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The determinants of migration to the EU: evidence from residence permits data

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Abstract

The report analyzes the drivers of different forms of migration. Specifically, using Eurostat data on new residence permits issued by EU countries to Third-Country Nationals, we are able to distinguish among five channels of entry and stay in Europe: family, work-related, education, humanitarian, and other reasons. We estimate several panel data gravity models for each of the groups of migrants, for the period 2008-2015. We find that geographical and cultural bilateral variables influence all forms of migration similarly. We provide evidence of network effects, especially for the groups of family and work-related migrants. Population growth in the country of origin is negatively associated with migration, except for the group corresponding to the humanitarian channel of entry into the EU. Increasing economic disparities between the origin and the destination countries, measured with GDP per-capita, are associated with higher migration movements, though not for all the groups. Restrictive migration policies in the destination country and travel visa restrictions seem to act as a deterrent for migration.

1. Introduction

There does not exist an exhaustive theory of the reasons determining migrations. International wage differences, net of migration costs, are considered as the main drivers of economic migration (Bodvarsson and Van Den Berg, 2009). However, these disparities between countries might not be decisive in influencing non-economic migrations. This could be the case for individuals moving for family, education, or humanitarian motives. Similarly, a comprehensive empirical analysis of the determinants of different forms of migration does not exist. This report explores the above research gap at the empirical level, addressing the following question. What is the relative weight of international migration drivers for different migrant groups? Migration movements of Third-Country Nationals (TCNs) to Europe constitute the focus of the analysis. Indeed, EU policy makers are currently in need of a deeper understanding of the drivers of migration forms for better migration governance in the medium-term. Moreover, identifying the determinants of migration for the different groups of migrants is necessary to design policies targeted at each of the groups.

To identify different forms of migration, we use Eurostat data on residence permits which contain information on the legal channels to enter and reside in Europe. Specifically, data allow us to distinguish among five reasons of entry and stay in the EU: family reasons (i.e. family formation or reunification), work-related reasons, education purposes (e.g. the case of students admitted to higher education courses), humanitarian reasons (such as refugees or individuals granted subsidiary protection, victims of human trafficking, unaccompanied minors), and other reasons (e.g. retirees). Interestingly, Eurostat data are bilateral, i.e. they contain information on the number of new residence permits issued by EEA countries (plus Switzerland) to TCNs of any citizenship, from 2008 to 2015. Data constraints constitute the main limitation to the study of different migration forms. Indeed, bilateral data on international migration inflows are aggregated and do not allow differentiating among groups of migrants. Hence, the main novelty of this report is that we address this issue using data of residence permits disaggregated by reason. However, as it will be detailed in the next section, some cautiousness is needed when using residence permits as a proxy for migration inflows.

We estimate several specifications of panel data gravity models using bilateral residence permits data for each of the five mentioned groups of migrants, separately. The results of this report suggest that dyadic variables (i.e. geographical and cultural) affect all the groups, with geographical distance acting as deterrent of migration especially for family migrants. Networks established through past migration play an important role in determining migration movements, especially for family and work-related migrants. Population growth in the country of origin is negatively associated with migrations of all the groups, except for the one of humanitarian migrants. The role of variables measuring the economic conditions in the countries of origin and destination is also explored. Increasing disparities in GDP per-capita between the origin and the destination countries are associated with higher migration movements between pairs of countries. This holds for all groups, except for the humanitarian one. However, such relation is not confirmed in all the sensitivity

analyses. We also seek evidence of the role of migration policies and travel visa restrictions in shaping migration patterns. For instance, we find that a relatively low strictness of family reunification policies in the destination country is associated with higher number of residence permits issued for family reasons. Travel visa restrictions seem to act as an obstacle to migration movements for all migrant groups. Finally, we perform sensitivity analysis using the Poisson model to address the problem of the presence of observations of residence permits equal to zero for several country-pairs. The sensitivity analysis suggests that the inclusion of zero-residence permit observations does not alter most of the results. Overall, our analysis confirms that drivers of human mobility do not have the same influence for all forms of migration. Hence, it is crucial to study separately each of the migrant groups.

Data limitations have prevented an extensive analysis of the drivers of different forms and channels of migration. Indeed, international migration inflows data are normally aggregated. However, there are some notable exceptions. For instance, for the education channel, Beine et al. (2014) study the determinants of the mobility of international students. Using data on students from UNESCO, OECD and EUROSTAT, they find that previous networks of high-skilled migrants positively influence student mobility. The cost of living in the country of destination and the quality of universities are also attractors of foreign students. For the family channel, the empirical literature investigating the drivers of migration is scant. Among the few exceptions, Nivalainen (2004) analyzes the pattern of migration of Finnish households. His results indicate that family migration movements are mainly motivated by the the husbands' need to move abroad for career related reason. There is a wide recognition that migration for humanitarian reasons is driven by non-economic considerations. Moreover, the profile of asylum seekers and refugees is generally different from the one of economic-migrants (Dustmann et al., 2016). However, to the best of our knowledge, a deep analysis of the determinants of such complex forms of migration has not been carried-out yet.

From the methodological perspective, we contribute to the literature employing panel data gravity models to identify the economic and non-economic drivers of bilateral migration movements at the macro-level (for recent reviews on gravity models on migration, see Beine et al., 2016; Ramos, 2016). Indeed, we find that these drivers differ and weigh differently for the various migration forms. Hence, our results point out the need to analyze them separately.

The remainder of the report is organized as follows: Section 2 illustrates data on residence permits and shows some facts and figures based on such data. Section 3 contains the empirical analysis and the main regression results. Robustness checks are performed in Section 4. Our concluding remarks are in Section 5.

2. Descriptive evidence

2.1 Data

Our analysis is based on the Eurostat *residence permits* database, available for the period 2008-2015. Data contain yearly information on the number of *first* residence permits, i.e. any authorization issued to a TCN for the first time allowing the TCN to stay legally in Europe¹. Importantly, data are bilateral: in other words, they record the number of residence permits issued to TCNs of any non-EU citizenship by any given European country². Data include information on the length of the validity of the residence permit³. For our analysis, we use residence permits with validity of at least 12 months. This is for consistency with the United Nations definition of long-term migrants, i.e. individuals moving their usual residence to another country for at least a year⁴. Even more importantly, permits are classified according to the *reasons* for their issuance. Such reasons indicate the regular channels to enter and reside in Europe. Five main categories (reasons) can be distinguished: family, occupation, education, humanitarian, and other reasons⁵.

The category of family includes permits issued for family formation or reunification. These permits are granted to spouses, children, and other family components joining either a TCN or an EU-citizen family member⁶. Moreover, individuals who join their family and also obtain the permission to work are recorded in the family category. The channel of occupation is broad and consists of permits issued to high-skilled workers, holders of EU-Blue Card, researchers⁷, seasonal and other migrant workers who have obtained an authorization to work in a given European country. Residence permits for education reasons are granted to students, i.e. individuals admitted to any full-time higher education course. Additionally, those permits are given to unremunerated trainees, volunteers, school pupils⁸. The group of humanitarian residence permits is also broad and heterogeneous. Indeed, it includes TCNs who obtain subsidiary protection, refugees, unaccompanied minors, and victims of human trafficking. These statuses are recognized by the European regulation⁹. TCNs who obtain a residence permit for other humanitarian reasons as defined by national laws (and not necessarily harmonized across countries) are comprised in

¹According to Eurostat definition, *first* permits include also renewed permits granted to the same individual for the same reason. To be considered as *first*, the validity of the new permit has to start at least six months after the cessation of the validity of the old permit. For further details, please see Eurostat (2015).

