Immigrants move where their skills are scarce: Evidence from English proficiency

Immigrants move where their skills are scarce: Evidence from English proficiency*

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This version: May 2019

Abstract

This paper studies whether individuals tend to migrate to countries where their skills are scarce or abundant. Focusing on English language skills, we test whether immigrants who are proficient in English choose to move to countries where many or few individuals speak English. We use the introduction of English classes into compulsory school curricula as an exogenous determinant for English proficiency of migrants of different ages, and we consider cohort data on migration among 29 European countries, where English is not the official language and where labor mobility is essentially free. Our estimation strategy consists of refined comparisons of cohorts, and we control for all variables traditionally included in international migration models. We find that immigrants who are proficient in English move to countries where fewer individuals speak English, and where hence their skills are scarce. We also show that similar results hold for general skills.

JEL classification: F22, I20, J24, J61

Keywords: migration, English language skills, choice of destination country

*This paper benefited from useful comments received at the WEAI conference 2018, the EALE conference 2018, and the workshop on "Current issues in migration economics" in Milan. We would also like to thank Eliana La Ferrara for valuable suggestions.

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1 Introduction

The effect of migration on natives' labor market outcomes crucially depends on whether migrants' skills are complements or substitutes to natives' skills. High substitutability of skills is associated with significantly negative wage effects of migration for low skilled natives (Borjas [2017]). Low substitutability between skills of low educated natives and migrants, on the other hand, implies that labor market competition between the two groups is limited (Altonji and Card [1991]). Finally, complementarities between high skilled natives and low skilled migrants could explain findings of positive wage effects of migration for high skilled natives (Dustmann, Frattini and Preston [2013]). In the end, whether migrants are equipped with skills which are complements or substitutes to natives' skills is an outcome of individuals' location decisions. However, little is known about if and how migrants take into account the relationship between their skills and those of natives when deciding where to migrate. The current paper focuses on English language skills and tests empirically if migrants who are proficient in English choose destination countries where many or few individuals speak English.

Without any additional assumptions, theoretically it is unclear whether individuals would prefer to migrate to countries where their skills are scarce or abundant. Migrating to countries where one's skills are scarce could imply greater returns if these skills are in high demand. Migrants might also suffer less discrimination if they compete with natives to a lesser degree. However, the scarcity of skills could also indicate a lack of demand. In this case, abundance of skills would signal higher returns and migrants would be better off choosing countries where natives share the same skill set. Being more similar to natives, they might also suffer less discrimination. In the current paper we focus on English language skills which are highly comparable across countries. Migrants who are proficient in English could prefer to move to countries where English is widely spoken, given that positive returns to a host country's language proficiency (Bleakley and Chin [2004]) and easier social integration (Bleakley and Chin [2010]) might extent to other widely spoken languages. On the other hand, a study by Ginsburgh and Prieto-Rodriguez [2011]

shows that returns to English proficiency are higher in countries where fewer individuals speak English.

Testing empirically how immigrants take into account the relationship between their skills and natives' skills when deciding where to migrate is challenging due to reverse causality and unobserved factors. In particular, migrants could decide to acquire skills according to the skill composition of their preferred destination country. Furthermore, unobserved factors could be correlated with both migrants' skills and their choice of destination country. For instance, individuals with parents from different countries are likely to be proficient in both of their parents' languages, and they are also likely to migrate to the home country of one of their parents. To address these endogeneity issues, we use the introduction of English classes into compulsory school curricula as an exogenous determinant for English proficiency of migrants of different ages. We show that such education reforms are related to improved English proficiency of affected cohorts. By changing compulsory education curricula, governments can determine their citizens' English proficiency which is likely to influence their migration decisions. Our analysis hence also allows us to study the implications of education policies for migration. Crucial for the validity of our results, we provide evidence on the exogeneity of education reforms with respect to past migration.

Our findings show that individuals who learned English during compulsory education migrate to countries where fewer people speak English, and where hence their language skills might be more valuable. In particular, those who learned English during compulsory education are 1.3% less likely to migrate to a country where 10 percentage point more individuals speak English. We also show that similar results hold for general skills. As mentioned before, the validity of our results relies on the exogeneity of education reforms with respect to migration. To address this issue, we follow Landes and Solmon [1972] and Lleras-Muney [2002], and we perform two empirical tests indicating that the introduction of English into compulsory school curricula is not predetermined by past migration rates nor systematically linked to any other socioeconomic factors that could affect migration.

