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# *What makes us move, what makes us stay: The role of culture in intra-EU mobility*

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# What makes us move, what makes us stay: The role of culture in intra-EU mobility*

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*Abstract.* This article analyses the determinants of international migration flows within the European Union and specifically focuses on the role of cultural and linguistic differences in explaining the size of these flows. For that purpose, a set of indicators of cultural distance are controlled for along with economic, demographic, geographical, political and network variables using data from 28 member states of the European Union over the period 1998-2018. Economic factors play an important role in examining migration flows, but economic differentials alone may be insufficient to explain the uneven real-life migration pattern in the EU. The results suggest strong evidence of the importance of linguistic distance in explaining the direction of migration flows across the European Union.

*JEL codes*: J61, F22, O15.

*Keywords*: European Union, Geographic Mobility, Labour Mobility, Migration, Optimum Currency Area.

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# 1 Introduction and motivation

The removal of barriers to the free movement of labour, capital, goods and services within the borders of the European Union was called for by the Treaty establishing the European Economic Community in 1957. Despite member states' growing economic integration, intra-EU labour mobility remained very low for decades and received comparatively little attention in the policy debate until Europe decided to move to a single currency. Labour mobility between member states of a currency area could work as an effective shock absorption mechanism.[1] Yet free movement of labour in Europe appeared to be a mere notion rather than an economic stabiliser – in 2000, only 0.1% of the total EU15 population changed official residence between two member states (European Commission, 2002), and a mere 1% resided in an EU country other than that of their citizenship (Eurostat, 2021b, 2021c). To support cross-border labour mobility, the EU undertook a number of initiatives.[2] But it was not until after the eastern enlargement rounds and the Great Recession that the dynamics of intra-EU labour mobility changed markedly.[3] The share of the EU citizens of working age residing in an EU member state other than that of their citizenship made up 2.4% in 2010 and increased further to 3.3% by 2020 (Eurostat, 2021a). However, it still is a modest figure in the light of substantial economic differences among European countries.

The recent financial crisis and the subsequent economic downturn have given a fresh impetus to political, economic and academic debates on labour mobility and its potential contribution to growth and employment in the euro area (e.g. Arpaia et al., 2016; Barslund & Busse, 2014; Elsner & Zimmermann, 2016; Galgóczi & Leschke, 2016; Kaczmarczyk & Stanek, 2016). There is an extensive literature on the volume and composition of migrants from accession countries as well as on the impact of labour mobility on both sending and receiving countries (e.g.

[1] The theory of optimum currency area, first described by Mundell (1961), sees labour mobility as a macroeconomic adjustment mechanism minimising the costs of asymmetric shocks.

[2] For example, the European Employment Services (EURES) cooperation network is intended to connect jobseekers with employers across Europe; and the European Skills, Competences and Occupations (ESCO) multilingual taxonomy targets the practical barriers of matching applicants' skills and qualifications with the foreign equivalent.

[3] Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia as well as Cyprus and Malta joined the EU on 1 May 2004. Bulgaria and Romania joined the EU on 1 January 2007, followed by the most recent enlargement – Croatia's accession on 1 July 2013.

Alcidi & Gros, 2019; Baas & Brüecker, 2010; Brüecker et al., 2009; Kahanec & Zimmermann, 2010). The understanding of the forces driving intra-EU mobility is nevertheless still limited.

This article contributes to the existing literature by identifying some of the key determinants of international migration flows within the EU and specifically examining the role of cultural and linguistic differences in explaining the size of these flows. The empirical analysis uses data from 28 EU member states over the period 1998–2018. A series of indicators of cultural distance are controlled for along with economic, demographic, geographical, political and network variables. The indicators measuring the extent of cultural barriers between countries are linguistic distance based upon the linguistic proximity measure constructed by Dyen et al. (1992) from the matrix of lexicostatistical percentages, an indicator calculated on the basis of cultural indicators created by Hofstede as well as a new index based on interpersonal distance preferences in different countries as measured by Sorokowska et al. (2017).

The results reveal that economic incentives, open borders, geographical proximity and the size of the network already settled in the destination country have a significant and positive effect on intra-EU migration flows. Cultural distance does not seem to prevent Europeans from moving to another member state, whereas linguistic distance has a significant and strong negative effect on the size of migration flows. These results show that open borders alone do not imply that EU citizens enjoy full freedom of movement. The cost of learning a new language is an important factor preventing Europeans from moving freely across the EU.

The remainder of the paper is organised as follows. Section 2 provides an overview of related literature. Section 3 describes the data used as well as the construction of the cultural and linguistic distance measures employed in the article. Section 4 outlines the empirical approach and discusses the results. Section 5 concludes.

# 2 Theoretical and empirical approaches to international migration

The decision to migrate abroad is affected by numerous determinants of economic as well as non-economic nature and may be shaped by various unmeasured or immeasurable factors. '[The] laws of population, and economic laws generally, have not the rigidity of physical laws, as they are continually being interfered with by human agency', Ravenstein observed in 1889 (p. 241).

Despite this early observation, for many years, a central role in shaping the views and strategies of academics and policymakers has been played by the traditional neoclassical approach to international migration, which suggests that migration takes place because there are variations in wages and in unemployment rates across labour markets in different countries that individuals respond to (Hicks, 1932; Harris & Todaro, 1970; Todaro, 1969). Neoclassical individuals from low-wage countries thus follow their adding-machine brains and inevitably choose to migrate in order to enjoy the highest income possible, hence maximising their utility. In the European case, it has been often shown that wage and unemployment differentials are not the central factor explaining international migration. Bentivogli and Pagano (1999) consider the migration responsiveness to wage and unemployment differentials in the United States and in the euro area.[4] The authors find the sensitivity of net immigration flows to regional disparities in both unemployment rates and income to be much lower in Europe than in the United States; moreover, there is no response of migration flows to shocks in the regional relative unemployment rate in Europe. Braunerhjelm et al. (2000) show that despite a considerable fall in wage differentials between some European countries – for example, between France and Spain – since the 1970s, there has been an even larger increase in unemployment differentials (p. 51). Consequently, when weighted by the probability of being employed, wage differentials have in fact increased. Braunerhjelm et al. (2000) argue that levels of income in the sending country rather than income differentials influence the propensity to migrate, considering that in developed countries, households are generally not forced to migrate due to

[4]The authors study 11 EU member states that have adopted the euro as their common currency on 1 January 1999: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain.

poverty and deprivation in the home country.

In an attempt to model migration flows more realistically, the human capital migration theory takes the heterogeneity of immigrants into account (e.g. Borjas, 1987, 1989; Hatton & Williamson, 2002; Sjaastad, 1962). It suggests that the probability of becoming employed and receiving higher wages at the destination relative to the origin, and thus to migrate, depends on individual human capital characteristics. This is why individuals from the same country of origin may have different costs of migration and consequently different inclination to move.

An examination of the population composition can therefore shed light on mobility attitudes of particular groups. For example, young people are likely to face lower costs of moving abroad and expect to derive the highest benefits from investment in their human capital. Burda (1993), in analysing migration patterns in Germany after the reunification, found that age is negatively and strongly associated with the inclination to migrate. Belot and Ederveen (2012) find a positive correlation between the share of young population in the country of origin and migration flows within the OECD. Mayda's (2010) study also confirms that the share of young population is one of the most important drivers of migration flows, albeit the analysis includes both developing and developed countries.

Workers with higher skill levels are likely to gain more from moving abroad, and it has been shown that high-skill migration is indeed becoming a dominant pattern of international migration (Brüecker, Bertoli, Facchini, Mayda, & Peri, 2012; Docquier & Rapoport, 2012; Grogger & Hanson, 2011). The argument that highly skilled workers are more likely to emigrate (positive selection) has been found to be relevant for developed countries (e.g Belot & Ederveen, 2012, for intra-EU15; Giannetti, 2001, for Italy; and Mauro & Spilimbergo, 1999, for Spain).

Migrant networks have also been shown to shape population movements to a substantial extent (e.g. Beine, Docquier, & Özden, 2015, 2011; Bredtmann, Nowotny, & Otten, 2017; Munshi, 2003). The presence of a national community in the destination country could reduce the private costs and risks of migrating abroad, as the first migrant faces the highest migration costs, while an established migrant network in the country of destination may increase the welfare of new migrants by, for example, providing information on employment opportunities or local housing markets. Gross and Schmitt (2005) show that the existence of cul-

tural communities is more beneficial to immigrants from developing countries than from developed countries. The authors argue that migration flows between OECD countries as well as between the EU member states show no reaction to the presence of cultural clusters. In contrast, Van Wissen and Visser's (1998) findings support the presence of network effects within the EEA: the variables indicating past migratory movements are important for predicting intra-EEA migration flows.