²Precisely, European Economic Area countries (EEA) and Switzerland.

³Three types of permits can be identified: validity between 3 and 5 months, validity between 6 and 11 months, validity equal to or greater than 12 months.

⁴See Recommendations on Statistics of International Migration, Revision 1 (1998), United Nations

⁵It should be noticed that the five reasons listed here do not exactly correspond to the ones defined by Eurostat. Indeed, here we split Eurostat category "Other" into two categories, i.e. humanitarian and other.

⁶These two sub-cases are regulated by the Family Reunification Directive 2003/86/EC and by the Directive 2004/38/EC, respectively. Individuals receiving a permit for family-related reasons according to the national legislations are also included in the category of family (Eurostat, 2015).

⁷The categories of high-skilled workers and EU-Blue Card holders are defined in Directive 2009/50/EC, while researchers in Directive 2005/71/EC.

⁸The definitions and the regulation of the different channels of entry for education reasons fall under the Directive 2004/114/EC.

⁹Specifically, they fall under the regulation of Directive 2004/83/EC and Directive 2004/81/EC.

the humanitarian channel. Finally, the residual category, other, is composed by individuals who are granted residence only (e.g. retirees who simply intend to live in European countries, without any other reasons as family reunification), plus other not specified motives.

The main advantage of analysing migration of TCNs using residence permits rather than bilateral migration flows data is the opportunity to identify the different channels of entry and stay in Europe. In fact, migration flows data, commonly used and analysed in the literature, are aggregated. Thus, they do not allow to distinguish among different forms of migration. This particular characteristic of residence permits data allows to identify whether the key drivers of migration hold true for all the categories and whether they exert the same influence for immigrants coming for different motives¹⁰. Do the channels to obtain residence permits mirror the real motive to enter the EU? When examining first residence permits data, we can provide a positive answer to this question. Indeed, a first permit is issued to an individual for the first time, hence it reflects the actual motive of the migrant's admission to the EU. It should also be mentioned that TCNs are allowed to renew their residence permit and to change its status (e.g. change from education to work-related permit). However, since we treat residence permits as a proxy for migration inflows, we are interested in the status of the residence permit at the time of a TCN's entry into the EU, rather than in its evolution over time. It should also be noticed that the implementation of residence permits data collection might still differ among countries. Therefore, while data comparability between years is guaranteed, some cautiousness is needed for their cross-country comparability (for details see Eurostat, 2015)¹¹. Despite this issue, residence permits data, until now largely unexplored, have the potential to shed light on the evolution of several forms of migration in the EU and on their corresponding determinants.

2.2 Facts and figures

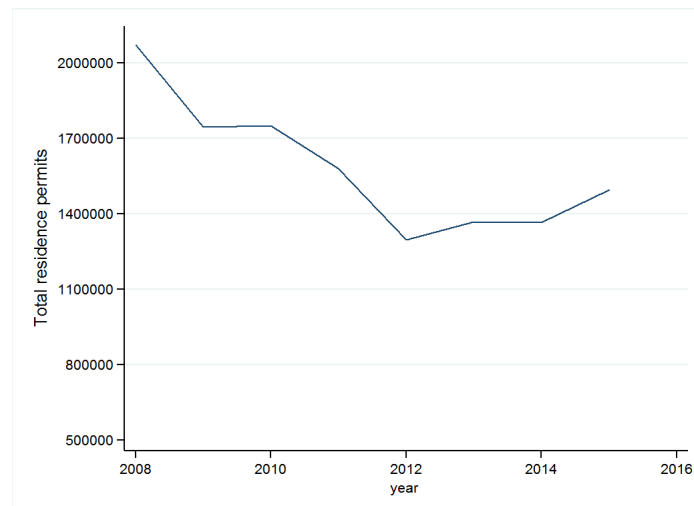
A first look at residence permits data reveals that the absolute number of first permits issued by EEA countries and Switzerland ranges between 1.3 and almost 2.1 million over the period 2008-2015. After the reduction of issued permits taking place from 2008 to 2012, a slight increase can be observed again in more recent years (see Figure 1 below). In 2015, the majority of first permits is issued for family reasons, which represent 41 percent of total permits. Lower shares can be observed for education and work-related reasons, which account for 19 and 15 percent of total permits in the same year, respectively (see Figure 2). Regarding the remaining two channels of entry, the "other reasons" channel barely reaches 14 percent of total permits, while the humanitarian one is below 10 percent in 2015 and does not display a dramatic increase over the period 2008-2015 (see Figure

¹⁰It should be noticed that residence permits data have to be considered as a proxy of migration flows with caution. Indeed, as explained before, first permits could also contain individuals already living in the country, whose old permit was expired at least six months before the issuing of the new permit for the same reason.

¹¹A minor data concern is related to the possible abuse of the legal channels to enter the EU. For instance, a TCNs can enter through the education channel, and then stay in the EU for another reason, e.g. for work-related motives. Besides anecdotal evidence, the real size of this phenomenon is unknown.

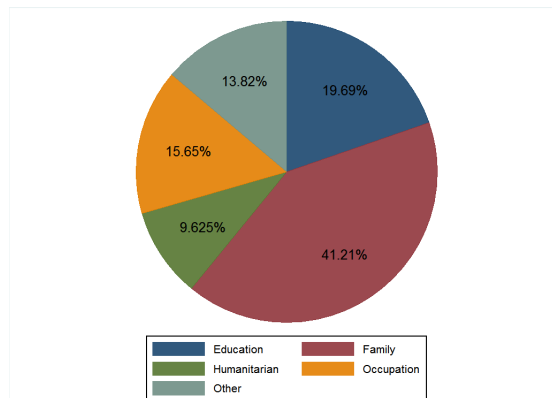
3). Instead, permits for work-related, family and education reasons exhibit more variation over time. In particular, permits for work are generally declining from 2010 and remain quite stable after that year. Family and education related permits decrease from 2010 to 2012 and start to slightly increase thereafter (see Figure 3 below).

Figure 1: Residence permits issued by EEA countries and Switzerland. Years: 2008-2015.