For our analysis we use cohort level data on migration from Eurostat, self-collected data on English classes in compulsory school curricula for each cohort, and Eurobarometer data on the proportion of English speakers in each country. We exclude migration from and to the UK and Ireland where English is an official language because: i) Different from other destination countries, migration to the UK and Ireland might be driven by individuals' desire to improve their English proficiency, and ii) different from individuals in other countries of origin, English is not an acquired skill for individuals from the UK and Ireland. We limit our analysis to migration among European countries because outside of Europe, countries differ significantly in migration restrictions and their enforcement, which are both important factors in determining migrants' choice of destination country. Basically unlimited labor mobility in Europe on the other hand, allows us to isolate the role of migrants' and natives' English skills from migration restrictions.[1]

Our empirical strategy exploits variation across countries of origin, countries of destination, age groups, and years. In particular, we test how the interaction between a cohort's exposure to English classes during compulsory education and the share of individuals who speak English in potential destination countries affects the number of migrants from this cohort to a particular destination country. Our estimation strategy controls not only for individuals' countries of origin and their chosen destination country, but also for individuals' age and the year of migration and all interactions between these fixed effects. In addition, we are also able to control for: (i) destination-age-year fixed effects like age-specific labor demands in destination countries during specific years, (ii) destination-origin-year interactions which capture aspects such as the establishment of specific agreements across pairs of countries, and (iii) origin-age-year fixed effects which account for factors like the state of the labor market in the origin country for different co-

[1]EU law guarantees free labor mobility but countries can impose temporary restrictions for nationals of new member states. Prior to 2014, some EU member states required that Bulgarian and Romanian nationals obtained residence and work permits. Regarding non-EU European countries in our sample, Norway and Liechtenstein belong to the Schengen area which has guaranteed free mobility since 2001 and 2011 respectively. Croatia joined the EU only in 2013, and Macedonia is an EU candidate country, and since 2009 its residents have been able to travel visa-free to the Schengen area. Controlling for destination-origin-year fixed effects, our identification strategy takes into account that these temporary restrictions could affect migration flows.

horts. In addition, we also control for cohort-specific differences in unemployment rates. Hence, our findings result from refined comparisons of cohorts which enables us to isolate the effect of the relationship between migrants' and natives' English skills on individuals' choice of destination country.

The current paper relates to the extensive literature on the effect of host country language proficiency on migrants' outcomes, as well as to two smaller strands of literature on migrants' returns to other languages such as English and to the literature on the impact of language skills on migration. Regarding the first literature, findings by among others Bleakley and Chin [2004], Gonzalez-Luna [2005], Chiswick and Miller [2010], and Dustmann and Fabbri [2003] show that immigrants' accomplishments in a host country's labor market depend positively and to a great extent on their host country's language skills. Regarding migrants' returns to English proficiency in countries where English is not the official language, Stöhr [2015] estimates higher returns to English skills for migrants compared to natives in Germany. Looking at natives and Russian immigrants in Israel, Lang and Siniver [2009] on the other hand find no differential returns between high-skilled immigrants and natives, but higher returns to English language skills for low-skilled natives compared to migrants. For Estonia and Latvia, Toomet [2011] finds that native Russians obtain higher returns to English skills than to knowing the local Baltic languages. While the current paper does not estimate migrants' returns to English proficiency directly, our results are in line with the before-mentioned paper by Ginsburgh and Prieto-Rodriguez [2011] who find that returns to English proficiency are higher in European countries where fewer individuals speak English.

We are only aware of two papers that specifically address how language proficiency affects individuals' decisions to migrate. Adserá and Pytlilová [2015] introduce proximity between languages of origin and destination countries and a dummy for widely spoken languages into a model that explains international migration flows. The authors find that migration rates increase with linguistic proximity and with English spoken in the country of destination. However, regarding

the second result and different from the current paper, the authors do not study how choice of destination country might differ by migrants' English skills. In Aparicio-Fenoll and Kuehn [2016], we analyze the effect that studying a foreign language during compulsory education has on the number of individuals that move to countries where this language is official, and we find a positive effect. Different from our previous work, the current paper focuses on acquired skills of migrants and natives, and how the interaction between both affects migration choices. The remainder of this paper is organized as follows: Section 2 presents our estimation strategy, and Section 3 describes the data. In Section 4 we present and discuss our results as well as robustness and exogeneity checks. Section 5 concludes.

