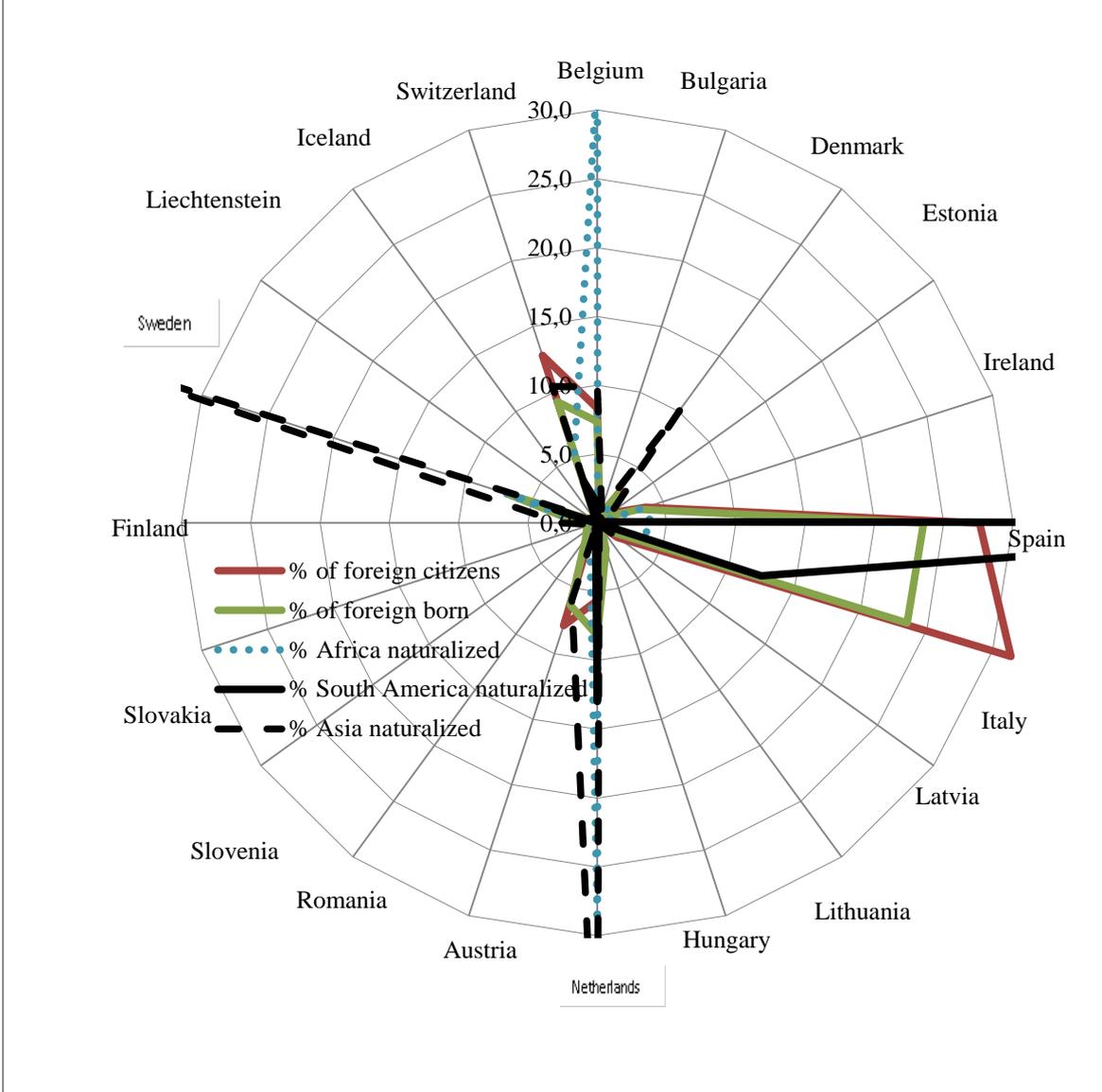
Source: Authors' own calculations

Figure 3 displays the participation of 20 out of the 32 EU&AFTA Member States[5] in the naturalization of immigrants from the major sources of immigration. Belgium and the Netherlands show a high rate of naturalization for African immigrants;

[5] Data are not available for Czech Republic, Croatia, France, Germany, Greece, Luxemburg, Malta, Norway, Poland, Portugal, Sweden, and UK.