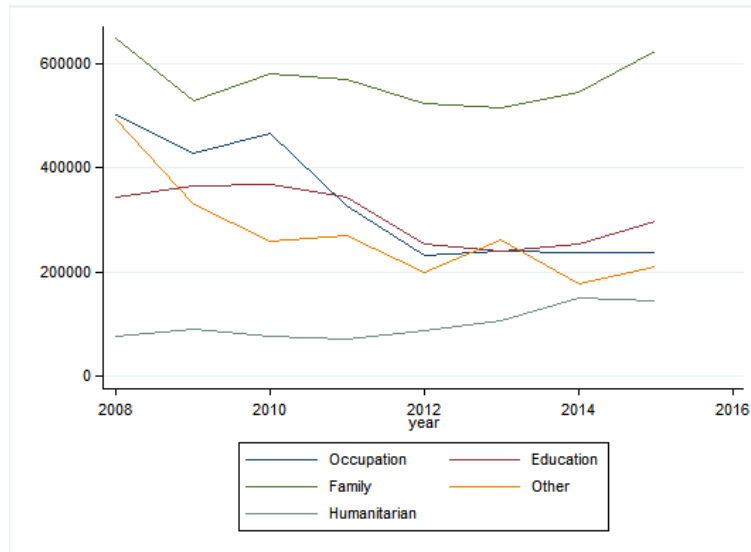
Notes: Source: own calculation based on Eurostat residence permits data. Only residence permits with validity of at least 12 months are included.

Figure 2: Residence permits issued by EEA countries and Switzerland, by reason. Year: 2015.



Notes: Source: own calculation based on Eurostat residence permits data. Eurostat category "Other" here is split into "humanitarian" and "other" categories. Only residence permits with validity of at least 12 months are included.

Figure 3: Residence permits issued by EEA countries and Switzerland, by reason. Years: 2008-2015.



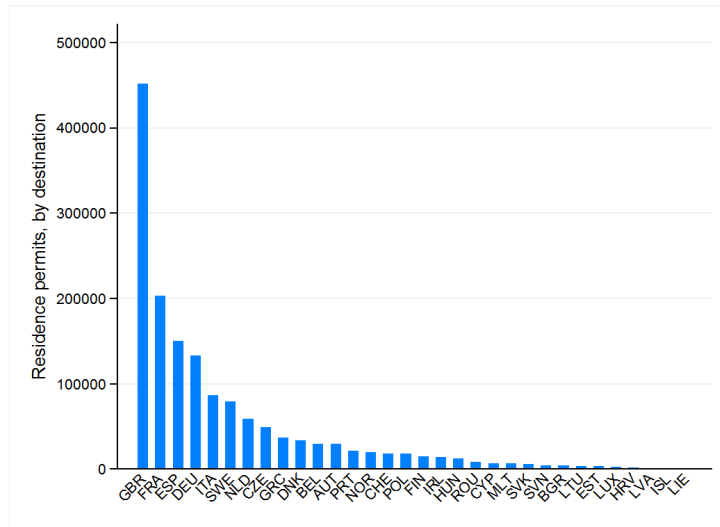
Notes: Source: own calculation based on Eurostat residence permits data. Eurostat category "Other" here is split into "Humanitarian" and "Other" categories. Only residence permits with validity of at least 12 months are included.

When breaking down residence permits by destination, we can observe an uneven distribution among EEA countries. In 2015, Great Britain has issued the highest value, in absolute numbers, of residence permits (451 thousand permits). It is followed by France, Spain, Germany, Italy, and Sweden, that issue a considerably lower number of permits (approximately 200 thousand each for the same year. See Figure 4 below). Figure 5 shows that the bulk of residence permits in Great Britain is issued for education and other reasons. Instead, in the other top five destinations, family is the largest channel of entry.

Similarly, residence permits can be disaggregated by origin country, i.e. by the citizenship of TCNs obtaining the permit. Figure 6 plots the number of residence permits and shows the top sending TCNs in 2015, with United States in the highest position. China, Syria, India, and Morocco follow. Further break down by reason of entry (see Figure 7) suggests that in 2015 the majority of United States citizens obtained residence permits for other reasons, whereas Chinese citizens entered and stayed in Europe mostly for education reasons.

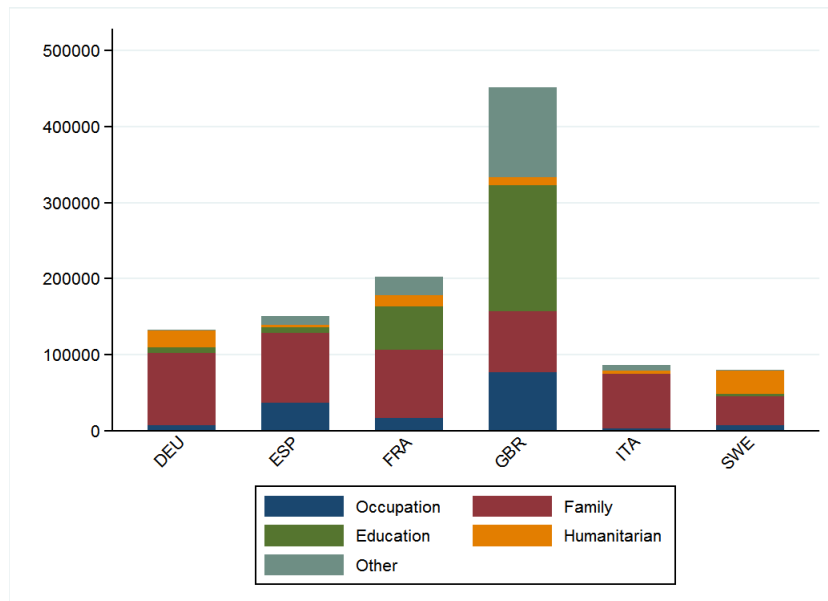
Finally, we can break down residence permits by destination, origin, and reason. Figure 8 represents the dis-aggregation along these three dimensions in 2015. The same patterns emerge: Great Britain is the country issuing the biggest volume of residence permits, mostly to citizens of the United State (for other reasons), of India (for occupation and family reasons) and of China (for education reasons). Overall, the family reason was the prevalent channel in 2015.

Figure 4: Residence permits by EEA and Switzerland (or destination countries). Year: 2015.



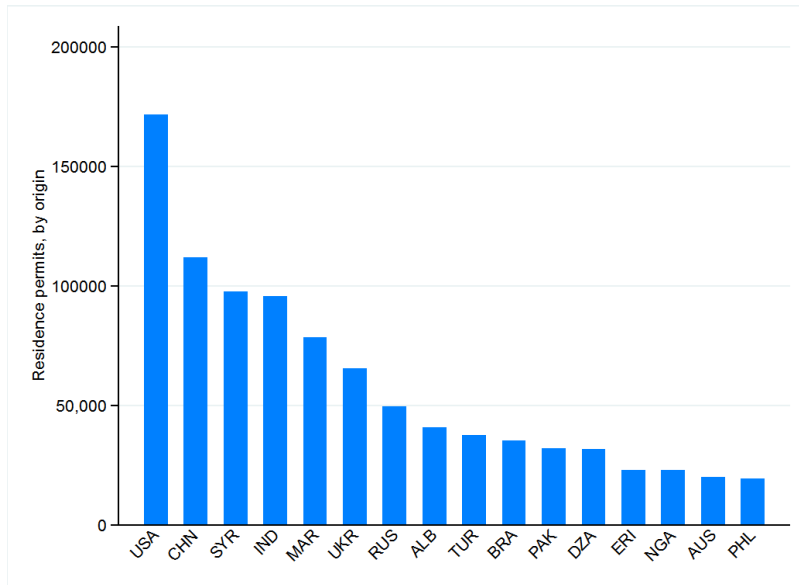
Notes: Source: own calculation based on Eurostat residence permits data. Only residence permits with validity of at least 12 months are included.