2 Empirical Strategy

We estimate the number of migrants in a cohort that move to a certain country as a function of the interaction of exposure to compulsory English classes at origin and the share of English speakers at destination by means of the following linear specification

$$\begin{aligned} \ln M_{odat} &= \beta_0 + \beta_1 CEC_{oat} \times PES_{dt} + \beta_2 D_o + \beta_3 D_d + \beta_4 D_a + \beta_5 D_t + \\ &+ \beta_6 D_{do} + \beta_7 D_{da} + \beta_8 D_{dt} + \beta_9 D_{oa} + \beta_{10} D_{ot} + \beta_{11} D_{at} + \\ &+ \beta_{12} D_{dot} + \beta_{13} D_{dat} + \beta_{14} D_{oat} + \beta_{15} C_{odat-1} + \beta_{16} K_{oat} + \varepsilon_{oadt}, \end{aligned} \tag{2.1}$$

where $\ln M_{odat}$ is the logarithm of the number of migrants from origin country o to destination country d in a cohort defined by the 5-year age group a at time t. Our coefficient of interest is β_1 on the interaction of a dummy variable for being exposed to compulsory English classes at origin (CEC) and the proportion of English speakers in the destination country (PES).[2] D denotes vectors of dummy variables, and their level of variation is indicated by the respective subindices.

[2]We do not include the un-interacted terms CEC and PES because they are not identified in the presence of origin-age-time interactions and destination dummies, respectively.

The vector C contains the following lagged cohort-specific variables: differences in unemployment rates between origin and destination country, population size, and the stock of migrants from each country residing in the destination. These three variables respectively account for, origin-destination differences in labor market opportunities across cohorts, the size of the cohort, and the pull-effect of networks in the destination country. K includes the number of years individuals in each cohort have lived in the EU, and the number of years they have lived under communism. These controls capture cohorts' integration in the EU and the influence of having lived under a different political regime with basically no migration possibilities. Note that in the presence of origin-age-time dummies, lagged population size of the age group and the number of years individuals in each cohort have lived in the EU and under communism are not identified. Finally, ε is the residual. In our estimation we compute standard errors using clusters at the origin-destination-age level. This way we take into account Bertrand, Dufflo and Mullainathan [2004]'s concern that standard errors could be underestimated due to serial correlation over time in the outcome of study.

Our estimation includes the richest set of dummy variables possible. We include binary variables for all single interactions and all double interactions with the exception of the interaction origin-destination-age. We cannot include the latter because the identifying variation of the interaction of compulsory English classes in origin countries and the proportion of English speakers in destination countries is happening at this level.[3] Therefore our identification strategy relies on the assumption that there are no other factors which vary at the origin-destination-age level– apart from labor market aspects captured by differences in cohort-specific unemployment rates and migrant stocks – and which are systematically correlated with migration patterns and the interaction of compulsory English classes at the origin and the proportion of English speakers at the destination.

[3]More precisely, the variation is at the origin-destination-age-year level, but given 8 years of observations and 5-year age groups, in the presence of origin-destination-age fixed effects we do not have enough variation over time to identify origin-destination-age-year varying factors such as our regressor of interest.

While one expects that introducing English into compulsory education leads to improved English proficiency of cohorts, this need not be the case. Education reforms might not be enforced or even prior to reforms, individuals could have been learning English. To test whether the introduction of English into compulsory school curricula had an impact on cohorts' English proficiency, measured in a given year, we estimate the following regression

$$PES_{ai} = \delta_0 + \delta_1 CEC_{ai} + \delta_2 D_a + \delta_3 D_i + \delta_4 C_{ai-1} + \delta_5 K_{ai} + \varepsilon_{ai}, \tag{2.2}$$

where PES_{ai} is the proportion of English speakers of age a in country i, CEC_{ai} indicates if individuals of age a in country i were exposed to English classes during compulsory education, D_i are country dummies, D_a are cohort indicators, C_{ai-1} contains the following age-specific variables measured one year before: unemployment rate, population size, and the average stock of migrants, K_{ai} are the number of years individuals in each cohort have lived in the EU and the number of years they have lived under communism, and ε is the error term. Note that due to the fact that we only have data for one particular year on the proportion of English speakers by age group, this regression lacks the time dimension.