Iceland, the Netherlands and Denmark for Asian Immigrants and Spain for Immigrants from South America. In all those cases the participation in the naturalization is higher than the participation in the total population, in the foreign nationals and in the foreign born population. The participation of Switzerland in the naturalization of Asian immigrants is over 10% but similar to the participation of foreign nationals and foreign born population, making it one of the countries with the lowest naturalization rate among the ones with a large population of immigrants.

Figure 4: Participation of major EU/EFTA Member states in naturalization of EU born immigrants (%)
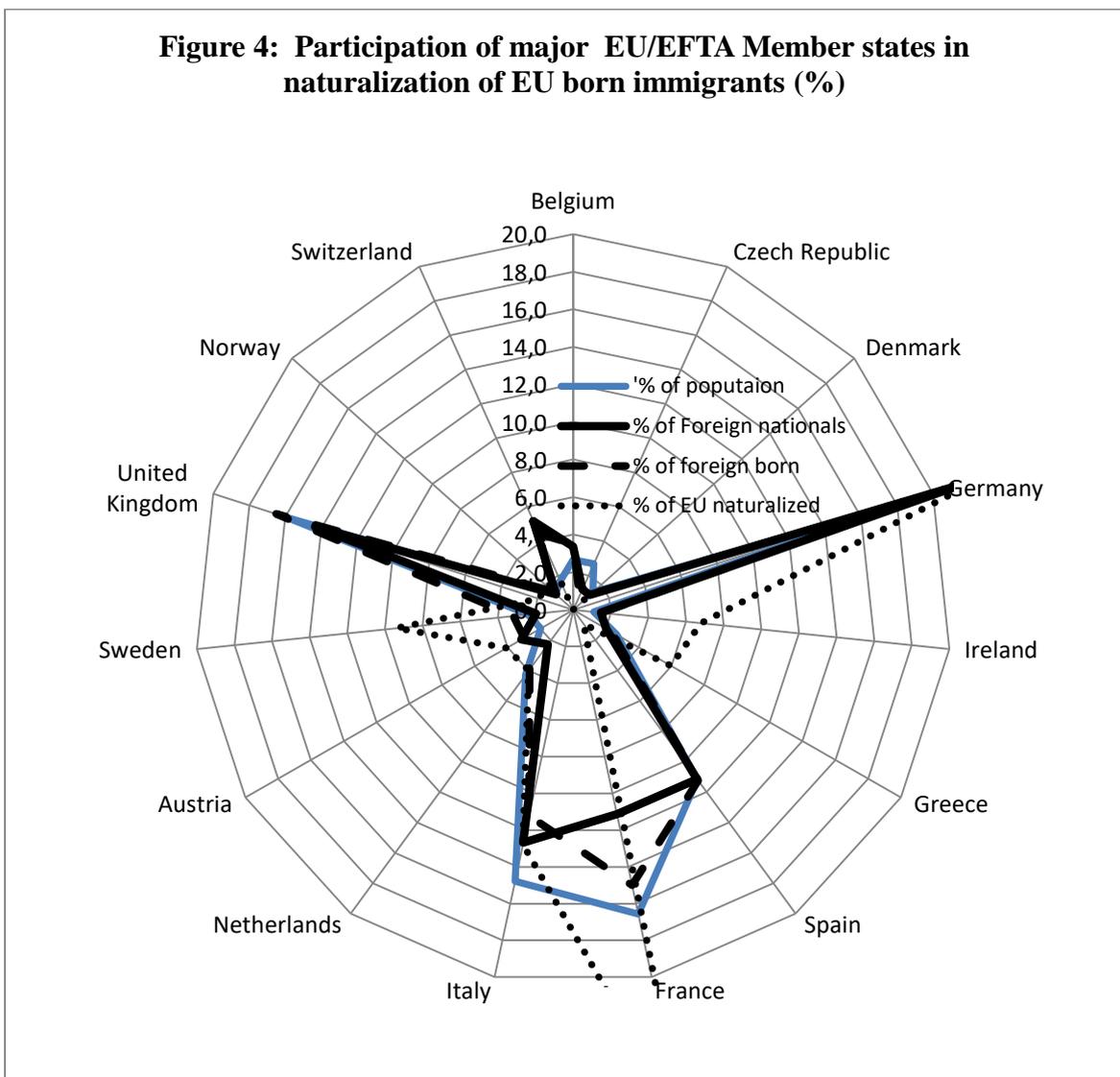
Source: Authors' own calculations

Figure 4 shows that four countries concentrate the naturalization of immigrants from other EU nations (France, Germany, Italy and Sweden). However, the participation in the naturalization is very similar to the participation in the foreign population or total population for Germany and Italy but it is higher for France and Sweden. On the contrary, nations with higher participation in the total population or foreign population than in the naturalization of EU immigrants are UK, Spain and Switzerland.