Figure 5: Residence permits in top destination countries, by reason. Year: 2015.



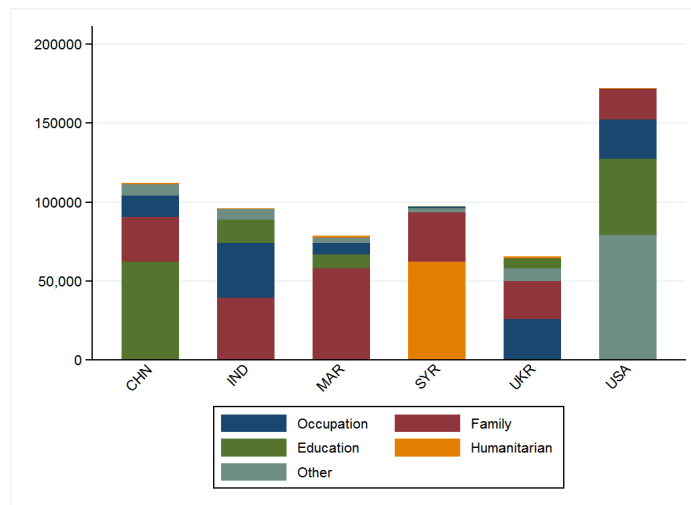
Notes: Source: own calculation based on Eurostat residence permits data. Eurostat category "Other" here is split into "Humanitarian" and "Other" categories. Only residence permits with validity of at least 12 months are included.

Figure 6: Residence permits by origin country. Year: 2015.



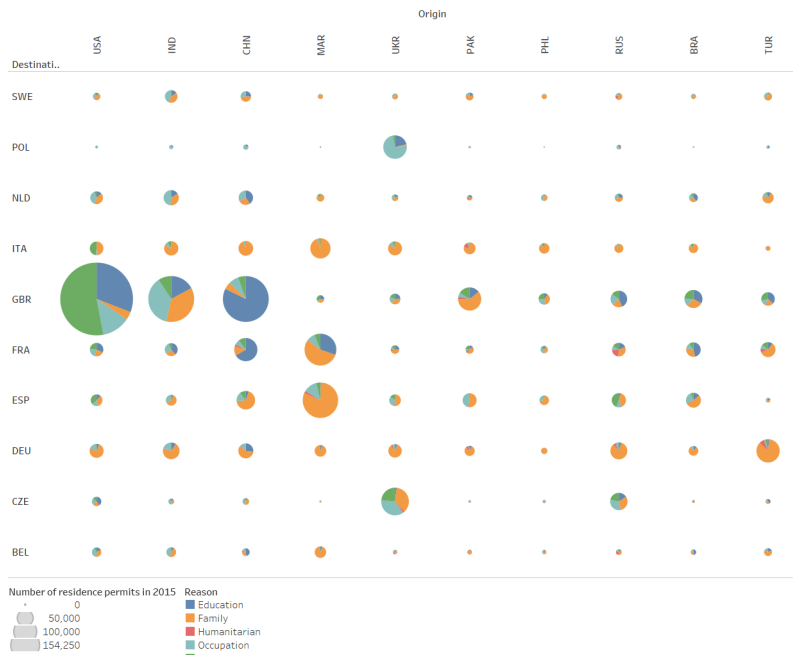
Notes: Source: own calculation based on Eurostat residence permits data. Only residence permits with validity of at least 12 months are included. EUROSTAT data on residence permits.

Figure 7: Residence permits in top origin countries, by reason. Year: 2015.



Notes: Source: own calculation based on Eurostat residence permits data. Eurostat category "Other" here is split into "humanitarian" and "other" categories. Only residence permits with validity of at least 12 months are included.

Figure 8: Residence permits by origin and destination countries. Year: 2015.



Notes: Source: own calculation based on Eurostat residence permits data. Eurostat category "Other" here is split into "humanitarian" and "other" categories. Only residence permits with validity of at least 12 months are included.

3. Determinants of migration: evidence from residence permits data

3.1 Empirical specification

The objective of this report is to identify the drivers of inflows of TCNs into the EU using bilateral residence permits, i.e. data containing information on permits issued by European countries to citizens of any third-country nationality. We follow the gravity approach commonly used to seek empirical evidence of the determinants of bilateral migration movements. We estimate the following gravity equation:

$$\ln\left(\frac{ResPer_{odt}}{Pop_{ot}}\right) = \beta_0 + \beta_1 \ln(dist)_{od} + \beta_2 contig_{od} + \beta_3 colony_{od} + \beta_4 com.lang_{od} + \\ + \beta_5 com.leg_{od} + \beta_6 \ln(migrstock)_{odt-1} + \beta_7 \ln(earn)_{dt-1} + \beta_8 \ln(GDPcpt.rat)_{odt} + \\ + \beta_9 \ln(pop.grt)_{ot} + c_t + c_o + c_d + \epsilon_{odt},$$

where $t = 2008, \dots, 2015$, o indicates 161 Third-Countries, d 31 EEA countries and Switzerland. For details about the data, please see Table 4 in the Appendix. The dependent variable, $\frac{ResPer_{odt}}{Pop_{ot}}$, is the ratio of first residence permits (with duration of at least 12 months) issued by country d to TCNs with citizenship from country o , in year t , and the population of country o . As it is common in gravity equations, we include a set of dyadic geographical and cultural variables: the distance between the capital of country o and d , $\ln(dist)_{od}$, and a control for whether they are neighbour, $contig_{od}$. $colony_{od}$ is a dummy variable indicating whether there has been a colonial relationship between o and d . $com.lang_{od}$ and $com.leg_{od}$ control for the presence of common language and legal system, respectively. To control for the network effects, we use the stock of migrants from origin o residing in country d in the previous year, $\ln(migrstock)_{odt-1}$. To capture the difference of economic conditions between the country of origin and the destination, we introduce the ratio between o and d of GDP per-capita, in natural logarithm, i.e. $\ln(GDPcpt.rat)_{odt}$. As economic variable, we also include the net earnings in the destination country, $\ln(earn)_{dt}$. First, it should be noticed that earnings are lagged by one year to mitigate the possible issue of reverse causality (i.e. the influence exerted by migrants on earnings in the destination country. See, for instance, Mayda, 2010). Unfortunately, comprehensive and comparable data on net earnings for all the Third-Countries do not exist, hence we cannot control for the earnings at the origin. As demographic variable, we use the population growth in the origin country, $\ln(pop.grt)_{ot}$. We include time dummies to control for the yearly shocks common to all countries. We also introduce destination and regional origin dummies¹² to control for the time-invariant unobserved heterogeneity.