Socially acceptable income levels lead to the non-monetary costs of migration being of more relevance for potential emigrants. Braunerhjelm et al. (2000) argue that 'cultural and linguistic factors can play a role in discouraging migration, provided however that home income is sufficiently high and households are willing to substitute home amenities for a further rise in wages through migration' (p. 53). For a long time migration research has paid limited attention to the potential influence of cultural determinants on international migration flows and did not go beyond including a control for sharing a common language or using broad linguistic groups as a proxy (e.g. Mayda, 2010; van Wissen & Visser, 1998).

Recent migration literature emphasises the potential influence of linguistic and cultural proximity in determining migration flows (e.g. Adsera & Pytlikova, 2015; Belot & Ederveen, 2012; Belot & Hatton, 2012; Bredtmann et al., 2017; Caragliu, Del Bo, de Groot, & Linders, 2013; Sprenger, 2013; White & Yamasaki, 2014). However, most studies include both developing and developed countries. Furthermore, there are differences in findings across studies addressing cultural determinants of migration. Belot and Ederveen (2012) examine migration flows between 22 OECD member countries over the period 1990-2003 using elaborate cultural distance measures and find that cultural links are important when analysing migration flows in the OECD setting, albeit less so when studying the 'European immobility puzzle'. Sprenger (2013) looks at migration flows between 21 members of both the EU and the OECD during the period 2000-2009 and shows that while there is a negative relationship between the size of migration flows and linguistic distance, cultural distance does not seem to play a significant role. Caragliu et al. (2013) analyse a sample of European countries of destination from a wider set of origin countries for the years 2002–2007 and evaluate measures of differences in values and institutions in order to represent cultural differences. The authors find that trust, credit information and institutional distances exert a negative effect on migration flows and show that these results are sensitive to alternative choice of

distance indicators.

Intra-EU mobility is a complex phenomenon. To identify the factors encouraging and impeding international migration in a complex combinations of both push and pull forces and a rapidly changing environment, we analyse economic, demographic, geographical, political and network determinants as well as a set of cultural distance measures.

# 3 Data construction

Table 1 provides definitions, sources and summary statistics of all variables. Data on migration flows between the 28 member states of the EU for the years 1998-2018 are collected from different sources (Eurostat, OECD and national statistical offices) to provide a most complete overview. No data are available on immigration flows to Cyprus and Malta from any of the sources used.

The size of the population at the origin indicates the magnitude of potential migration while the size of the population at the destination captures possible gravity effects.

The number of foreigners of the citizenship of the sending country in the receiving country is included in order to capture the existence of network effects.

The economic push and pull factors are controlled by purchasing power adjusted GDP per capita and unemployment rates at the origin and destination.

The share of tertiary educated people is included as an indication of workers' skill level. The share of young people (aged 20-34) in the total population of the sending country is intended to capture the age structure of the population.

The distance in kilometres between the capital cities of the origin and destination countries is included to capture the monetary cost of migration involved. In addition, it is expected to capture the information the potential migrant has about the possible destination and its labour market. For the same purpose, a dummy variable is defined with the value of 1 if two countries share a common border and 0 if they do not.

Migration policies are represented by a dummy variable with the value of 1 if the receiving country allows free movement of workers from the sending country and 0 if it does not. This measure is relevant for the EU in the light of the transitional arrangements concerning free movement of workers. The citizens of Bulgaria,

Table 1: Definition of the variables, descriptive statistics and sources

| Variable | Description | Source | Obs. | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|---|---|
| Inflow | Migration inflow by citizenship from country $i$ (origin) to country $j$ (destination), units, yearly data | Eurostat, OECD, national statistical offices | 11,320 | 2155.931 | 10379.66 | 0 | 271443 |
| GDP per capita origin/destination | GDP per capita in PPS, current prices (thousands), yearly data | Eurostat | 15,768 | 24.0783 | 11.40047 | 5.07 | 80.47 |
| Unempl. rate origin/destinatin | Unemployment rate (%), yearly data | Eurostat | 15,772 | 8.791085 | 4.309402 | 2.2 | 27.5 |
| Population origin/destinatin | Total population (millions), yearly data | Eurostat | 15,876 | 17.81789 | 22.52581 | .384176 | 82.79235 |
| Distance | Distance in kilometres between capital cities of countries $i$ and $j$ (thousands) | luftlinie.org/ | 15,876 | 1.399903 | .7368552 | .055 | 3.765 |
| Border | Dummy variable denoting whether countries $i$ and $j$ share a common border (1) or not (0) | World atlas | 15,876 | .0976316 | .2968253 | 0 | 1 |
| Share young origin | Share of young people (20-34) in the total population of country $i$ (%) | Eurostat | 15,795 | 20.7042 | 2.01264 | 15.9 | 25.7 |
| Share tertiary educated origin | Share of persons with tertiary education attainment in the total population of country $i$ in 2011, 15-64 years (%) | Eurostat | 15,876 | 23.81071 | 6.924365 | 12.9 | 34.4 |
| Population of origin | Number of foreign nationals in country $j$ by citizenship of country $i$ (thousands), yearly data | Eurostat | 10,216 | 19.20058 | 69.64353 | 0 | 1190.091 |
| Open | Dummy variable denoting whether country $j$ allows free movement of workers from country $i$ (1) or not (0) | European Commission | 15,876 | .7002394 | .4581675 | 0 | 1 |
| Common language | Dummy variable denoting whether country $j$ has the same official language as country $i$ (1) or not (0) | European Commission | 15,876 | .037037 | .1888585 | 0 | 1 |
| Linguistic distance | Index of linguistic distance | Own calculations based on Dyen et al. (1992) and Adsera and Pytlikova (2015) | 15,876 | .6816429 | .2529474 | 0 | 1 |
| Hofstede distance | Index of cultural distance | Own calculations based on Hofstede (2010) | 14,741 | 1.863523 | 1.316505 | 0 | 8.299022 |
| Interpersonal distance | Index of interpersonal distance preferences | Own calculations based on Sorokowska et al. (2017) | 4,410 | 24.63367 | 16.77463 | 1.010742 | 66.74598 |

Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia were subject to a transitional period that imposed restrictions on the free movement of labour (European Union, 2003; European Commission, 2008, 2015). A maximum of seven years (2+3+2) of postponement enabled the member states to regulate the opening of their labour markets. Not only did most of the EU15 member states keep restrictions during that period, several accession countries used reciprocal measures to restrict access to their labour markets for nationals from those member states that restricted labour market access for their nationals. In addition, Spain liberalised access to its labour market for Romanian workers on 1 January 2009 but invoked the safeguard cause in 2011, temporarily suspending the law on free movement of workers (European Commission, 2011).

## 3.1 Cultural distance and migration

Four cultural variables are included to measure the extent to which the country of destination differs in culture and thus necessitates making an effort to adapt to a new culture.

### Common language dummy

A dummy variable is defined with the value of 1 if two countries have the same official language and 0 if not. This indicator takes only official languages into account and not officially recognised minority languages such as, for example, Finnish in Sweden, French in the Aosta Valley region in Italy or German the district of North Schleswig in Denmark.

### Linguistic distance

The index of linguistic distance is constructed based on the linguistic proximity measure created by Dyen et al. (1992) from the matrix of lexicostatistical percentages for the Indo-European languages. Lexicostatistics assesses degrees of relatedness between languages and uses lexicostatistical percentages to classify the varieties of speech. The lexicostatistic method uses a list of basic meanings that are present in almost every culture, i.e. culture-independent core vocabulary that includes pronouns, simple adjectives, simple verbs, names of body parts and names

of natural phenomena, for example, 'mother', 'I', 'all', 'to breathe', 'to kill', 'snow', 'blood', 'child' and numerals from one to five. The phonetic representations of the words with these basic meanings are collected for all languages belonging to a language family. They are then considered for each meaning to determine whether some of all the forms are cognate. This method allows to avoid words borrowed from one language to another. For example, English 'flower' is not cognate to French 'fleur', because it is borrowed from French. However, English 'blossom' is (Dyen et al., 1992, p. 95). The lexicostatistical percentage is the percentage of all meanings for which the forms are cognate. For instance, French and English are connected by 23.6%, and German and English are connected by 57.8% (Dyen et al., 1992, pp. 102-118). Basing on Dyen et al. (1992), the indicator of linguistic distance is defined as

$$1 - \max_{\forall i \in A, \forall j \in B} \{proximity\{i, j\}\},$$

where $i$ and $j$ are the official languages of countries $A$ and $B$ respectively. *proximity* is the lexicostatistical percentage as described above. One *maximises* the proximity between languages by taking the highest value of linguistic proximity of all possible pairs of languages for the countries with several official languages. The indicator can range from 0, when countries have the same official language and thus no distance, to 1, when countries' official languages belong to different language families as in the case of the distance between the languages of the Uralic language family and the Indo-European languages (for more details, see Table A3 in the Appendix).[5] Uralic languages are not part of the Indo-European family and are thus not discussed in Dyen et al. (1992). To fill this gap, linguistic distance index for Finnish, Hungarian and Estonian is constructed as proposed by Adsera and Pytlikova (2015, p. F53).