3. Analysis of Causality between Economic Growth and Immigration

The objective of our empirical analysis is to study the existence of a statistical relationship between immigration flows into EU/EFTA Member States and real GDP per capita. Moreover, we also aim to find out if the relationship runs from real GDP per capita to immigration or vice versa.

There are third-age migrants that move to South EU Member States for retirement. Consequently, they cannot be considered traditional migrants that escape unemployment or are attracted by higher salaries or welfare benefits. Nearly all immigrants from nations with lower wages than average (Bulgaria, Lithuania, Poland Portugal, Rumania) arriving in Greece, Italy, Portugal and Spain (Italy) belong to the working age population, whereas only between less than half and two thirds of the immigrant from richer countries (Belgium, Denmark, Finland, Germany, Norway, Sweden, Switzerland and the UK) are in working age. However, the influence of immigrants on economic growth doesn´t need to be exclusively through the labor market and they can contribute to economic growth as long-term tourists (Balaguer and Cantavella-Jordá, 2002) that consume and invest. Therefore, we assume that emigrants affect economic growth independent on the age and relation to the labor market. Since data by age of immigrants population for Italy, Slovenia and Spain are available, we analyze separately the relationship between immigration to these three

countries and real GDP per capita considering all the foreigners arriving but also only the working age immigrants.

To examine the existence of causality between variables, we follow Granger's Representation Theorem (Granger, 1988). Real GDP, immigration and population data published by Eurostat can be used. The first step is to test for the cointegration property of both time series real GDP per capita and number of people arriving from other countries. The three time series (number of immigrants, working age immigrants and real GDP per capita) in logarithms are non-stationary but they are stationary after the first differentiating, i.e integrated of order one. Therefore, it is possible to apply the Johansen Cointegration test for testing the number of cointegration vectors (Johansen and Juselius, 1990).

Table 2. Johansen and Juselius Test Statistic results

COUNTRY	VARIABLES	H_0	H_1	Trace p-value	Lag
Finland	LGDPpc, LIMM	r=0	r=1	0.00	3
		r≤1	r≥2	0.06	
Germany	LGDPpc, LIMM	r=0	r=1	0.00	3
		r≤1	r≥2	0.55	
Italy	LGDPpc, LIMM	r=0	r=1	0.00	2
		r≤1	r≥2	0.02	
Slovenia	LGDPpc, LIMM	r=0	r=1	0.04	1
		r≤	r≥	0.05	
Spain	LGDPpc, LIMM	r=0	r=1	0.02	3
		r≤1	r≥2	0.14	
Switzerland	LGDPpc, LIMM	r=0	r=1	0.04	1
		r≤1	r≥2	0.15	

Note: r is the number of vector of cointegration. P-value of MacKinnon *et al.* (1999). Number of lags minimize Akaike information criterion

Table 2 reports the results of the Johansen cointegration test. The likelihood ratio test rejects the null hypothesis of no cointegration for all the countries at 5% significance

level except for Slovenia and Italy that is rejected at 1%. Therefore, the two time series are cointegrated over the sample period in all the cases.

The fact that the variables are cointegrated confirms the presence of a statistical long-run relationship between the variables. Since both variables are non-stationary and cointegrated, i.e. the linear combination of these two is itself stationary, the Granger Representation Theorem (Granger, 1988) allows us to employ the Error Correction Model (ECM) that may represent the long-run and short-run jointly. The ECM following models for both variables and each EU/EFTA host country (Finland, Germany, Italy, Slovenia, Spain and Switzerland) are constructed:

$$DIMM_t = \gamma_0 + \sum_{i=1}^{p} \gamma_{1i} \cdot DIMM_{t-i} + \sum_{i=0}^{p} \gamma_{2j} DGDP_{t-j} + \phi \cdot \hat{\mu}_{t-1} + \varepsilon_t \quad [1]$$