The model is estimated using least squares dummy variables. We run three sets of regressions, separately. In the first set, we use total residence permits. In other words, the dependent variable consists of all permits, independently of the reason for their issuance. In the second set of estimations, we run regressions separately for each of the five groups of reasons (family, education, work, humanitarian, and

¹²Since we have 160 origin countries, we group origins into-macro regions and include regional dummies. In this way, we avoid to lose a non-negligible number of degrees of freedom. Using regional dummies, we are also able to gain additional variation. However, we also present one of the specifications including all the origin dummies.

other). We then compare the estimated coefficients and we test whether they are statistically different between groups. Indeed, our aim is to investigate whether the key drivers of migration patterns in EU, here measured through residence permits, differ according to the forms and motives for migrating. In the third group of regressions, we include controls for travel visa restrictions and migration policies. These regressions are run separately from the previous ones. Indeed, the policy indicators cover only specific policies (e.g. strictness of family reunification policies), hence they are included only in the regressions for the groups affected by such measures. In Section 4, we run several robustness checks. For the sensitivity analysis, we estimate a Poisson regression model for count data. Indeed, residence permits contain non-negligible number of zero observations, especially the ones disaggregated by reason. Moreover, we present additional specifications including different economic controls for the origin and the destination countries.

3.2 Total residence permits

The first set of regressions using total residence permits is shown in Table 1. The results confirm the findings of the literature which analyzes the determinants of international migration using bilateral aggregate migration rates data (see, for instance, Beine et al., 2016). Indeed, networks of previous migrants, geographic, and cultural bilateral variables are crucial in determining bilateral migration patterns. For instance, a 1 percent increase in the stock of previous migrants with the same citizenship is associated with an increase of bilateral residence permits ranging from 1.6 to 1.9 percent. Differences in economic conditions between origin and destination countries, measured through the ratio of GDP per-capita between origin and destination, positively affect the dependent variable. This means that increasing differences of GDP per-capita between the origin and the destination are associated with higher inflows of TCNs. Net earnings in the destination country are not significant (see specification 2, Table 1). The population growth in the origin country is negatively associated with the dependent variable (see specification 4). However, when all origin dummies are included, the coefficient loses significance (see specification 5).

Table 1: Main regression results. Total first residence permits.

<i>Dep. Var.</i> : $\ln\left(\frac{\text{Res.Per.}_{odt}}{\text{Pop}_{ot}}\right)$	(1)	(2)	(3)	(4)	(5)
In dist.	-0.905*** (0.091)	-0.905*** (0.091)	-1.087*** (0.088)	-0.991*** (0.091)	-0.735*** (0.130)
contig.	0.083 (0.318)	0.083 (0.318)	-0.160 (0.356)	-0.157 (0.350)	0.111 (0.237)
colony	1.007*** (0.353)	1.007*** (0.353)	1.059*** (0.358)	1.110*** (0.359)	0.996*** (0.223)
com. lang.	1.275*** (0.171)	1.275*** (0.171)	1.228*** (0.161)	1.196*** (0.158)	0.719*** (0.107)
com. leg.	0.364*** (0.092)	0.364*** (0.092)	0.446*** (0.092)	0.480*** (0.091)	0.502*** (0.065)
In migr. stock _{t-1}	0.198*** (0.014)	0.198*** (0.014)	0.171*** (0.013)	0.163*** (0.013)	0.309*** (0.015)
$\ln(\text{earn})_{dt-1}$		-0.130 (0.1952)	0.300*** (0.027)		
$\ln(\text{GDPcpt.rat})_{odt}$			0.314*** (0.028)	0.300*** (0.027)	-0.554*** (0.132)
pop. grt. _{ot}				-0.173*** (0.024)	-0.014 (0.015)
Year dummies	yes	yes	yes	yes	yes
Destination dummies	yes	yes	yes	yes	yes
Origin regional dummies	yes	yes	yes	yes	no
Origin dummies	no	no	no	no	yes
<i>R</i> ²	0.557	0.558	0.588	0.595	0.775
Obs	14289	14287	13827	13827	13827

Notes: 10%, 5% and 1% levels of confidence indicated by *, ** and *** respectively. Robust standard errors clustered at the country-pair level.

3.3 Residence permits by reason

In the second set of regressions, we use first residence permits data disaggregated by reason for issuing the permit. We estimate the same specification as the one in column 4, Table 1. The results are reported in Table 2. The following main facts emerge: first, the dyadic variables (i.e. geographical distance and contiguity between country pairs, the presence of colonial ties, common language, and common legal system between the origin and the destination) influence all channels of migration. In particular, geographical distance is negative and significant for all the groups. Additionally, when comparing the estimated coefficients of the distance, we find that they are statistically different between groups. For instance, the coefficient for the group family is higher and statistically different from the ones of education, work-related, and other groups. Instead, it is not statistically different from the one of the humanitarian group¹³. In other words, geographical distance is found to exert a higher influence on the movements of family migrants rather than on the other groups.

Interestingly, we can observe that the relation between migrant networks and residence permits remains positive and significant only for the groups of family and occupation (see Table 2). Moreover, when performing the test as before, we find that the coefficients of the network effects are statistically different between the two groups. Family migrants are the most affected by the presence of previous migrant communities. This suggests that networks are more important for family migrants rather than for individuals migrated for work-related reasons. This could be due to the fact that most EU countries have demand-driven labour migration systems (Czaika and Parsons, 2009). This means that a TCN needs either the sponsor of an employer or a job-offer to be eligible for a work-related residence permit. Hence, migrant workers might not necessarily need the support of previous migrant communities to find a job. Networks might simply act as facilitator of their migration movements. Instead, the role of network is crucial for family migrants. For instance, previous communities might reduce migration costs for new immigrants, provide them with information about the life conditions in the destination countries, support their possible job search after they have entered the EU as family migrants. Surprisingly, the positive network effect disappears for the other groups.

As for the total residence permits, the GDP per-capita ratio is positive and significant for all the groups, except for the humanitarian one. Indeed, for the latter it becomes negative and significant. This means that an increasing disparity in economic conditions between the origin and the destination is associated with decreasing residence permits for humanitarian reasons. Finally, population growth in the origin country is negatively associated with residence permits for all categories except for the humanitarian one. Strictly speaking, population growth in a given year is driven either by the excess of births over deaths, or by positive net migration¹⁴, or both. Hence, we can interpret the result as follows. In countries where population growth is driven by excess of births, an increasing number of new-borns

¹³Specifically, we perform a Chow test to check whether the estimated coefficient of one group is equal to the estimated coefficient of another group. We repeat the test for each of the estimated coefficients, comparing two groups at a time. This results in ten tests for each of the regressors. Hence, due to space constraints, the test statistics are not reported here.

¹⁴In case of positive net migration, immigration is higher than emigration.

might discourage individuals' mobility. Indeed, the presence of a new-born might make mobility difficult. In countries where population growth is mainly driven by positive net migration the issue of reverse causality may arise. Indeed, population changes in the origin country could be influenced by the country's migration dynamics. To mitigate this issue, we also run regressions using population growth lagged by one year. These specifications confirm the negative relationship between population growth in the country of origin and the number of residence permits.

Summing up, the analysis of residence permits disaggregated by reasons reveals that there are some differences in the drivers of migration among groups. Importantly, distance and migrant networks weight more for family migrants rather than for all the other groups. Increasing economic disparities between the origin and the destination increases migration movements for all groups, except that for the humanitarian one. Despite the cautiousness needed when distinguishing among several migrants' groups due to the data caveats explained in the previous section, the results confirm that migration drivers weight differently for each of the groups.