[5]By means of a lexicostatistical analysis, Kessler and Lehtonen (2006) verified that the groups, representing the Indo-European and Uralic languages are not connected. The authors found that none of the pairwise combinations between Uralic and Indo-European languages were significant.

### Cultural distance based on Hofstede dimensions

The measure of cultural distance on the basis of Hofstede (2010) cultural dimensions is computed as described by Kogut and Singh (1988) in their analysis of the choice of market entry mode in the United States:

$$CD_{i,j} = \frac{1}{6}\frac{\sum_{k=1}^{6}(I_{i,k} - I_{j,k})^2}{V_k},$$

where $CD_{i,j}$ denotes the cultural difference or distance between country $i$ and country $j$. $I_{i,k}$ is the Hofstede index for country $i$ and dimension $k$. $V_k$ indicates the variance of the index of the $k$th dimension. Hofstede cross-cultural dimensions are possibly the most widely used measurement to proxy cultural distance. The dimensions are based on Hofstede's original survey of IBM employees in over 40 countries and reflect six anthropological topics that are handled differently in different nations and include power distance, individualism versus collectivism, masculinity versus femininity, uncertainty avoidance, long-term orientation versus short-term normative orientation and indulgence versus restraint (Hofstede & Hofstede, 2010). Data are available for all dimensions and all countries except Cyprus.

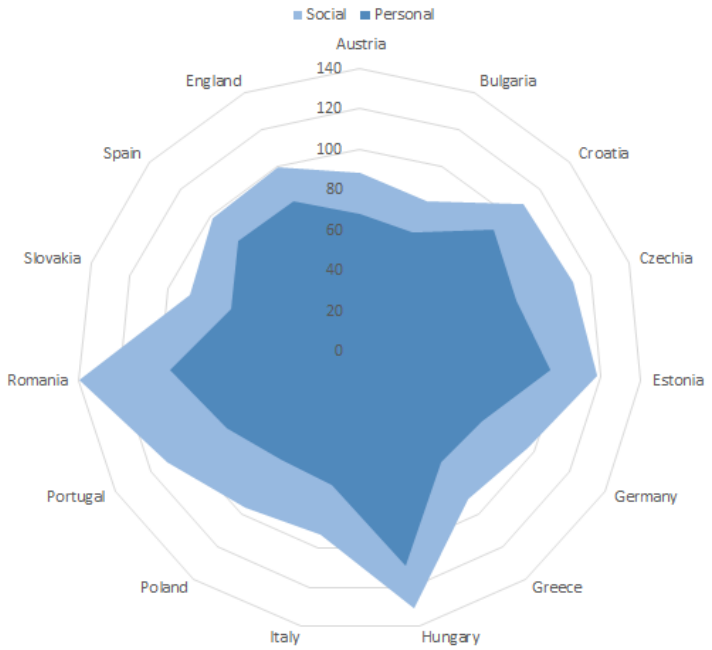
### Cultural distance based on preferred interpersonal distance

Interpersonal distance, or interpersonal space, is a distance individuals maintain in interpersonal interactions (Hall, 1966; Hayduk, 1983). According to Hall's (1966) proxemic theory, cultural norms are the most important factors to describe the preferred interpersonal distance: what is personal or social in one culture may be intimate in another.[6] Thus, a measure calculated using the preferred interpersonal distance could proxy 'latent culture' more directly than measures based on surveys on national cultural values.[7]

[6]Hall (1966) suggested that people of the so-called contact cultures (represented by Southern European, Latin American and Arab countries) prefer closer interpersonal distance than people in North America, Northern Europe and Asia, or noncontact cultures. While often supported by anecdotal evidence, empirical results only partially confirm the idea that interpersonal distances are closer in southern Europe than in northern Europe (Mazur, 1977; Remland, Jones, & Brinkman, 1977).

[7]Just like people's actions reveal their underlying preferences, revealed culture potentially reveals latent culture. Most survey-based cultural distance measures, however, reflect reported,

Figure 1: Preferred interpersonal distance in cm




Source: Author's own illustration based on Sorokowska et al. (2017).

Sorokowska et al. (2017) compare preferred interpersonal distances across 42 countries, analysing three types of interpersonal distance: social distance (when approaching a stranger, 122-210 cm), personal distance (when approaching an acquaintance, 46-122 cm) and intimate distance (maintained in close relationships, 0-46 cm). Fifteen EU member states are included in the study by Sorokowska et al.(2017): Austria, Bulgaria, Croatia, Czechia, Estonia, Germany, Greece, Hungary, Italy, Poland, Portugal, Romania, Slovakia, Spain and the United Kingdom (represented by England). The three countries from the full sample where participants' preferred distance from a stranger was largest were Romania (139.64 cm), Hungary (130.72 cm) and Saudi Arabia (126.87 cm), whereas the three countries where participants required least personal space when approaching a stranger were Argentina (76.52 cm), Peru (79.61 cm) and Bulgaria (81.37 cm). In Estonia, Croatia, Hungary and Romania people stand farther from their acquaintances than Austrians and Slovaks do with strangers (see Figure 1).

or stated, culture as revealed by a survey (Maseland & Hoorn, 2010).

We propose an indicator of cultural distance based on objective values of preferred interpersonal distances in different regions measured by Sorokowska et al. (2017). The measure is constructed as follows with the Euclidean distance formula used to calculate a composite distance index on a set of dimensions:

$$Space_{i,j} = \sqrt{(Socialdist_i - Socialdist_j)^2 + (Personaldist_i - Personaldist_j)^2},$$

where $i$ and $j$ are countries' indices. For the purpose of this study, we focus on preferred interpersonal distance with strangers and acquaintances, i.e. social distance and personal distance.

The correlation coefficients between the analysed distance variables (physical, linguistic, Hofstede and interpersonal) are low and even negative, suggesting that the measures capture different aspects of cultural distance (see Table A1 in the Appendix).

# 4 Empirical approach and estimation

To structure the ideas discussed above, following Belot and Ederveen (2012), we consider the following specification:

$$M_{i,j,t} = g(\bar{Y}_{i,t}, \bar{Y}_{j,t}, \bar{C}_{i,j}, \bar{S}_{i,t}), \tag{1}$$

where $M_{i,j,t}$ is the gross migration flow from country $i$ to country $j$ at time $t$. $\bar{Y}_{i,t}$ and $\bar{Y}_{j,t}$ represent country-specific elements (e.g. GDP per capita, unemployment rate, total population) $\bar{C}_{i,j}$ is the cost of migration from country $i$ to country $j$ (e.g. physical or linguistic distance, free movement of labour), and $\bar{S}_{i,t}$ denotes an aggregate measure of an individual-level characteristic (e.g. the share of tertiary educated and the share of young people in the total population of the sending country) in the costs of migration. Some explanatory variables are time invariant.

The dependent variable under analysis is the total inflow of citizens of the sending country ($i$) in the receiving country ($j$). It is an example of a count variable, which is discrete and non-negative. To model this type of data, we use the pooled Poisson model with cluster-robust Huber–White standard errors, clustered at the country-pair level. Thus, standard errors allow for intragroup correlation,

relaxing the requirement that the observations be independent within groups. Furthermore, fixed effects for the country of destination are introduced to control for unobserved country-specific characteristics and, in this way, correct for the correlation between panels. The non-linear Poisson maximum likelihood estimator has been shown to be fully robust, relying only on a correctly specified mean function, meaning that the parameter estimators are consistent even if the assumption for the distribution is incorrect (Winkelmann, 2015, 2008; Wooldridge, 1999). Alternative methods to analysing count data include the negative binomial regression model (see e.g. Belot & Ederveen, 2012) or log-linearising the dependent variable. Both alternative estimation methods were performed as robustness tests and are presented in columns (6) and (7) of Table 2. To reduce the risk of reverse causality in the model (migration flows having an impact on earnings and employment), the economic variables are lagged by one period. This is also useful to account for the information available at the time the migration decision is taken. The stock of foreign population is also lagged.