One might wonder whether our results are specific to English skills or whether they also apply to more general skills. To address this issue we test if differences in educational attainment between potential migrants and natives shape individuals' migration decisions, running the following variant of our main regression

$$\begin{aligned} \ln M_{odat} \;=\; & \beta_0 + \beta_1 CS_{oat} \times AVS_{dt} + \beta_2 D_o + \beta_3 D_d + \beta_4 D_a + \beta_5 D_t + \\ & + \beta_6 D_{do} + \beta_7 D_{da} + \beta_8 D_{dt} + \beta_9 D_{oa} + \beta_{10} D_{ot} + \beta_{11} D_{at} + \\ & + \beta_{12} D_{dot} + \beta_{13} D_{dat} + \beta_{14} D_{oat} + \beta_{15} C_{odat-1} + \beta_{16} K_{oat} + \varepsilon_{oadt}, \end{aligned} \tag{2.3}$$

where we substitute our original interaction by a different one that interacts the years of compulsory education at origin that were effective for individuals of age a in year t (CS), with the

average years of schooling in the destination country (AVS). All other variables are as defined before.

As mentioned before, the validity of our estimation results relies on the exogeneity of education reforms that introduced English into compulsory education. To check if this is the case we run two different regressions. First we follow Landes and Solmon [1972] who suggest to test if education reforms can predict past outcomes. As the authors argue, if this is the case then exogeneity does not hold, and causality is likely to run from outcomes to education reforms. Our research question considers the effect of the interaction of English in compulsory education at origin and the proportion of English speakers at destination on choice of destination country, and hence our main concern is the exogeneity of education laws with respect to migration. We hence estimate the following regression

$$E_{i\tau-5} = \alpha_0 + \alpha_1 Reform(CEC_{i\tau}) + \alpha_2 Y_{i\tau} + \alpha_3 \Delta Y_{i\tau-5} + \alpha_4 D_i + \alpha_5 D_\tau + \epsilon_{i\tau-5}, \quad (2.4)$$

where $E_{i\tau-5}$ denotes country i's emigration rate measured 5 years prior to τ. $Reform(CEC_{i\tau})$ is an indicator for a reform that introduced English into compulsory school curricula in year τ, $Y_{\tau i}$ are different socio-economic variables (GDP per capita, population growth, share of the urban population, and average years of schooling) measured at time τ, and $\Delta Y_{\tau-5i}$ are their 5-year variation rates. D_τ are year dummies.

For a different endogeneity check, we follow Lleras-Muney [2002], and we explore the potential determinants of introducing English into compulsory school curricula by running the following regression

$$Reform(CEC_{i\tau}) = \gamma_0 + \gamma_1 Y_{\tau i} + \gamma_2 \Delta Y_{\tau-5i} + \gamma_4 D_i + \gamma_5 D_\tau + \epsilon_{i\tau}, \quad (2.5)$$

where all variables are as defined before. We run this regression to test for any relationships

between reforms that introduced English into compulsory school curricula and different socio-economic variables that could affect migration, as well as their 5-year variation rates.

3 Data

For our analysis we use Eurostat data on immigration for 26 EU countries plus Norway, Liechtenstein, and Macedonia. As mentioned before we exclude migration from and to the UK and Ireland where English is an official language because: i) Different from other destination countries, migration to the UK and Ireland might be driven by individuals' desire to improve their English proficiency, and ii) different from individuals in other countries of origin, English is not an acquired skill for individuals from the UK and Ireland.[4] In particular, we consider the flow of immigrants by five-year age groups and citizenship for 2008-2016. For arrivals in Germany and Austria, missing data for 2009-2016, and 2010 and 2013 respectively is complemented with data from the Statistische Bundesamt and Statistik Austria.