Table 2: Main regression results. First residence permits by reason.

<i>Dep.Var.:</i> $\ln\left(\frac{\text{Res.Per.}_{odt}}{\text{Pop}_{ot}}\right)$	(FAM)	(EDUC)	(WORK)	(HUMAN)	(OTH)
In dist.	-1.108*** (0.040)	-0.764*** (0.047)	-0.876*** (0.049)	-1.003*** (0.082)	-0.691*** (0.057)
contig.	-0.317* (0.192)	-0.298 (0.197)	-0.267 (0.212)	-1.436*** (0.360)	0.555** (0.220)
colony	1.224*** (0.107)	1.898*** (0.112)	1.177*** (0.123)	0.942*** (0.174)	1.311*** (0.130)
com. lang.	1.188*** (0.070)	1.084*** (0.074)	1.201*** (0.087)	0.467*** (0.113)	0.917*** (0.088)
com. leg.	0.299*** (0.039)	0.539*** (0.045)	0.583*** (0.046)	0.370*** (0.073)	0.607*** (0.051)
In migr. stock _{t-1}	0.142*** (0.006)	-0.032*** (0.007)	0.066*** (0.008)	-0.001 (0.012)	-0.031*** (0.009)
$\ln(\text{GDPcpt.rat})_{odt}$	0.270*** (0.014)	0.438*** (0.0160)	0.386*** (0.017)	-0.123*** (0.030)	0.248*** (0.020)
$\ln(\text{pop. grt})_{ot}$	-0.193*** (0.014)	-0.080*** (0.015)	-0.189*** (0.017)	0.103*** (0.028)	-0.065*** (0.018)
Year dummies	yes	yes	yes	yes	yes
Destination dummies	yes	yes	yes	yes	yes
Origin regional dummies	yes	yes	yes	yes	yes
R^2	0.586	0.462	0.524	0.284	0.465
Obs	11907	0.462	8765	5548	7330

10%, 5% and 1% levels of confidence indicated by *, ** and *** respectively.

3.4 The role of policies

In this sub-section, we investigate whether policies in the destination country and travel visa requirements influence the patterns of residence permits. It should firstly be noticed that policies are quite stable over time. Additionally, in our analysis we use a relatively short panel (i.e. 8 years, from 2008 to 2015). Hence, policies which do not display changes over time, cultural and institutional factors (such as the country level of bureaucracy and efficiency), and other unobservable time invariant characteristics of the destination countries are captured by the destination fixed effects.

To analyse the role of policies, we use the Migrant Integration Policy Index (Mipex), which indicates the extent to which migration and integration policies are restrictive or favorable for migrants. Specifically, the Mipex includes several indicators and sub-indicators which capture the strictness of different policy dimensions. It should be noticed that even though the Mipex index is commonly used to measure integration policies, we select those Mipex sub-indicators which proxy admission and migration policies. For instance, the index *mipex family*, is a composite indicator measuring whether *legally resident foreign citizens have a facilitated right to reunite in their families (e.g. like nationals or EU citizens who move from one Member State to another)*¹⁵. This indicator is built including several aspects such as eligibility conditions to obtain the the status of family reunification, the security of the status, and the rights associated with such status). It takes values from 0 to 100, with higher values indicating a more favorable or less restrictive policy. In the regressions for the family group, we use the lagged indicator since the role of policies in influencing the issuance of residence permits might not be instantaneous (for details about the Mipex, please see Table 4 in the Appendix). In the regressions for the group of occupation we include the *mipex occup* indicator. This measures whether *legally-resident foreign citizens have comparable workers' rights and opportunities like nationals to access jobs and improve their skills*. As before, it is based on several dimensions, such as the access to the labour market and to general and targeted support (such as public employment services)¹⁶. The results of the regression including the Mipex indicators are reported in Table 3. The coefficient of the lagged family indicator is positive and significant for the family group. Hence, more favorable and sportive family reunification policies are associated with higher residence permits for family reasons. Similarly, the coefficient of *mipex occup_{at-1}* is positive and significant. In other words, a labour market supporting immigrants and where TCNs have similar rights as to the ones of native workers tends to be associated with more residence permits for occupation.

As a final step we introduce a dummy variable for travel visa requirements. In our analysis we use Visa Network data (see Table 4 in the appendix) from Mau et al. (2015). Their database contains information on whether a given destination imposes pre-arrival visa restrictions (such as passports or health requirements) to any

¹⁵<http://mipex.eu/>

¹⁶It should be noticed that the Mipex also includes a general indicator for Education. However, we do not include it in the regression for the group of education since it measures the extent to which migrants' children are encouraged to achieve in schools as the nationals and education support measures are targeted at them. Hence, the index does not refer to researchers and students' admitted to higher education courses, as the ones included in residence permits data.

given TCNs in 1969 and in 2010 (i.e. $visa_{od}$ is a dummy equal to one if restrictions are in place). We use data for 2010 and, due to data constraints, we assume that bilateral visa are constant over the period considered (i.e. we use the dummy for 2010 for all the years in our analysis, 2008-2015). We estimate the model using total residence permits. Indeed, all migration movements, independently of their form, might be influenced by travel restrictions. From the results, we can observe that the coefficient of visa is negative and statistically significant at 5 percent level (see the third column of Table 3). Bilateral visa restrictions are negatively associated with the total residence permits. However, it could be argued that travel visa restrictions do not have any direct influence on the number of residence permits since they constitute a restriction to travels, rather than to migration. Hence, this results simply hints that travel visa restrictions might represent a cost for moving from a given TCN origin to any EU destination. Even if in an indirect way, they may act as a disincentive to migration movements.

Table 3: Main regression results. Policies and Visa.

$Dep.Var.: \ln\left(\frac{Res.Per._{odt}}{Pop_{ot}}\right)$	(FAM)	(WORK)	(TOTAL)
ln dist.	-1.133*** (0.105)	-0.886*** (0.118)	-0.967*** (0.092)
contig.	-0.422 (0.346)	-0.194 (0.504)	-0.173 (0.354)
colony	1.330*** (0.376)	1.187*** (0.398)	1.110*** (0.359)
com. lang.	1.163*** (0.173)	1.194*** (0.177)	1.186*** (0.158)
com. leg.	0.303*** (0.098)	0.585*** (0.116)	0.487*** (0.091)
ln migr. stock _{t-1}	0.143*** (0.014)	0.068*** (0.015)	0.165*** (0.013)
ln(GDPcpt.rat) _{odt}	0.271*** (0.030)	0.387*** (0.038)	0.325*** (0.029)
ln(pop. grt) _{ot}	-0.189*** (0.031)	-0.188*** (0.037)	-0.175*** (0.024)
mipex family _{dt-1}	0.010*** (0.004)		
mipex occup _{dt-1}		0.031*** (0.006)	
visa _{od}			-0.189** (0.079)
Year dummies	yes	yes	yes
Destination dummies	yes	yes	yes
Origin regional dummies	yes	yes	yes
R^2	0.589	0.522	0.595
Obs	11035	8716	13827

10%, 5% and 1% levels of confidence indicated by *, ** and *** respectively.
Robust standard errors clustered at the country-pair level.