In line with the theoretical ideas presented above, costs associated with migration are expected to be larger with physical, cultural and linguistic distance and to fall with the size of existing networks and with the right to free movement of workers.

## 4.1 Results

Table 2 first presents estimation results including economic, demographic, geographical and political variables (column (1)). The coefficients of the Poisson model can be interpreted at semi-elasticities since the model is specified with a log-linear conditional expectation function (Winkelmann, 2008). For example, taking the point estimate related to lagged GDP per capita in the receiving country, the effect would be a [exp(0.140)-1] x 100 = 15.03% increase. That is, an increase in GDP per capita of 1,000 PPS in the destination country would increase immigration flows by 15.03%, *ceteris paribus*. An increase in GDP per capita at the origin discourages migration. Higher unemployment rate at the destination decreases immigration. An increase of one percentage point in the lagged unemployment rate in the destination country decreases migration flows by 4.74%, *ceteris paribus*. The effect of an increase in the unemployment rate at the ori-

Table 2: Estimation results

| Dependent variable: Inflow | (1) Poisson | (2) Poisson | (3) Poisson | (4) Poisson | (5) Poisson | (6) Negative Binomial | (7) OLS |
|---|---|---|---|---|---|---|---|
| Lagged GDP/cap dest. | 0.140*** | 0.156*** | 0.148*** | 0.145*** | 0.152*** | 0.139*** | 0.155*** |
| | (0.0178) | (0.0194) | (0.0188) | (0.0179) | (0.0252) | (0.0187) | (0.0219) |
| Lagged GDP/cap origin | -0.131*** | -0.154*** | -0.130*** | -0.127*** | -0.138*** | -0.0957*** | -0.0814*** |
| | (0.0168) | (0.0165) | (0.0172) | (0.0157) | (0.0188) | (0.0129) | (0.0164) |
| Lagged unempl. rate dest | -0.0486*** | -0.0495*** | -0.0392** | -0.0393** | -0.0483*** | -0.0138 | 0.00353 |
| | (0.0130) | (0.0139) | (0.0172) | (0.0179) | (0.0180) | (0.0103) | (0.0120) |
| Lagged unempl. rate origin | -0.0217 | -0.0155 | -0.00587 | -0.00574 | 0.0204 | 0.000702 | 0.00334 |
| | (0.0192) | (0.0159) | (0.0168) | (0.0157) | (0.0168) | (0.0109) | (0.0120) |
| Population dest. | 0.0709** | 0.0854** | -0.0395 | -0.0482 | -0.0494 | -0.0670* | 0.0140 |
| | (0.0308) | (0.0339) | (0.0388) | (0.0380) | (0.0374) | (0.0350) | (0.0418) |
| Population origin | 0.0346*** | 0.0352*** | 0.0280*** | 0.0295*** | 0.0397*** | 0.0430*** | 0.0446*** |
| | (0.00356) | (0.00312) | (0.00294) | (0.00323) | (0.00379) | (0.00391) | (0.00355) |
| Share tertiary educated origin | -0.0497*** | -0.0455*** | -0.0263** | -0.0229* | -0.0175 | -0.0399*** | -0.0515*** |
| | (0.0139) | (0.0123) | (0.0132) | (0.0122) | (0.0193) | (0.0148) | (0.0138) |
| Share young origin | 0.0144 | 0.0263 | 0.00543 | -0.00400 | -0.0197 | -0.00814 | 0.00832 |
| | (0.0362) | (0.0374) | (0.0341) | (0.0371) | (0.0415) | (0.0325) | (0.0341) |
| Distance 1000 km | -0.410*** | -0.397** | -0.389*** | -0.387*** | -0.357* | -0.349*** | -0.327** |
| | (0.159) | (0.157) | (0.125) | (0.128) | (0.190) | (0.131) | (0.131) |
| Border | 0.459** | 0.197 | 0.0936 | 0.121 | 0.578*** | 1.309*** | 1.144*** |
| | (0.194) | (0.226) | (0.174) | (0.161) | (0.184) | (0.241) | (0.231) |
| Open | 0.291* | 0.330** | -0.0618 | -0.0741 | 0.0454 | -0.0935 | 0.0939 |
| | (0.171) | (0.151) | (0.170) | (0.168) | (0.156) | (0.128) | (0.151) |
| Common language | | 0.139 | 0.261 | 0.363 | 0.689* | -0.553 | -0.390 |
| | | (0.319) | (0.286) | (0.297) | (0.387) | (0.387) | (0.343) |
| Linguistic distance | | -1.493*** | -1.296*** | -1.285*** | -0.995** | -0.816** | -0.736** |
| | | (0.541) | (0.441) | (0.421) | (0.464) | (0.351) | (0.361) |
| Lagged population of origin | | | 0.00202*** | 0.00209*** | 0.00161*** | 0.00350*** | 0.00297*** |
| | | | (0.000310) | (0.000302) | (0.000331) | (0.000894) | (0.000578) |
| Hofstede distance | | | | 0.168* | 0.288** | 0.338*** | 0.278*** |
| | | | | (0.0927) | (0.120) | (0.0803) | (0.0829) |
| Interpersonal distance | | | | | 0.0213*** | 0.0137*** | 0.0118** |
| | | | | | (0.00549) | (0.00473) | (0.00556) |
| _cons | 5.701*** | 6.085*** | 7.109*** | 6.923*** | 5.346*** | 5.044*** | 3.153** |
| | (1.213) | (1.310) | (1.066) | (1.062) | (1.256) | (1.176) | (1.244) |
| $N$ | 10747 | 10747 | 7767 | 7508 | 2157 | 2157 | 2157 |
| $R^2$ | | | | | | | 0.805 |

Robust standard errors are clustered at the country-pair level (in parentheses). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

OLS: linear model with log-transformed variable. In order not to discard the zero observations when taking logarithms, one is added to each observation of immigration flows and foreign population stocks.

gin is, however, statistically insignificant, which is in line with previous findings (e.g. Belot & Ederveen, 2012). As expected, the effect of the population size variables is positive and significant. The share of tertiary educated in the total population of the sending country seems to discourage migration. According to the European Commission (2021, p. 14), only about a third of EU movers had a tertiary level of education in 2019. It could be that low-skilled individuals are more likely to migrate in order to benefit from a compressed wage distribution in destination countries with a higher level of earnings equality.[8] The share of young people shows no statistically significant effect. The effect of geographical distance is large, negative and significant; and sharing a border has a strong positive and statistically significant effect on migration flows. Finally, there is a positive and statistically significant relationship between the size of migration flows and open borders.

Column (2) introduces a common language dummy and the indicator of linguistic distance. The indicator of linguistic distance is highly significant as a determinant of migration flows within the EU. As expected, its effect is negative and high. The simple dummy for sharing a common language has an insignificant effect on migration flows. Wissen and Visser (1998), whose analysis also involved very few multilingual countries and countries with the same official language, find same effect of the simple language dummy. This outcome suggests that a more refined measure is required in a multilingual setting.

Column (3) shows the results of the estimation including the number of foreigners of the citizenship of the sending country in the receiving country. The results suggest that the size of ethnic network has a positive effect on the size of migration flows.

Finally, cultural variables are introduced in columns (4) and (5). Hofstede scores are available for all countries in the sample, except Cyprus, whereas the data on preferred interpersonal distances are available for only 15 countries in the sample. Both measures of cultural distance have a positive and statistically significant effect on migration between EU member states, albeit the effect of

[8]Looking at emigrants from Germany, Parey et al. (2017) find that migrants to countries with a higher level of earnings inequality (e.g. the United States and France) are positively selected, whereas migrants to more equal countries (e.g. Scandinavian countries) are negatively selected and benefit from a more compressed wage distribution. However, (2017) examine only high-skilled emigrants.

the distance index based on interpersonal distance preferences is smaller. Rather than suggesting that opposites attract, we are inclined to conclude that cultural distance between countries is of little importance to European migrants' choice of destination.

Columns (6) and (7) show that that the effects identified in this article hold across a range of econometric specifications.