We also rely on Eurostat for data on national unemployment rates, the stock of migrants by citizenship, and GDP per capita in Purchasing Power Standards (PPS). Again we complement missing data for 2011 on the stock of migrants for Germany and Austria with data from the Statistische Bundesamt and Statistik Austria respectively. Unemployment rates, total population, and the stock of migrants are considered disaggregated by 5-year age groups and are measured one year prior to migration, i.e. in 2007-2015. For unemployment, we take the difference in age-group-specific unemployment rates between origin and destination countries. We obtain data on GDP per capita in PPS for Macedonia from the Statistical Office of Estonia. For Liechtenstein

[4]We have data for the following 29 countries of origin: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden. However, Cyprus, France, Greece, Macedonia, Malta, Poland, and Portugal do not provide information on migration inflows, and hence we only have information for 22 destination countries. While English is also an official language in Malta we do not exclude migration from Malta where many locals communicate in Maltese, and where 12% of the population does not speak English. Nevertheless our results are robust to the exclusion of Malta as country of origin.

we do not have data on GDP per capita in PPS, and we use data for Luxembourg, the most similar country to Liechtenstein when considering GDP per capita measured in current or constant US$ (see World Bank Data).[5] Note that GDP per capita in PPS terms is normalized to 100 for the EU-28 average.

We restrict our sample to young cohorts between 25 and 49 who are most likely to migrate for work-related reasons. We exclude those younger than 25 because for these cohorts it is difficult to disentangle migration from education decisions, in particular in the presence of a large scale EU program – Erasmus– that provides subsidies for studying abroad.[6] Regarding older workers, the number of years that individuals have to work to become eligible for pension payments varies widely across countries (e.g. France and Spain require 15 years while Germany requires 5 years). Hence, for older individuals such policy aspects which are unrelated to their English skills and to English skills of natives in potential destination countries might influence their migration decisions.

Our data on exposure to English during compulsory education come mainly from the European Commission's Education, Audiovisual and Culture Executive Agency. We construct a database that includes information on the starting age for studying English during compulsory education for each age group and country of origin. Educational reforms that have occurred during the last decades indicate whether individuals of different cohorts were exposed to English during compulsory education.[7] In particular, our age restriction implies that the oldest cohorts in our sample were born in 1959. In around half of all countries in our sample, mainly in Scandinavia and some Eastern European countries, these older individuals learned English during

[5]Our results do not change when excluding Liechtenstein from the estimation that uses data on GDP per capita; see Table A6 in the Appendix.

[6]For 2007-13 the EU allocated €3.1 billion to the Erasmus program.

[7]When the design of the compulsory school curricula is such that students have the option to choose English among several other languages, we consider that English was potentially learned during compulsory education. This way we are able to avoid that the individual decision to study English rather than other foreign languages could be determined by future migration decisions. However, note that typically English is the first foreign language in compulsory education, and in most countries students only choose among different second foreign languages.

compulsory education. In Spain, Portugal and certain Central and Eastern European countries on the other hand, such education reforms happened much later and only younger cohorts learned English during compulsory education. We hence observe within- and across-country variation in the exposure to English during compulsory education (see Table A1 in the Appendix). Note that the assignment of years of exposure to English in compulsory education to 5-year age groups is not always straightforward. Thus, for age groups in which only some individuals were affected by the introduction of English, we construct a weighted average for the proportion of affected individuals. As weights we use data from Eurostat on the number of individuals of each exact age within the age group.

We obtain the share of proficient English speakers, i.e. the percentage of those being able to hold a conversation in English, in each destination country from the Eurobarometer survey data (European Commission [2012] and [2006]), see Table A2 in the Appendix.[8] Note that this data is not available for Norway, Liechtenstein, and Macedonia. For our main estimation we hence impute the fraction of English speakers in Norway with data from Melitz and Toubal [2014]. For Liechtenstein we use numbers for Austria, and for Macedonia we compute the average share of English speakers in Slovenia and Croatia. We choose these countries because they are similar along dimensions related to language and language learning. Liechtenstein and Austria share German as a common language, and they have a very similar Human Development Index (0.916 Liechtenstein and 0.908 Austria) which intends to assess the overall development of a country, including measures of education. Macedonia, Slovenia, and Croatia also have extremely similar languages, and all three countries share a common past, including the introduction of foreign languages into compulsory school curricula during the 1950's in the former country of Yugoslavia. However, note that in our robustness checks we make sure that our main results hold without these three countries for which data was imputed. For our first stage estimation, we only use data from the Eurobarometer [2012] survey because data on the proportion of English speakers by age

[8]In particular, for 2012-2016 we use data for 2012, and for 2008-2011 we construct weighted averages giving larger weights to data closer in time.