4. Robustness checks

4.1 Sensitivity analysis

As a sensitivity analysis, we run several alternative specifications to check the robustness of the results. Firstly, we estimate a Poisson model for count data, using the Poisson pseudo-maximum likelihood estimator (PPML) as in Santos Silva and Tenreyro (2006 and 2010. The results are shown in Table 5 in the Appendix). The Poisson model allows to take into account the presence of observations of residence permits which are equal to zero for some of the country-pairs. Such observations are dropped when using OLS, with the dependent variable in logarithm. Hence, we check whether the results are sensitive to the inclusion of observations equal to zero, included in level in the Poisson model. This is especially important for the humanitarian group. Indeed, residence permits issued to citizens of a given TCN origin by any given EU destination equal to zero reach 60 percent of the total country-pairs for this group.

The estimation results from the Poisson model confirm the results for the geographical, cultural and demographic variables (except than for the common legal system variable, which is not significant anymore). Some differences emerge for the migrants stocks and for the GDP per-capita ratio. The coefficient of the network effects is still positive and significant for the family and work-related migrants. Instead, differently from the main specifications, the network effects become positive and significant for the humanitarian group. The results for the economic variable, i.e. the GDP per-capita ratio, display some differences from the main specifications. Indeed, the GDP per-capita ratio is positive and significant only for the education group. Higher economic differences between the origin and the destination countries are associated with higher number of residence permits for education reasons. We also run specifications including the logarithm of GDP-per capita in the origin and in the destination countries separately, and their squared terms. However, the coefficients of GDP-per capita are not always significant. Moreover, we do not find any evidence supporting the so called migration-hump (i.e. the inverse U-shape relationship between economic development and emigration. See, for instance, Clemens 2014)¹⁷. The Poisson regression for the humanitarian group confirms the negative sign of the GDP per-capita ratio for the humanitarian group. Finally, the coefficients of the population growth continues to be negative and significant as in the main specifications. In conclusion, except for the economic variable, the inclusion of observations equal to zero does not alter the results.

4.2 Alternative specifications

Since the Poisson model seems to suggest that GDP-per capita ratio coefficient is not fully robust, we also run alternative specifications using as economic indicators the natural logarithm of the employment rate in the origin and in the destination country. When using total residence permits the employment rate at origin is nega-

¹⁷These alternative specifications are not reported here for simplicity, but they are available upon request to the Authors.

tively associated with the dependent variable, while the coefficient of the employment rate at destination is positive and significant, both for the OLS and for the PPML estimations. This means that favorable labour market conditions in the destination country, measured through the employment rate, tend to attract migrants. Similarly, increasing employment rates in the country of origin are associated with less migration movements, i.e. they tend to retain individuals in the origin. These results are confirmed for the group of family, in both estimations. Instead, for the group of workers, only the employment rate at destination is significant. Higher employment rates are related to the issuance of more residence permits for work-related reasons. Instead, for the humanitarian migrants, only the employment rates at destination is negative and significant, in both the OLS and the PPML estimations (The results are shown in Table 6 and Table 7 in the Appendix).

5. Concluding remarks

The report provides the first empirical evidence on the determinants of different forms of migration to Europe. Dyadic variables (such as geographical and cultural) influence in a similar way all migration forms, i.e. work-related, family, education and humanitarian migrations. Instead, network effects, economic, and demographic variables exert their influence on migration forms in different ways. Overall, the presence of previous migrant communities is positively associated with migration for family and work-related reasons. Population growth in the country of origin is negatively associated with migration movements of all groups, except for the humanitarian one. The role of economic variables in influencing migration movements is less clear cut. Growing disparities in GDP per-capita between the origin and the destination are associated with higher migration for work-related, family, education reasons. However, the results are not confirmed by all the sensitivity analyses. This would require further investigation of the role of economic disparities in influencing different forms of migration, measured through residence permits. When looking at the employment rates in the origin and in the destination countries, we find more robust results. Higher employment rates at destinations are associated with larger family and work-related migration. Instead, higher employment rate in the origin country discourages migration for the groups of family and humanitarian. Finally, restrictive migration policies, such as the ones imposing constraints and strict eligibility criteria to family reunification, tend to be associated with lower numbers of residence permits.

Other obstacles and facilitators of migration movements could be taken into account. For instance, we have neglected the role of conflicts or political instability in the origin country for the group of humanitarian migrants. Additionally, residence permits data could be further disaggregated by looking at the sub-groups of migrants comprised in each of the five categories. For instance, the group of unaccompanied children included among humanitarian migrants could be analyzed separately. All these possible developments are left as subjects for further research.

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6. Appendix

Table 4: Data: description and sources.

Variable	Definition	Source
Dependent Variable:		
ResPer _{odt}	First Residence Permits	Eurostat, Residence permits database
Pop _{ot}	Total population	World Bank, WDI Variable: <i>SP.POP.TOTL</i>
Dyadic Variables:		
dist _{od}	Distance between capitals	CEPII
contig _{od}	Contiguous countries (dummy)	CEPII
colony _{od}	Colonial link (dummy)	CEPII
com.lang _{od}	Common official language (dummy)	CEPII
com.leg _{od}	Common legal system (dummy)	CEPII
Migrant networks:		
migrstock _{odt-1}	Migrant Population by citizenship	Eurostat, Migration and citizenship database Variable: <i>migr_pop1ctz</i>
Economic Variables:		
earn _{dt-1}	Net earn. (single person, without children)	Eurostat, Earnings database Variable: <i>earn_nt_net</i>
GDP pct	GDP per-capita (constant 2010\$)	World Bank, WDI Variable: <i>NY.GDP.MKTP.KD</i>
Empl. rate	Empl. rate (% tot. lab. force)	World Bank, WDI Variable: <i>SL.EMP.1524.SP.FE.ZS</i>
Demographic Variables:		
pop.grt _{ot}	Population growth	World Bank, WDI Variable: <i>SP.POP.GROW</i>
Policy Variables:		
visa _{odt}	Pre-arrival travel visa restrictions	Mau et al. (2015) Years: 1969, 2010; EEA countries and CHE
mipex _{dt-1}	Migrant Integration Policy Index	MIPEX; Years: 2007-2014; EU28

Table 5: Sensitivity analysis: estimation results using Poisson model.