## 4.2 Conclusions and policy implications

This article investigates the forces driving intra-EU mobility. We use data on migration flows between 28 member states of the EU for the period 1998-2018 to analyse the role of economic, demographic, geographical, political as well as network variables and pay particular attention to cultural and linguistic distance between the EU member states. The indicators measuring cultural barriers between countries are a linguistic distance measure constructed using lexicostatistical percentages, an indicator based on Hofstede's cultural dimensions and a new index based on interpersonal distance preferences in different countries.

The results indicate that economic incentives, geographical proximity, a common border, the free movement of labour as well as the size of the migrant network have a significant and positive effect on intra-EU mobility flows. Cultural distance between countries does not seem to prevent Europeans from moving to another member state; rater the opposite is true. The coefficient of linguistic distance, on the other hand, is negative and highly significant in all samples and specifications. Thus, migration flows between two countries are smaller the less related their languages are, *ceteris paribus*.

Our results have important policy implications. Migration selectivity patterns seem to go beyond institutional factors, and open borders do not automatically mean that EU citizens enjoy full freedom of movement. Even though the COVID-19 pandemic is likely to accelerate the ongoing digital transformation of the European economy and promote teleworking and the use of digital technology, making the physical distance less important, the language barrier will likely remain a challenge for the European labour market. Isphording and Otten (2017) find that greater linguistic distance between the native language and the host country language has a strong negative influence on host country language

acquisition, and it explains a large share of language skill heterogeneity among immigrants. Policies aimed at promoting instruction of foreign languages could encourage international labour mobility. The advantages of foreign language proficiency are manifold. Language proficiency can expand the choice of destination countries. Furthermore, adequate proficiency in the host country language may affect immigrants' marginal productivity, facilitate social integration and increase the potential to accumulate human capital.

# References


Adsera, A., & Pytlikova, M. (2015). The role of language in shaping international migration. *Economic Journal*, *125*(586), 49-81.

Alcidi, C., & Gros, D. (2019). *EU Mobile Workers: A challenge to public finances?* Contribution for informal ECOFIN, Bucharest, 5-6 April, 2019.

Arpaia, A., Kiss, A., Palvolgyi, B., & Turrini, A. (2016). Labour mobility and labour market adjustment in the eu. *IZA Journal of Migration*, *5*(1).

Baas, T., & Brüecker, H. (2010). Wirkungen der Zuwanderungen aus den neuen mittel- und osteuropaeischen EU-Staaten auf Arbeitsmarkt und Gesamtwirtschaft. *Friedrich-Ebert-Stiftung WISO Diskurs*.

Barslund, M., & Busse, M. (2014). *Making the most of EU labour mobility. Report of a CEPS Task Force*. Brussels: Centre for European Policy Studies.

Beine, M., Docquier, F., & Özden, . (2011). Diasporas. *Journal of Development Economics*, *95*, 30–41.

Beine, M., Docquier, F., & Özden, . (2015). Dissecting network externalities in international migration. *Journal of Demographic Economics*, *81*(4), 379–408.

Belot, M., & Ederveen, S. (2012). Cultural barriers in migration between OECD countries. *Journal of Population Economics*, *25(3)*, 1077–1105.

Belot, M., & Hatton, T. J. (2012). Immigrant selection in the oecd. *The Scandinavian Journal of Economics*, *114*(4), 1105-1128.

Bentivogli, C., & Pagano, P. (1999). Regional Disparities and Labour Mobility: the Euro-11 versus the USA. *Labour*, *13 (3)*, 737-760.

Borjas, G. (1987). Self-Selection and the Earnings of Immigrants. *The American Economic Review*, *77*, 531-553.

Borjas, G. (1989). Economic Theory and International Migration. *International Migration Review*, *23*, 457-485.

Braunerhjelm, P., Faini, R., Norman, V., Ruane, F., & Seabright, P. (2000). *Integration and the Regions of Europe: How the Right Policies Can Prevent Polarization. Monitoring European Integration 10*. London: Centre for Economic Policy Research.

Bredtmann, J., Nowotny, K., & Otten, S. (2017). Linguistic Distance, Networks and Migrants' Regional Location Choice. *IZA Discussion Paper*, *11171*.

Brüecker, H., Baas, T., Beleva, I., Bertoli, S., Boeri, T., Damelang, A., ... Zylicz, A. (2009). *Labour mobility within the EU in the context of enlargement and the functioning of the transitional arrangements* [Report]. DG for Employment, Social Affairs and Inclusion of the EC.

Brüecker, H., Bertoli, S., Facchini, G., Mayda, A. M., & Peri, G. (2012). Understanding Highly Skilled Migration in Developed Countries: The Upcoming Battle for Brains. In F. Docquier, H. Brücker, H. Rapoport, & T. Boeri (Eds.), *Brain Drain and Brain Gain: The Global Competition to Attract High-Skilled Migrants* (pp. 15–188). United Kingdom: OUP Oxford.

Burda, M. (1993). The determinants of East-West German migration. *European Economic Review*, *37*, 452-461.

Caragliu, A., Del Bo, C., de Groot, H., & Linders, G. (2013). Cultural determinants of migration. *The Annals of Regional Science*, *51 (1)*, 7-32.

Docquier, F., & Rapoport, H. (2012). Globalization, brain drain, and development. *Journal of Economic Literature*, *50*(3), 681-730.

Dyen, I., Kruskal, J., & Black, P. (1992). *An Indoeuropean Classification: A Lexicostatistical Experiment*. Philadelphia: The American Philosophical Society.

Elsner, B., & Zimmermann, K. F. (2016). Migration 10 years after: Eu enlargement, closed borders, and migration to germany. In M. Kahanec & K. F. Zimmermann (Eds.), *Labor migration, eu enlargement, and the great recession* (p. 85-101). Berlin, Heidelberg: Springer Berlin Heidelberg.

European Commission. (2002). *Commission's Action Plan for skills and mobility, COM/2002/0072 final.*

European Commission. (2008). *The impact of free movement of workers in the context of EU enlargement. Report on the first phase (1 January 2007 – 31 December 2008) of the Transitional Arrangements set out in the 2005 Accession Treaty and as requested according to the Transitional Arrangement set out in the 2003 Accession Treaty, Communication, COM(2008) 765 final.*

European Commission. (2011). *The Commission accepts that Spain can temporarily restrict the free movement of Romanian workers, MEMO/11/554.* online. Retrieved from `https://ec.europa.eu/commission/presscorner/detail/en/MEMO_11_554` (Retrieved on 11.10.2021)

European Commission. (2015). *Report from the Commission to the Council on the Functioning of the Transitional Arrangements on Free Movement of Workers*

*from Croatia (First phase: 1 July 2013 - 30 June 2015), COM(2015) 233 final.*

European Commission. (2021). *Annual Report on Intra-EU Labour Mobility 2020.* Luxembourg: Publications Office of the European Union.

European Union. (2003). Documents concerning the accession of the Czech Republic, the Republic of Estonia, the Republic of Cyprus, the Republic of Latvia, the Republic of Lithuania, the Republic of Hungary, the Republic of Malta, the Republic of Poland, the Republic of Slovenia and the Slovak Republic to the European Union. *Official Journal of the European Union*, *46*(L236).

Eurostat. (2021a). *Eu citizens living in another member state - statistical overview.* online. Retrieved from `https://ec.europa.eu/eurostat/statistics-explained/images/3/32/EU_citizens_living_in_another_MS_2020_REV.xlsx` (Retrieved on 11.10.2021)

Eurostat. (2021b). *EU/EFTA citizens of working age who usually reside in another EU/EFTA country by citizenship and age.* online. Retrieved from `https://ec.europa.eu/eurostat/databrowser/view/lfst_lmbpcita/default/table?lang=en` (Retrieved on 11.10.2021)

Eurostat. (2021c). *Population on 1 January by age group and sex.* online. Retrieved from `https://ec.europa.eu/eurostat/databrowser/view/demo_pjangroup/default/table?lang=en` (Retrieved on 11.10.2021)

Galgóczi, B., & Leschke, J. (2016). *EU Labour Migration in Troubled Times: Skills Mismatch, Return and Policy Responses*. Abingdon: Routledge.

Giannetti, G. (2001). Skill complementarities and migration decision. *Labour*, *15(1)*, 1–31.

Grogger, J., & Hanson, G. (2011). Income maximization and the selection and sorting of international migrants. *Journal of Development Economics*, *95*, 42–57.

Gross, D., & Schmitt, N. (2005). Cultural clustering, skills, and international labour mobility. *Policy study – CD Howe institute*, *42*, 115–132.

Hall, E. T. (1966). *The hidden dimension.* Heidelberg: Springer.