group is only available for that year while the other Eurobarometer [2006] survey only provides data aggregated by country. Given that in addition to Norway, Liechtenstein, and Macedonia, the dis-aggregated data by age group is neither available for Croatia, our first stage uses data for 25 countries of origin. Additional variables such as the share of secondary and tertiary educated come from Eurostat, while average years of schooling come from Barro and Lee [2010]. Note that this last data is not available for Liechtenstein. For all other countries it is only available for 2005 and 2010, and hence for years 2008-2010 we linearly interpolate data and use numbers for 2010 afterwards. We also have information on the number of years of compulsory education for each cohort in each country which we take from Aparicio-Fenoll and Kuehn [2017], and we use data on linguistic proximity from Melitz and Toubal [2014].

For our exogeneity checks we consider a broad set of reforms, including those that were passed before the oldest cohorts in our sample entered compulsory education. In particular, we consider reforms carried out between 1965 and 1995, and hence for 5-year variation rates we require data from 1960 onward. We use data on educational attainment from Barro and Lee [2010] and World Bank data on population growth and the percentage of the population living in urban areas. These three variables are available from 1960 onward for all countries with the exception of Macedonia. Data on migration outflows come from various editions of the United Nations Statistical Yearbooks, available for 1950-1995 for 23 of the 29 countries in our sample.[9] We use data from the OECD on GDP per capita which is available since 1960. However, for former communist countries like the Czech Republic, Croatia, Hungary, Poland, Slovakia, and Slovenia this series only starts in 1990. To avoid loosing observations, we hence set missing values for GDP per capita for 1960-1989 for these countries to the sample mean, and we define an indicator

[9]Editions: 1952, 1954, 1957, 1959, 1962, 1966, 1968, 1970, 1977, 1985, 1989, 1996. For Croatia, Macedonia, and Slovenia we use data for Yugoslavia available between 1956 and 1977. For the Czech Republic and Slovakia, data for Czechoslovakia is used until 1992. No data on emigration from the USSR is available, and hence we cannot assign data to Estonia, Latvia or Lithuania. Data for Bulgaria, Romania, and Liechtenstein is only sporadically available. For Spain, Norway, and Finland, data before 1962, before 1960, and between 1960-66, respectively could not be used. Different from data for all other periods it included only intercontinental migration or excluded migration to Scandinavian countries respectively.

for missing data. Our final sample for the exogeneity check hence includes 22 countries.[10] Table 3.1 shows the descriptive statistics for our data.

Table 3.1: Descriptive statistics

Variable	Mean	Std. Dev.	Min.	Max.
Main variables				
Number of migrants	196.816	1083.605	1.000	32182
CEC×PES	0.371	0.305	0.000	0.900
CEC	0.692	0.448	0.000	1.000
PES	0.539	0.227	0.200	0.900
Years under EU	16.183	14.602	0.000	51.500
Years under communism	5.917	8.565	0.000	28.500
Population, origin	1,107,493	1,510,898	2,216	7,211,847
Age group				
25-29	0.200	0.400	0.000	1.000
30-34	0.200	0.400	0.000	1.000
35-39	0.200	0.400	0.000	1.000
40-44	0.200	0.400	0.000	1.000
45-49	0.200	0.400	0.000	1.000
Year				
2008	0.103	0.304	0.000	1.000
2009	0.103	0.304	0.000	1.000
2010	0.109	0.311	0.000	1.000
2011	0.104	0.305	0.000	1.000
2012	0.115	0.319	0.000	1.000
2013	0.115	0.319	0.000	1.000
2014	0.121	0.326	0.000	1.000
2015	0.115	0.319	0.000	1.000
2016	0.115	0.319	0.000	1.000
Difference in unemployment	1.666	6.994	-28.000	40.100
Stock of immigrants	1,895	7,119	0.000	150,221
GDP pc (PPS)	114.610	58.348	46.000	270.000
5-year growth GDP	0.002	0.030	-0.111	0.159
N=24,906				
Pseudo first stage				
English speakers by age group	0.587	0.259	0.084	1.000
N=125				
Additional variables				
Share of secondary education	75.398	8.076	50.200	87.600
Share of tertiary education	24.599	7.363	10.700	39.600
Average years of schooling	11.244	0.937	9.434	12.821
Years of compulsory schooling*	8.939	1.196	6.000	13.000
Linguistic proximity	2.245	2.210	0.000	10.000
N=24,906and *N=23,646				
Exogeneity checks: 22 countries (1965-1995)				
Reform: English compulsory	0.023	0.149	0.000	1.000
Emigrants (logs)	9.425	2.106	0.693	14.030
Population growth (annual %)	0.517	0.506	-1.180	3.800
Urban population (% of total pop.)	68.321	14.873	32.500	96.780
Avg. years of schooling	7.666	1.732	2.460	11.240
GDP per capita (log)	9.459	0.607	7.591	10.622
Missing GDP	0.403	0.491	0.000	1.000
5-year variation rates				
Emigrants (logs)	-0.231	0.826	-4.262	1.620
Population growth	-0.058	0.586	-4.780	4.690
Urban population	0.041	0.045	-0.012	0.266
Avg. years of schooling	0.081	0.065	-0.133	0.297
GDP per capita (log)	0.000	0.063	-0.235	0.067
N= 576				