$$DGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_{ii} \cdot DGDP_{t-i} + \sum_{i=0}^{p} \beta_{2j} \cdot DIMM_{t-j} + \phi \cdot \hat{\mu}_{t-1} + \varepsilon_t \quad [2]$$

where D is the first difference operator, *GDP* and *IMM* represent natural logarithms of GDP per capita in real terms and number of people arriving in Spain from other countries, respectively. P is the number of lags. Since we are working with annual data the maximum number of lags is P=3. The optimal number of lags is selected according to Akaike Information Criterion (Akaike, 1973). $\gamma's$ and $\beta's$ are the short term parameters in equation (1) and (2), respectively. ε_t is assumed to be a white noise error term, $\hat{\mu}_{t-1}$ is the error correction term (ECT). The ECT captures the correction back towards long term equilibrium whenever there was any deviation from the long run equilibrium path. Granger (1988) demonstrated that if two economic variables are cointegrated, long-run causality must exist in at least one direction. The presence of causality can be analyzed by testing both the estimated coefficients of the ECT in equations (1) and (2) and their statistical significance by a t-test. Therefore, it is necessary to observe the statistical significance of the estimated coefficients of the ECT in order to conclude if there is a relationship running from immigration to real GDP per capita or the reverse.

Table 3. ECT in the VECM for different countries

COUNTRY	DEPENDENT VARIABLE	ECT	t-Statistic
Finland	D(LIMM)	-0.05	-5.81
	D(LGDPpc)	-0.006	*0.85*
Germany	D(LIMM)	-5.57	-4.88
	D(LGDPpc)	-0.45	-3.28
Italy	D(LIMM)	-1.04	-3.92
	D(LGDPpc)	-0.06	-2.41
Slovenia	D(LIMM)	-0.71	-3.53
	D(LGDPpc)	-0.02	-0.97
Spain	D(LIMM)	1.20	0.333
	D(LGDPpc)	-0.36	-2.04
Switzerland	D(LIMM)	-0.41	-2.26
	D(LGDPpc)	0.01	0.50

Note: The residuals show no serial autocorrelation

Table 3 provides the estimated coefficient associated with the ECT in both equations (1) and (2). The estimated coefficient in equation (1) for Italy are -1.0 and -0.06, respectively. Furthermore, both coefficients were found to be statistically significant and confirm the existence of a bidirectional long term Granger causality running from immigration to GDP per capita and vice versa. The deviation of the long run equilibrium of immigrants caused by a shock is corrected by 10 % over the following year and the correction is 0.6 % per year in case of deviation of long- run equilibrium of GDP per capita.

The values of the t- statistics for Germany and Italy show that the estimators associated with the ECT are significant. However, only the value of the parameter of the ECT in both equations (2) is in the interval (0; -1). The estimator associated with the ECT in equation 2 was also found significant and in the interval (0; -1) for Spain. Consequently, there is a long-run causality from Immigration to real GDP per capita for both countries Germany and Spain.   At first glance it could be that the absence of response of immigration to real GDP per capita in both countries Germany and

Spain is due to the restrictive immigration policy as it was pointed out for Switzerland (Liebig, 2002). Another explanation is the lack of attractiveness of the countries for potential immigrants despite economic growth. Taking into account that the main source of immigrants are EFTA/EU countries and that each competes with other developed economies to attract and select immigrants it implies that the nation is not competitive, i.e. other countries offer higher wages and more welfare benefits. Consequently, for the specific case of Spain immigrants may choice other destinations due to the traditional high unemployment rate in Spain that can be a handicap for recruiting foreign people. Of course we don't know the variables assumed by immigrants when making their decisions but it seems rational that they expect a better future in nations with lower unemployment rates and higher salaries than in countries like Spain with one of the highest unemployment rates in the EU over the last decades.