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

Hatton, T., & Williamson, J. (2002). What Fundamentals Drive World Migration?

*Australian National University Discussion Papers*, *45*, 1-34.

Hayduk, L. A. (1983). Personal space: Where we now stand. *Psychological Bulletin*, *94*, 293–335.

Hicks, J. (1932). *The theory of wages*. London: Macmillan.

Hofstede, G., & Hofstede, G. (2010). *Geert Hofstede's personal website.* online. Retrieved from `https://geerthofstede.com/research-and-vsm/dimension-data-matrix/` (Retrieved on 27.02.20221)

Isphording, I. E., & Otten, S. (2017). Linguistic Distance and the Language Fluency of Immigrants. *Ruhr Economic Papers*, *274*.

Kaczmarczyk, P., & Stanek, M. (2016). Crisis and Beyond: Intra-EU Mobility of Polish and Spanish Migrants in a Comparative Perspective. In A. Triandafyllidou & I. Isaakyan (Eds.), *High-Skill Migration and Recession: Gendered Perspectives* (p. 69-100). London: Palgrave Macmillan UK.

Kahanec, M., & Zimmermann, K. (Eds.). (2010). *EU labor markets after post-enlargement migration*. Heidelberg: Springer.

Kessler, B., & Lehtonen, A. (2006). *Multilateral comparison and significance testing of the Indo-Uralic question.* Unofficial prepublication draft of chapter 3 of: Forster, Peter and Colin Renfrew (eds.), Phylogenetic methods and the prehistory of languages. Cambridge, England: McDonald Institute for Archaeological Research, 2006. Retrieved from `http://spell.psychology.wustl.edu/McDonald/paper/Kessler--Multilateral.pdf` (Retrieved on 11.10.2021)

Kogut, B., & Singh, H. (1988). The effect of national culture on the choice of entry mode. *Journal of International Business Studies*, *19*(3), 411–432.

Maseland, R., & Hoorn, A. (2010, 10). Values and marginal preferences in international business. *Journal of International Business Studies*, *41*, 1325-1329.

Mauro, P., & Spilimbergo, A. (1999). How do the skilled and the unskilled respond to regional shocks? the case of spain. *IMF Staff Papers*, *46(1)*.

Mayda, A. (2010). International migration: A panel data analysis of the determinants of bilateral flows. *Journal of Population Economics*, *23(4)*, 1249–1274.

Mazur, A. (1977). Interpersonal spacing on public benches in "contact" vs. "non-contact" cultures. *The Journal of Social Psychology*, *101*(1), 53–58.

Mundell, R. (1961). A theory of optimum currency areas. *The American Economic Review*, *51(4)*, 657–665.

Munshi, K. (2003). Networks in the modern economy: Mexican migrants in the U.S. labor market. *The Quarterly Journal of Economics*, *118(2)*, 549–597.

Parey, M., Ruhose, J., Waldinger, F., & Netz, N. (2017). The selection of high-skilled emigrants. *The Review of Economics and Statistics*, *99*(5), 776-792.

Ravenstein, E. (1885). The laws of migration. *Journal of the Statistical Society of London*, *48*, 167–235.

Remland, M. S., Jones, T. S., & Brinkman, H. (1977). Interpersonal distance, body orientation, and touch: effects of culture, gender, and age. *The Journal of social psychology*, *135*(3), 281–297.

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

Sorokowska, A., Sorokowski, P., Hilpert, P., Cantarero, K., Frackowiak, T., Ahmadi, K., ... John D. Pierce, J. (2017). Preferred interpersonal distances: A global comparison. *Journal of Cross-Cultural Psychology*, *48*(4), 577-592.

Sprenger, E. (2013). *The determinants of international migration in the european union: An empirical analysis* (Working Papers No. 325). Regensburg: Leibniz Institut für Ost- und Südosteuropaforschung (Institute for East and Southeast European Studies).

Todaro, M. (1969). A Model of Labour Migration and Urban Unemployment in Less Developed Countries. *American Economic Review*, *59*, 138-148.

van Wissen, L., & Visser, H. (1998). An Explanatory Analysis of International Migration Flows Within the European Economic Area. In G. C., P. Nijkamp, & J. Poot (Eds.), *Crossing Borders: Regional and Urban Perspectives on International Migration* (pp. 337–359). Alredshot: Ashgate.

White, R., & Yamasaki, N. (2014). Source-destination cultural differences, immigrants' skill levels, and immigrant stocks: Evidence from six oecd member countries. *National Institute Economic Review*, *229*(1), R53-R67.

Winkelmann, R. (2008). *Econometric Analysis of Count Data*. Heidelberg: Springer.

Winkelmann, R. (2015). Counting on count data models. *IZA World of Labor*, *148*.

Wooldridge, J. M. (1999). Distribution-free estimation of some nonlinear panel data models. *Journal of Econometrics*, *90*(1), 77-97.

# Appendix

Table A1: Correlation between distance variables

| | Physical | Linguistic | Hofstede | Interpersonal |
|---|---|---|---|---|
| Physical | 1.0000 | | | |
| Linguistic | 0.2771** | 1.0000 | | |
| Hofstede | 0.0917** | 0.1888** | 1.0000 | |
| Interpersonal | -0.1085** | 0.2594** | -0.0277* | 1.0000 |

* $p < 0.10$, ** $p < 0.05$.