Differences in unemployment rates, stock of immigrants, and population all by age group refer to years $t-1$, i.e 2007-2015. CEC stands for "Compulsory English classes at origin" and PES for "Proportion of English speakers at destination."

For the variables included in our main specification we have observations for 24,906 cells defined by the combination of country or origin, country of destination, age group, and year. On

[10] Aggregate migration outflow data is available for 22 countries from 1950-1995, but data for all other control variables is not available for Macedonia, and it is available for all other countries only from 1960 onward. The final sample for the exogeneity check includes the following countries: Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden.

average 197 individuals from one of the age groups migrate each year from a certain country of origin to a different country of destination. Note that in order to not loose observations with value zero, we sum value one to all cells before applying the logarithmic transformation to our dependent variable. In our robustness checks we make sure that this adjustment is not driving our results. Around 69% of cohorts in our sample learned English during compulsory education in their countries of origin, and approximately 54% of individuals in each country of destination speak English. On average, cohorts have lived 16 years and 6 years under EU membership and under communism, respectively. The average cohort size is 1.1 million, and unemployment differences by cohort between origin and destination countries range from -28% to +40%. Finally, the average stock of immigrants from each cohort in a certain destination country is 1,894. In order to not loose observations when data for unemployment rate differences or the stocks of migrants are missing, we impute the average values for the respective year, and we define dummy variables indicating when information is imputed.

4 Results

4.1 Main results

We first test whether the introduction of English into compulsory school curricula had an impact on cohorts' English proficiency (see Equation 2.2). As mentioned before while one expects this to be the case, education reforms might not be enforced or even prior to reforms, individuals could have been learning English. Table 4.1 shows the results. The estimated coefficients indicate that policies that introduced English into compulsory school curricula significantly increased the share of English speakers in affected cohorts. In particular, on average due to these reforms 16% more individuals in affected cohorts report to speak English. Figure A-1 in the Appendix shows a graphical representation of these results. There is a positive correlation between a cohort's past exposure to English during compulsory education and the proportion of those currently

claiming to be able to hold a conversation in English within each cohort. In the second graph, we control for age and origin country fixed effects by plotting the residuals of the regression of English proficiency on age and origin country dummies against the residuals obtained from regressing exposure to English during compulsory schooling on age and origin country dummies. The fitted line corroborates that English classes during compulsory education are associated to better English skills.

Table 4.1: Compulsory English classes and share of proficient English speakers

	(1)	(2)	(3)
Compulsory English classes	0.261	0.220	0.159
	(0.059)***	(0.049)***	(0.040)***
Single dummies	X	X	X
Age-specific controls		X	X
Years in EU & under communism			X
Number of observations	125	125	125
R-squared	0.779	0.853	0.894

The dependent variable is the fraction of individuals from a certain age group and country who report to be able to hold a conversation in English. The data is from the Eurobarometer 2012. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5% and *** if the level of significance is less than 1%. All columns include country and age group dummies, age-specific controls refer to unemployment rate, population size and average stock of migrants measured one year prior. Errors are clustered by country of origin and age.