Futhermore, the results may indicate that since most part of the immigrants arrive in Germany and Spain from EU/EFTA Member States, within both freedom of movement for employees and access to the labor market. Their decision is not dependent on the business cycle of the host countries (ONS, 2017).   Other major source of immigration for Spain and Germany have the origin in historical links, Spain with Latin America and Germany with Eastern Europe (Zentralrat de Juden in Deutschland, 2009) that could also make immigration to those nations less dependent on Business cycles. This results are in line with both previous findings in the literature for Germany for the period 1970-2005 (González-Gómez and Otero-Giraldez, 2011) and for Spain from the macroeconomic point of view (Kangasmani et al, 2012) report the positive effects of the presence of foreign workers on economic growth, particularly in *Hotel and restaurants* and *transport and communication* industries, over the 1990s and earlier 2000s. Finally, the results show the existence

of long-run causality from real GDP per capita to number of immigrant for Switzerland, Finland and Slovenia.

4. Analysis based on Granger causality test

In order to apply the cointegration techniques developed by Johansen and Juselius (1990) or Engle and Granger (1987) it is necessary to verify that the time series are integrated of the same order. Although the autoregressive distributed lag (ARDL) bounds testing approach can be applicable irrespective of whether the times series are stationary in their levels or first differences (Pesaran and Pesaran, 1997), the dependent variable must be integrated of order one. In our case of two variables implies that Immigration and real GDP per capita should be both integrated of order one. Since in Real GDP per capita in Denmark, Netherlands, Iceland, Latvia and Sweden is integrated of order one and immigration stationary, neither Johansen and Juselius (1990) nor Engle and Granger (1987) nor Pesaran and Pesaran (1997) can be applied to test the existence of causality in both directions.

One alternative method of analysis, based on the causality concept developed by Granger (1969) can be employed to statistically study the relationship between both variables. The approach that has been widely applied in many studies starts with the construction of causal models:

$$IMM_t = a_0 + a_1 IMM_{t-1} + ... + a_p IMM_{t-p} + \beta_1 DGDP_{t-1} + ... + \beta_p DGDP_{t-p} + \varepsilon_t \quad [3]$$

$$DGDP_t = \mu_0 + \mu_1 DGDP_{t-1} + ... + \mu_p DGDP_{t-p} + \delta_1 IMM_{t-1} + ... + \delta_p IMM_{t-p} + u_t \quad [4]$$

where IMM and DGDP are the two series that must be stationary. The residuals of the models ε_t and μ_t must be uncorrelated white-noise series. The lag length is based on the no-correlation of the residual and the Akaike Information Criterion (Akaike 1973). The first equation means that the change in the dependent variable immigration (IMM) can be expressed as a function of its own past and of the past of real GDP per capita (GDP). In the same way, the second equation determines that the change in variable GDP per capita can be caused not only by their lags but also

by the past of the variable immigration. Therefore, the definition of causality in the sense of Granger implies that real GDP per capita is causing immigration if it is proved that some estimated coefficient β_i is statistically nonzero and the null hypothesis of the contrast with two restrictions is that real GDP per capita does not Granger-cause Immigration in the first regression $(H0:\beta_1=\beta_2=....=\beta_P=0)$. Similarly, immigration is causing real GDP per capita if it is demonstrated that some δ_i is statistically nonzero and the null hypothesis is that immigration does not Granger-cause real GDP per capita in the second regression $(H0:\delta_1=\delta_2=....=\delta_P=0)$. The statistical test used to contrast these hypotheses is the conventional F.

The results of the pairwise Granger causality between one difference for the real GDP per capita and the respective number of people arriving in each of these countries indicate that we can reject both null hypothesis at a 10% significance level for Denmark. As a results, the test provides evidence that there is a bidirectional causality. For Netherlands and Iceland unidirectional causality was found to run from Immigration to real GDP per capita. No evidence of causality was found for Latvia and Sweden.

Table 4. Granger causality test for different countries

COUNTRY	NULL HYPOTHESIS	p-value	Lag
Denmark	DLGDPpc does not Granger Cause LIMM	0.10	1
	LIMM does not Granger Cause DLGDPpc	0.01	3
Netherlands	DLGDPpc does not Granger Cause LIMM	0.11	1
	LIMM does not Granger Cause DLGDPpc	0.00	1
Iceland	DLGDPpc does not Granger Cause LIMM	0.94	3
	LIMM does not Granger Cause DLGDPpc	0.02	2
Latvia	DLGDPpc does not Granger Cause LIMM	0.72	3
	LIMM does not Granger Cause DLGDPpc	0.39	2
Sweden	DLGDPpc does not Granger Cause LIMM	0.36	1
	LIMM does not Granger Cause DLGDPpc	0.12	3

Note: The number of lags minimize Akaike information criterion.