Table A2: Migration flows, 1998-2018, average over available years

| To/ from | **AT** | **BE** | **BG** | **HR** | **CY** | **CZ** | **DK** | **EE** | **FI** | **FR** | **DE** | **EL** | **HU** | **IE** | **IT** | **LV** | **LT** | **LU** | **MT** | **NL** | **PL** | **PT** | **RO** | **SK** | **SI** | **ES** | **SE** | **UK** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AT** | | 214 | 2750 | 3728 | 23 | 1439 | 181 | 66 | 300 | 932 | 14471 | 696 | 7249 | 174 | 2452 | 161 | 198 | 82 | 9 | 810 | 5220 | 469 | 9716 | 4076 | 1290 | 843 | 397 | 1190 |
| **BE** | 284 | | 2603 | 257 | 54 | 413 | 285 | 121 | 316 | 11097 | 2984 | 891 | 796 | 336 | 3695 | 225 | 295 | 242 | 47 | 8799 | 5689 | 2528 | 6416 | 587 | 139 | 3146 | 439 | 2079 |
| **BG** | 31 | 28 | | 9 | 12 | 24 | 13 | 5 | 6 | 58 | 153 | 384 | 10 | 11 | 127 | 10 | 10 | 1 | 2 | 38 | 74 | 10 | 71 | 13 | 5 | 28 | 14 | 312 |
| **HR** | 69 | 11 | 20 | | 1 | 29 | 6 | 2 | 5 | 46 | 241 | 6 | 47 | 6 | 144 | 2 | 4 | 1 | 1 | 27 | 35 | 5 | 30 | 29 | 239 | 14 | 25 | 52 |
| **CY** | n.d. | n.d. | n.d. | n.d. | | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| **CZ** | 305 | 63 | 981 | 154 | 11 | | 37 | 16 | 35 | 322 | 1633 | 96 | 432 | 52 | 340 | 43 | 54 | 2 | 3 | 210 | 1052 | 49 | 921 | 9002 | 28 | 118 | 77 | 480 |
| **DK** | 149 | 146 | 671 | 115 | 11 | 202 | | 190 | 341 | 790 | 2055 | 235 | 433 | 149 | 870 | 525 | 1209 | 5 | 7 | 527 | 2794 | 247 | 1842 | 254 | 45 | 801 | 1334 | 1169 |
| **EE** | 15 | 16 | 24 | 4 | 2 | 28 | 13 | | 362 | 78 | 160 | 12 | 18 | 9 | 91 | 198 | 64 | 1 | 1 | 22 | 39 | 20 | 30 | 16 | 4 | 54 | 66 | 58 |
| **FI** | 33 | 32 | 129 | 29 | 5 | 45 | 67 | 2651 | | 186 | 302 | 82 | 155 | 40 | 175 | 135 | 99 | 1 | 2 | 91 | 276 | 45 | 209 | 37 | 10 | 185 | 682 | 315 |
| **FR** | 442 | 5606 | 933 | 171 | 30 | 415 | 463 | 90 | 389 | | 6817 | 759 | 572 | 793 | 9156 | 109 | 158 | 503 | 12 | 2082 | 2431 | 9425 | 4876 | 342 | 97 | 8112 | 905 | 9335 |
| **DE** | 10103 | 2268 | 37914 | 22707 | 221 | 8826 | 2254 | 834 | 2205 | 13906 | | 18211 | 31650 | 1799 | 33521 | 4937 | 6573 | 1740 | 76 | 9350 | 130737 | 9130 | 90756 | 11323 | 2461 | 13525 | 2641 | 10042 |
| **EL** | 81 | 66 | n.d. | n.d. | n.d. | 86 | 56 | 5 | 58 | 242 | 552 | | 83 | 27 | 239 | n.d. | n.d. | 2 | n.d. | 190 | 412 | 8 | n.d. | 60 | 7 | 33 | 99 | 958 |
| **HU** | 365 | 98 | 69 | 165 | 39 | 54 | 32 | 11 | 73 | 291 | 1674 | 59 | | 49 | 278 | 12 | 19 | 3 | 5 | 239 | 162 | 43 | 6773 | 961 | 30 | 129 | 113 | 320 |
| **IE** | 152 | 157 | 120 | 46 | 12 | 1294 | 193 | 498 | 264 | 2687 | 2093 | 74 | 1216 | | 1321 | 3213 | 5769 | 3 | 30 | 485 | 21503 | 328 | 916 | 2494 | 47 | 1807 | 543 | 6221 |
| **IT** | 337 | 373 | 4233 | 903 | 19 | 464 | 150 | 94 | 138 | 2046 | 2196 | 457 | 739 | 187 | | 213 | 421 | 21 | 52 | 535 | 6839 | 417 | 72750 | 772 | 218 | 1612 | 249 | 1750 |
| **LV** | 11 | 7 | 61 | 3 | 1 | 16 | 27 | 54 | 28 | 40 | 142 | 4 | 4 | 9 | 34 | | 199 | 1 | 1 | 17 | 41 | 10 | 42 | 5 | 2 | 28 | 61 | 54 |
| **LT** | 5 | 8 | 17 | 3 | 0 | 5 | 23 | 13 | 19 | 30 | 71 | 5 | 4 | 4 | 33 | 69 | | 0 | 1 | 13 | 58 | 9 | 27 | 4 | 1 | 23 | 17 | 28 |
| **LU** | 60 | 1222 | 108 | 53 | 9 | 78 | 130 | 49 | 89 | 2907 | 904 | 184 | 137 | 116 | 956 | 51 | 64 | | 22 | 226 | 308 | 3582 | 320 | 62 | 45 | 352 | 143 | 432 |
| **MT** | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| **NL** | 366 | 1998 | 2325 | 199 | 69 | 430 | 360 | 125 | 429 | 2412 | 6470 | 1490 | 1315 | 579 | 2572 | 404 | 566 | 53 | 27 | | 9599 | 1594 | 1913 | 582 | 120 | 2293 | 569 | 4423 |
| **PL** | 173 | 120 | 481 | 82 | 9 | 196 | 142 | 18 | 90 | 762 | 2514 | 86 | 155 | 86 | 647 | 73 | 237 | 6 | 3 | 286 | | 161 | 299 | 197 | 29 | 408 | 288 | 705 |
| **PT** | n.d. | n.d. | 819 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1298 | 993 | n.d. | n.d. | n.d. | 1273 | n.d. | n.d. | n.d. | n.d. | 589 | | | 3120 | n.d. | n.d. | 1352 | n.d. | 1813 |
| **RO** | 242 | 102 | 298 | 50 | 22 | 54 | 38 | 11 | 38 | 764 | 785 | 322 | 379 | 47 | 806 | 24 | 56 | 4 | 2 | 181 | 229 | 170 | | 85 | 15 | 158 | 118 | 262 |
| **SK** | 138 | 37 | 139 | 56 | 3 | 670 | 21 | 3 | 11 | 112 | 297 | 28 | 465 | 15 | 155 | 11 | 11 | 1 | 2 | 32 | 282 | 16 | 538 | | 16 | 56 | 19 | 130 |
| **SI** | 68 | 13 | 410 | 1069 | 1 | 30 | 6 | 3 | 8 | 63 | 123 | 6 | 72 | 8 | 271 | 5 | 8 | 1 | 1 | 23 | 49 | 8 | 110 | 143 | | 22 | 15 | 74 |
| **ES** | 657 | 2382 | 10251 | 207 | 27 | 651 | 757 | 187 | 878 | 8091 | 10232 | 410 | 791 | 1292 | 14111 | 350 | 1441 | 44 | 22 | 3423 | 4862 | 7842 | 52038 | 542 | 137 | | 1703 | 22262 |
| **SE** | 173 | 156 | 524 | 536 | 26 | 163 | 2928 | 396 | 2801 | 783 | 2185 | 694 | 583 | 209 | 694 | 470 | 880 | 5 | 10 | 762 | 3732 | 200 | 1337 | 134 | 58 | 739 | | 1518 |
| **UK** | 1065 | 1593 | 3487 | 370 | 1773 | 2663 | 2550 | 703 | 1142 | 15823 | 11744 | 6573 | 3151 | 5559 | 12693 | 2782 | 6646 | 200 | 517 | 4303 | 29115 | 7344 | 18275 | 3074 | 200 | 11786 | 2731 | |

Source: Eurostat, OECD and national statistical offices.