<i>Dep. Var.</i> : $\left(\frac{\text{Res.Per.}_{odt}}{\text{Pop}_{ot}}\right)$	(TOT)	(FAM)	(EDUC)	(WORK)	(HUMAN)	(OTH)
In dist.	-1.373*** (0.283)	-1.749*** (0.321)	-0.944* (0.533)	-0.972*** (0.271)	-0.604** (0.273)	-1.325*** (0.299)
contig.	-0.642* (0.356)	-1.033* (0.553)	-0.431 (0.601)	-0.425 (0.324)	-1.162 (1.138)	-0.393 (0.604)
colony	1.734** (0.710)	2.187*** (0.840)	2.809*** (0.294)	1.108 (0.773)	1.945*** (0.620)	-0.377 (0.448)
com. lang.	1.671*** (0.485)	1.317** (0.537)	2.143*** (0.493)	2.359*** (0.689)	-0.310 (0.571)	2.258*** (0.518)
com. leg.	-0.119 (0.261)	-0.374 (0.298)	0.174 (0.259)	0.602* (0.329)	0.212 (0.308)	-0.065 (0.324)
In migr. stock _{t-1}	0.157*** (0.058)	0.133* (0.074)	0.061*** (0.023)	0.166*** (0.052)	0.221*** (0.064)	0.255*** (0.047)
ln(GDPcpt.rat) _{odt}	-0.072 (0.107)	0.030 (0.094)	0.365* (0.204)	-0.371* (0.196)	-0.303** (0.132)	-0.102 (0.181)
ln(pop. grt) _{ot}	-0.550*** (0.103)	-0.531*** (0.114)	-0.502*** (0.131)	-0.700*** (0.123)	0.066 (0.078)	-0.739*** (0.172)
Year dummies	yes	yes	yes	yes	yes	yes
Destination dummies	yes	yes	yes	yes	yes	yes
Origin regional dummies	yes	yes	yes	yes	yes	yes
RESET test, p-value	0.040	0.472	0.009	0.000	0.916	0.000
<i>R</i> ²	0.511	0.412	0.716	0.464	0.099	0.738
Obs	17743	17885	17881	17748	17762	17878

10%, 5% and 1% levels of confidence indicated by *, ** and *** respectively. Robust standard errors clustered at the country-pair level. Test statistics of the RESET test are reported. Specifically, the RESET is implemented including the square of the vector of the estimated parameters in the regression and checking its significance as in Santos Silva and Tenereryos, (2006). The null hypothesis is that the coefficient of this additional regressor is equal to zero. Rejecting the null hypothesis means that the model suffers from mis-specification of the functional form. The groups of family and humanitarian only pass the RESET test.

Table 6: Alternative specifications using employment rates.

<i>Dep. Var.</i> : $\left(\frac{\text{Res.Per.}_{odt}}{\text{Pop}_{ot}}\right)$	(TOT)	(FAM)	(EDUC)	(WORK)	(HUMAN)	(OTH)
In dist.	−0.742*** (0.091)	−0.912*** (0.102)	−0.581*** (0.106)	−0.680*** (0.119)	−0.690*** (0.167)	−0.509*** (0.121)
contig.	0.041 (0.320)	−0.146 (0.287)	−0.096 (0.379)	−0.058 (0.464)	−1.400*** (0.498)	0.732 (0.454)
colony	1.044*** (0.349)	1.043*** (0.349)	1.885*** (0.441)	1.018*** (0.389)	1.193*** (0.428)	1.181*** (0.363)
com. lang.	1.122*** (0.161)	1.179*** (0.177)	1.074*** (0.183)	1.219*** (0.192)	0.420* (0.225)	0.889*** (0.172)
com. leg.	0.463*** (0.089)	0.279*** (0.095)	0.463*** (0.103)	0.526*** (0.113)	0.342** (0.154)	0.573*** (0.107)
In migr. stock _{t−1}	0.216*** (0.013)	0.192*** (0.014)	0.001 (0.013)	0.098*** (0.014)	0.019 (0.021)	0.004 (0.016)
In(empl.rate) _{ot}	−0.197*** (0.057)	−0.121** (0.060)	0.164** (0.078)	0.045 (0.075)	−0.679*** (0.114)	−0.131* (0.073)
In(empl.rate) _{dt}	0.433*** (0.111)	0.354*** (0.114)	−0.111 (0.154)	1.242*** (0.181)	0.148 (0.283)	1.089*** (0.203)
In(pop. grt) _{ot}	−0.156*** (0.024)	−0.167*** (0.028)	−0.078*** (0.030)	−0.187*** (0.036)	−0.036 (0.053)	−0.053* (0.032)
Year dummies	yes	yes	yes	yes	yes	yes
Destination dummies	yes	yes	yes	yes	yes	yes
Origin regional dummies	yes	yes	yes	yes	yes	yes
<i>R</i> ²	0.587	0.581	0.423	0.503	0.287	0.452
Obs	14088	12155	8590	8966	5868	7519

10%, 5% and 1% levels of confidence indicated by *, ** and *** respectively. Robust standard errors clustered at the country-pair level.

Table 7: Alternative specifications using employment rates. Poisson model.

<i>Dep. Var.</i> : $\left(\frac{\text{Res.Per.}_{odt}}{\text{Pop}_{ot}}\right)$	(TOT)	(FAM)	(EDUC)	(WORK)	(HUMAN)	(OTH)
In dist.	-1.082*** (0.261)	-1.439*** (0.284)	-1.098*** (0.393)	-0.907*** (0.313)	-0.107 (0.280)	-1.294*** (0.287)
contig.	-0.675** (0.337)	-0.875** (0.355)	0.105 (0.537)	-0.641* (0.387)	-1.482 (1.221)	-0.870 (0.586)
colony	0.719*** (0.248)	0.640** (0.276)	2.532*** (0.320)	0.051 (0.384)	1.591** (0.755)	-0.432 (0.508)
com. lang.	2.095*** (0.334)	2.076*** (0.356)	2.373*** (0.359)	2.898*** (0.481)	-0.022 (0.539)	2.547*** (0.556)
com. leg.	-0.047 (0.219)	-0.250 (0.248)	0.272 (0.223)	0.666* (0.355)	-0.210 (0.470)	0.194 (0.230)
In migr. stock _{t-1}	0.317*** (0.045)	0.350*** (0.053)	0.100** (0.040)	0.239*** (0.061)	0.405*** (0.083)	0.309*** (0.052)
ln(empl.rate) _{ot}	-0.475* (0.259)	-0.528* (0.270)	-0.827** (0.364)	-0.122 (0.401)	-0.649*** (0.197)	0.126 (0.284)
ln(empl.rate) _{dt}	1.136*** (0.294)	0.639** (0.298)	0.390 (0.516)	0.273 (0.704)	1.319 (1.145)	3.443*** (0.544)
ln(pop. grt) _{ot}	-0.432*** (0.092)	-0.330*** (0.096)	-0.479*** (0.148)	-0.511*** (0.132)	-0.477*** (0.089)	-0.533*** (0.130)
Year dummies	yes	yes	yes	yes	yes	yes
Destination dummies	yes	yes	yes	yes	yes	yes
Origin regional dummies	yes	yes	yes	yes	yes	yes
R ²	0.716	0.718	0.846	0.447	0.409	0.800
Obs	17617	17759	17755	17621	17632	17754

10%, 5% and 1% levels of confidence indicated by *, ** and *** respectively. Robust standard errors clustered at the country-pair level.

List of abbreviations and definitions

CEPII: Centre d'Etudes Prospectives et d'Informations Internationales

EEA: European Economic Area

MIPEX: Migrant Integration Policy Index

TC: Third Country

TCN: Third Country National

WB: World Bank

WDI: World Development Indicator

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