5. Conclusions

The EU Member States Economies have undergone a remarkable economic transformation over the last decades and one of the greatest changes were the increasing linkages with the global economy, particularly the linkages with EU nations through trade, investment, common monetary policy and free movement of people. The EU/EFTA is a world center of immigration with traditional immigration countries such as Germany, UK, France, Belgium, Sweden etc. and other that abandoned the status of nations of emigrants and have become immigration countries (Italy, Spain). Due to both, the rising importance of the economic integration scheme of the EU and the agreement with the members of the Free Trade Association (EFTA), half of the immigrants arrive from EU-28 countries whereas proximity and historical links to North Africa, South America and non EU Europe seem to be the explanation for the other main sources of immigration. Indeed, the economic integration process in the EU includes the creation of a free market for labor in the EU countries. It reduces the cost of moving from one EU/EFTA Member State to a different one and affects the

immigration flows within the EU/EFTA nations and with other third countries. Therefore, in nearly all EU/EFTA countries the EU is the largest source of immigration. It is remarkable that among all EU-28/EFTA countries, three EFTA nations show the highest percentage of EU-28 immigrants in the total number of immigrants.

Moreover, it seems that immigrants coming from non-EU European nations are more likely to apply for naturalization than EU nationals that benefit from the European integration scheme similar to the recent waves of applications for naturalization by British nationals living in EU-27) countries (Faz, 2017) or EU-27 nationals living in Britain as a consequence of the Brexit referendum. When there are historical links such as between Germany and Jewish people from the former Soviet Union, between Spain and Portugal with Latin America, UK and the Commonwealth it is also more likely that immigrant qualify for naturalization.

On the other hand, free mobility of labor among EU and EFTA countries and the common external migration policy can reduce the damages that migration policy had on economic growth in the past in some countries such as Switzerland or increase it due to the existence of cheaper labor imposed by the free movement of labor within the EU/EFTA economic areas. Member States still can adopt specific systems of permits for immigrants or opt out the application of certain Directives such us the EU Blue Card Directive for third countries migrants in order to select their immigrants according to their needs in terms of economic growth and public acceptance of migration policy. Therefore, immigration policy characteristics may vary across different countries.

There is no conclusive evidence in the empirical literature regarding the relationship between immigration and GDP per capita. This study analyses it separately for EU-

countries with available data on immigration and GDP at Eurostat database. For this purpose, we followed the Granger Long-run causality based on both the Error Correction Model (ECM) and Johansen cointegration test where possible and the Granger causality test in the other cases.

Our empirical findings provide interesting and useful information for the public debate, the acceptance of immigration policy and, in terms of policy evaluation, represent important contributions to the existing literature. The main outcomes can be summarized in the following points:

(1) The results reveal that there is causality running from number of immigrant arriving in Germany, Iceland, Netherlands and Spain to real GDP per capita but not vice versa, so that immigration flows don't respond to jobs and/or better lifestyle opportunities in these host countries. Therefore, these findings suggest that possible pieces of legislation to control the number of foreign people have proved to be effective. Another explanation could be lower wages and/or higher unemployment rates or bad score on any other key characteristic to attract and select immigrants than in other competitors EU/EFTA- countries. The results may also indicate that since most part of the immigrants arrive from EU/EFTA Member States, within both freedom of movement for employees and access to the labor market and or due historical links, they are not dependent on the business cycle of the host countries and the immigration policy.   Nevertheless, immigration to these countries have had a sizable impact on GDP per capita, that is to say that despite the lack of attractiveness of these nations, immigrants contribute to economic growth.

(2) Causality running from real GDP per capita to immigration was found for Switzerland, Slovenia and Finland. It could suggest that although the possible selective migration policies on foreign immigrants may have contributed to

the public acceptance, they have not been effective as means of control of the number of foreigners. On the other hand, it also shows that these nations are attractive and show high level of competiveness when recruiting foreign population despite possible restrictive immigration policies. However, unfortunately the response of immigrants to economic growth did not contribute to economic growth.

(3) Bidirectional causality was found for Italy and Denmark. Consequently, possible pieces of legislation were not effective but could had played an important role in terms of public acceptance of migration and flows of immigrants have contributed to economic growth.