Table A3: Linguistic distance between EU28 countries

| | AT | BE | BG | HR | CY | CZ | DK | EE | FI | FR | DE | EL | HU | IE | IT | LV | LT | LU | MT | NL | PL | PT | RO | SK | SI | ES | SE | UK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AT** | 0.000 | 0.000 | 0.769 | 0.764 | 0.812 | 0.741 | 0.293 | 1.000 | 0.369 | 0.756 | 0.000 | 0.812 | 1.000 | 0.422 | 0.735 | 0.800 | 0.776 | 0.000 | 0.422 | 0.162 | 0.754 | 0.753 | 0.751 | 0.742 | 0.733 | 0.747 | 0.369 | 0.422 |
| **BE** | 0.000 | 0.000 | 0.769 | 0.764 | 0.812 | 0.741 | 0.293 | 1.000 | 0.352 | 0.000 | 0.000 | 0.812 | 1.000 | 0.392 | 0.197 | 0.793 | 0.776 | 0.000 | 0.392 | 0.000 | 0.754 | 0.291 | 0.421 | 0.742 | 0.733 | 0.266 | 0.352 | 0.392 |
| **BG** | 0.769 | 0.769 | 0.000 | 0.291 | 0.811 | 0.311 | 0.760 | 1.000 | 0.764 | 0.791 | 0.769 | 0.811 | 1.000 | 0.772 | 0.769 | 0.694 | 0.658 | 0.769 | 0.772 | 0.779 | 0.369 | 0.781 | 0.798 | 0.315 | 0.385 | 0.782 | 0.764 | 0.772 |
| **HR** | 0.764 | 0.764 | 0.291 | 0.000 | 0.821 | 0.281 | 0.749 | 1.000 | 0.763 | 0.772 | 0.764 | 0.821 | 1.000 | 0.766 | 0.755 | 0.663 | 0.643 | 0.764 | 0.766 | 0.779 | 0.320 | 0.766 | 0.778 | 0.268 | 0.316 | 0.768 | 0.763 | 0.766 |
| **CY** | 0.812 | 0.812 | 0.811 | 0.821 | 0.000 | 0.836 | 0.817 | 1.000 | 0.816 | 0.843 | 0.812 | 0.000 | 1.000 | 0.838 | 0.822 | 0.848 | 0.828 | 0.812 | 0.838 | 0.812 | 0.837 | 0.833 | 0.843 | 0.832 | 0.821 | 0.833 | 0.816 | 0.838 |
| **CZ** | 0.741 | 0.741 | 0.311 | 0.281 | 0.836 | 0.000 | 0.746 | 1.000 | 0.767 | 0.769 | 0.741 | 0.836 | 1.000 | 0.759 | 0.753 | 0.667 | 0.624 | 0.741 | 0.759 | 0.756 | 0.234 | 0.764 | 0.777 | 0.086 | 0.337 | 0.760 | 0.767 | 0.759 |
| **DK** | 0.293 | 0.293 | 0.760 | 0.749 | 0.817 | 0.746 | 0.000 | 1.000 | 0.170 | 0.759 | 0.293 | 0.817 | 1.000 | 0.407 | 0.737 | 0.797 | 0.778 | 0.293 | 0.407 | 0.337 | 0.749 | 0.750 | 0.763 | 0.732 | 0.733 | 0.750 | 0.170 | 0.407 |
| **EE** | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.000 | 0.300 | 1.000 | 1.000 | 1.000 | 0.750 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| **FI** | 0.369 | 0.352 | 0.764 | 0.763 | 0.816 | 0.767 | 0.170 | 0.300 | 0.000 | 0.758 | 0.369 | 0.816 | 0.750 | 0.409 | 0.746 | 0.791 | 0.782 | 0.369 | 0.409 | 0.352 | 0.773 | 0.759 | 0.761 | 0.756 | 0.754 | 0.759 | 0.000 | 0.409 |
| **FR** | 0.756 | 0.000 | 0.791 | 0.772 | 0.843 | 0.769 | 0.759 | 1.000 | 0.758 | 0.000 | 0.756 | 0.843 | 1.000 | 0.764 | 0.197 | 0.793 | 0.779 | 0.000 | 0.764 | 0.756 | 0.781 | 0.291 | 0.421 | 0.765 | 0.782 | 0.266 | 0.758 | 0.764 |
| **DE** | 0.000 | 0.000 | 0.769 | 0.764 | 0.812 | 0.741 | 0.293 | 1.000 | 0.369 | 0.756 | 0.000 | 0.812 | 1.000 | 0.422 | 0.735 | 0.800 | 0.776 | 0.000 | 0.422 | 0.162 | 0.754 | 0.753 | 0.751 | 0.742 | 0.733 | 0.747 | 0.369 | 0.422 |
| **EL** | 0.812 | 0.812 | 0.811 | 0.821 | 0.000 | 0.836 | 0.817 | 1.000 | 0.816 | 0.843 | 0.812 | 0.000 | 1.000 | 0.838 | 0.822 | 0.848 | 0.828 | 0.812 | 0.838 | 0.812 | 0.837 | 0.833 | 0.843 | 0.832 | 0.821 | 0.833 | 0.816 | 0.838 |
| **HU** | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.750 | 0.750 | 1.000 | 1.000 | 1.000 | 0.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| **IE** | 0.422 | 0.392 | 0.772 | 0.766 | 0.838 | 0.759 | 0.407 | 1.000 | 0.409 | 0.764 | 0.422 | 0.838 | 1.000 | 0.000 | 0.753 | 0.803 | 0.784 | 0.422 | 0.000 | 0.392 | 0.761 | 0.760 | 0.773 | 0.750 | 0.751 | 0.760 | 0.409 | 0.000 |
| **IT** | 0.735 | 0.197 | 0.769 | 0.755 | 0.822 | 0.753 | 0.737 | 1.000 | 0.746 | 0.197 | 0.735 | 0.822 | 1.000 | 0.753 | 0.000 | 0.782 | 0.758 | 0.197 | 0.753 | 0.740 | 0.764 | 0.227 | 0.340 | 0.749 | 0.760 | 0.212 | 0.746 | 0.753 |
| **LV** | 0.800 | 0.793 | 0.694 | 0.663 | 0.848 | 0.667 | 0.797 | 1.000 | 0.791 | 0.793 | 0.800 | 0.848 | 1.000 | 0.803 | 0.782 | 0.000 | 0.387 | 0.793 | 0.803 | 0.805 | 0.668 | 0.804 | 0.821 | 0.643 | 0.677 | 0.794 | 0.791 | 0.803 |
| **LT** | 0.776 | 0.776 | 0.658 | 0.643 | 0.828 | 0.624 | 0.778 | 1.000 | 0.782 | 0.779 | 0.776 | 0.828 | 1.000 | 0.784 | 0.758 | 0.387 | 0.000 | 0.776 | 0.784 | 0.786 | 0.639 | 0.785 | 0.797 | 0.605 | 0.662 | 0.770 | 0.782 | 0.784 |
| **LU** | 0.000 | 0.000 | 0.769 | 0.764 | 0.812 | 0.741 | 0.293 | 1.000 | 0.369 | 0.000 | 0.000 | 0.812 | 1.000 | 0.422 | 0.197 | 0.793 | 0.776 | 0.000 | 0.422 | 0.162 | 0.754 | 0.291 | 0.421 | 0.742 | 0.733 | 0.266 | 0.369 | 0.422 |
| **MT** | 0.422 | 0.392 | 0.772 | 0.766 | 0.838 | 0.759 | 0.407 | 1.000 | 0.409 | 0.764 | 0.422 | 0.838 | 1.000 | 0.000 | 0.753 | 0.803 | 0.784 | 0.422 | 0.000 | 0.392 | 0.761 | 0.760 | 0.773 | 0.750 | 0.751 | 0.760 | 0.409 | 0.000 |
| **NL** | 0.162 | 0.000 | 0.779 | 0.779 | 0.812 | 0.756 | 0.337 | 1.000 | 0.352 | 0.756 | 0.162 | 0.812 | 1.000 | 0.392 | 0.740 | 0.805 | 0.786 | 0.162 | 0.392 | 0.000 | 0.769 | 0.747 | 0.746 | 0.753 | 0.754 | 0.742 | 0.352 | 0.392 |
| **PL** | 0.754 | 0.754 | 0.369 | 0.320 | 0.837 | 0.234 | 0.749 | 1.000 | 0.773 | 0.781 | 0.754 | 0.837 | 1.000 | 0.761 | 0.764 | 0.668 | 0.639 | 0.754 | 0.761 | 0.769 | 0.000 | 0.776 | 0.784 | 0.222 | 0.367 | 0.772 | 0.773 | 0.761 |
| **PT** | 0.753 | 0.291 | 0.781 | 0.766 | 0.833 | 0.764 | 0.750 | 1.000 | 0.759 | 0.291 | 0.753 | 0.833 | 1.000 | 0.760 | 0.227 | 0.804 | 0.785 | 0.291 | 0.760 | 0.747 | 0.776 | 0.000 | 0.371 | 0.760 | 0.781 | 0.126 | 0.759 | 0.760 |
| **RO** | 0.751 | 0.421 | 0.798 | 0.778 | 0.843 | 0.777 | 0.763 | 1.000 | 0.761 | 0.421 | 0.751 | 0.843 | 1.000 | 0.773 | 0.340 | 0.821 | 0.797 | 0.421 | 0.773 | 0.746 | 0.784 | 0.371 | 0.000 | 0.777 | 0.790 | 0.406 | 0.761 | 0.773 |
| **SK** | 0.742 | 0.742 | 0.315 | 0.268 | 0.832 | 0.086 | 0.732 | 1.000 | 0.756 | 0.765 | 0.742 | 0.832 | 1.000 | 0.750 | 0.749 | 0.643 | 0.605 | 0.742 | 0.750 | 0.753 | 0.222 | 0.760 | 0.777 | 0.000 | 0.306 | 0.756 | 0.756 | 0.750 |
| **SI** | 0.733 | 0.733 | 0.385 | 0.316 | 0.821 | 0.337 | 0.733 | 1.000 | 0.754 | 0.782 | 0.733 | 0.821 | 1.000 | 0.751 | 0.760 | 0.677 | 0.662 | 0.733 | 0.751 | 0.754 | 0.367 | 0.754 | 0.790 | 0.306 | 0.000 | 0.772 | 0.754 | 0.751 |
| **ES** | 0.747 | 0.266 | 0.782 | 0.768 | 0.833 | 0.760 | 0.750 | 1.000 | 0.759 | 0.266 | 0.747 | 0.833 | 1.000 | 0.760 | 0.212 | 0.794 | 0.770 | 0.266 | 0.760 | 0.742 | 0.772 | 0.126 | 0.406 | 0.756 | 0.772 | 0.000 | 0.759 | 0.760 |
| **SE** | 0.369 | 0.352 | 0.764 | 0.763 | 0.816 | 0.767 | 0.170 | 1.000 | 0.000 | 0.758 | 0.369 | 0.816 | 1.000 | 0.409 | 0.746 | 0.791 | 0.782 | 0.369 | 0.409 | 0.352 | 0.773 | 0.759 | 0.761 | 0.756 | 0.754 | 0.759 | 0.000 | 0.409 |
| **UK** | 0.422 | 0.392 | 0.772 | 0.766 | 0.838 | 0.759 | 0.407 | 1.000 | 0.409 | 0.764 | 0.422 | 0.838 | 1.000 | 0.000 | 0.753 | 0.803 | 0.784 | 0.422 | 0.000 | 0.392 | 0.761 | 0.760 | 0.773 | 0.750 | 0.751 | 0.760 | 0.409 | 0.000 |

Source: Own calculations based on Dyen et al. (1992) and Adsera and Pytlikova (2015).