(4) No relationship was found for Latvia and Sweden, i.e. possible migration policies on foreign immigrants have been effective as means of control of the number of foreigners but may have caused a shortage of labor that acts as a bottleneck in the economy, damaging economic growth.

(5) Considering that the share of immigrants over the age of 65 arriving from EU-28 Member States in some countries is very high, we have analysed separately the immigrants age between 16 and 65 when data were available (Italy, Spain and Slovenia) and the results are similar to those obtained for all the immigrants.

Finally, the findings of this study should be regarded in light of its limitations, which persuit to some topics for future research. For instance, immigrants' statistics do not include refugees but at least in some countries that make an effort to integrate refugees in the labor market they replace economic migration flows.

References

Balaguer, J. and Cantavella-Jordá M, (2002). Tourism as a long-run economic growth factor: the Spanish case, *Applied Economics*, 34, 877-884.

Glyn, A (2004). The assessment: how fare has globalization gone? *Oxford Review of Economic Policy*, 20(1), 1-4.

Gonzalez-Gomez, M. and Otero-Giráldez, M. S. (2011). The causality between economic growth and immigration in Germany and Switzerland. *The Economic and Social Review,* 42(3), 271-287.

Engle, R.F. and Granger, C.W.J.(1987). Cointegration and Error Correction: Representation, Estimation and Testing", *Econometrica*, 55, 251-276.

Faz (2017). Immer mehr Briten wollen Deutsche werden. *Frankfurter Allgemeine Zeitung. http://www.faz.net/aktuell/wirtschaft/immer-mehr-briten-wollen-deutsche-werden-15059373.html*

Granger, C., (1969). Investigating Causal Relations by Econometric Models and Cross-Spectral Methods, *Econometrica*, Vol. 37, pp. 424-438.

Granger, C. (1988). Some Recent Developments in a Concept of Causality, *Journal of Econometrics*, 39, 199-211.

Johansen, S. and Juselius, K. (1990). Maximun Likelihood Estimation and Inference on Cointegration with Applicationes to the Demand for Money. *Oxford Bulletin of Economics and Statistics*, Vol. 52, pp. 169-210.

Kangasniemi, M., Mas, M., Robinson, C. and Serrano, L. (2012). The economic impact of migration: productivity analysis for Spain and the UK *J Prod Anal,* 38,333–343 DOI 10.1007/s11123-012-0280-4

Lewis, E. (2004) Lewis, E. (2004). Local Open Economics within the US: How do Industries Respond to Immigration?, *Federal Reserve Bank of Philadelphia Working Paper* No. 04.

Liebig, T., (2002). Switzerland's Immigration Policy: Lessons for Germany?, *Diskussions papiere* Nr. 76, Institut für Arbeit und Arbeitsrecht, Universität St. Gallen.

MacKinnon, J., Haug, A. and Michelis, L. (1999). Numerical Distribution Functions of Likelihood Ratio Test for Cointegration", *Journal of Applied Econometrics*, 14, 563-577.

Morley, B., (2006). Causality Between Economic Growth and Immigration: An ADRL Bounds Testing Approach, *Economics Letters,* 90, 72-76.

Nickell, S. and J. Saleheen (2015). The Impact of Immigration on Occupational Wages:Evidence from Britain. *Bank of England Staff Working Paper* No. 574.

Office for National Statistics–ONS (2017). Migration Statistics Quarterly Report: May 2017.
https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/bulletins/migrationstatisticsquarterlyreport/may2017

Pesaran, M.H. & Pesaran, B. (1997). Working with Microfit 4.0: Interactive econometric analysis. Oxford University Press, Oxford

Salt, J. and Miller, J. (2006) Foreign labour in the UK: Current patterns and trends. *Labour Market Trends*, 11(10), 35-355

Stalder, P., Frick,A., GaillardD, S.and Salzgeber, R. (1994). Auswirkungen der Ausländerpolitik auf den Strukturwandel in der Schweiz: Schätzungen und Simulationen mit einem ökonometrischen gesamtwirtschaftlichen 4-Sektoren Modell, *Schlussbericht/Nationales Forschungsprogramm,* 27.

Tapinos, G. (1993). The Macroeconomic Impact of Immigration: Review of the Literature Published Since the Mid-1970s. *Trends in International Migration*, 157-