We then turn to our main Equation 2.1, and we estimate the effect of the interaction of compulsory English classes (CEC) at origin and the proportion of English speakers (PES) at destination on migrants' choice of destination country. Table 4.2 displays the results of this estimation. Column (1) shows the results for the specification with the interaction term, including dummies for origin, destination, age, and year, and all interactions between these dummy variables. Columns (2) and (3) add the triple interactions destination-origin-year and destination-age-year respectively, and column (4) also controls for origin-age-year effects. The sign and magnitude of the coefficient is arguably stable across all specifications. We find a negative and significant effect, indicating that immigrants who are proficient in English migrate to countries where fewer individuals speak English. Therefore, immigrants who are proficient in English choose to move to countries where fewer individuals speak English, and where hence their skills are scarce. In

particular, a 10 percentage point increase in the proportion of English speakers reduces the propensity of English-proficient individuals to migrate to that destination by 1.3%.

Table 4.2: Compulsory English classes and migrants' choice of destination country

	(1)	(2)	(3)	(4)
Compulsory English classes origin×				
Proportion English speakers destination	-0.124	-0.130	-0.130	-0.125
	(0.070)*	(0.064)**	(0.066)**	(0.067)*
Single dummies	X	X	X	X
All simple interactions	X	X	X	X
Destination by origin by year		X	X	X
Destination by age by year			X	X
Origin by age by year				X
Number of observations	24,906	24,906	24,906	24,906
R-squared	0.963	0.604	0.621	0.640

The dependent variable is the natural logarithm of the number of individuals from a certain age group and country migrating to a given destination in a particular year, adjusted to avoid missing values in zero cells. The data is from Eurostat and covers the period 2008-2016. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5% and *** if the level of significance is less than 1%. All regressions contain dummy variables for age group, year, country of origin and country of destination, a variable for lagged age-specific differences in unemployment rates, the lagged population size of the age group, the lagged stock of migrants from each country of origin by age group and destination country, and the number of years individuals have lived in the EU and under communism. Lower values for R^2 in columns (2) through (4) are due to the fact that, different from column (1) which has been estimated by OLS, these are estimated by fixed effect regressions. Errors are clustered by country of origin, destination and age.

We then check if these results extend to more general skills. Table 4.3 displays the results of estimating Equation 2.3. Once we control for the triple interaction destination-origin-year, the negative effect becomes significant, indicating that immigrants who received more years of compulsory schooling move to countries where individuals have on average fewer years of education. Hence, our finding for English proficiency extends to more general skills, suggesting that migrants seem to be more likely to move to countries where their skills are scarce.

4.2 Heterogeneity

To better understand which type of migration is driving our result, we investigate the potential heterogeneity behind the estimated effect by allowing our coefficient of interest to vary along different factors. In particular, we interact our main variable of interest $CEC \times PES$ with a time

Table 4.3: Extension to general skills - years of compulsory schooling and migrants' choice of destination country

	(1)	(2)	(3)	(4)
Years of compulsory education origin×				
Av. years schooling destination	-0.009	-0.010	-0.009	-0.009
	(0.006)	(0.005)**	(0.005)*	(0.005)*
Single dummies	X	X	X	X
All simple interactions	X	X	X	X
Destination by origin by year		X	X	X
Destination by age by year			X	X
Origin by age by year				X
Number of observations	23,646	23,646	23,646	23,646
R-squared	0.961	0.615	0.632	0.651

The dependent variable is the natural logarithm of the number of individuals from a certain age group and country migrating to a given destination in a particular year, adjusted to avoid missing values in zero cells. The data is from Eurostat and Barro and Lee [2010], and covers the period 2008-2016. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5% and *** if the level of significance is less than 1%. All regressions contain dummy variables for age group, year, country of origin and country of destination, a variable for lagged age-specific differences in unemployment rates, the lagged population size of the age group, the lagged stock of migrants from each country of origin by age group and destination country, and the number of years individuals have lived in the EU and under communism. Lower values for R^2 in columns (2) through (4) are due to the fact that, different from column (1) which has been estimated by OLS, these are estimated by fixed effect regressions. Errors are clustered by country of origin, destination and age.

trend and with each variable contained in C_{oadt} (population size, differences in unemployment rates, and migrant stocks by cohorts). In addition, using data from Barro and Lee [2010], we also construct a variable for differences in average years of schooling between origin and destination countries. We then run regressions where we introduce each of these new interactions one at a time to test whether the negative estimated effect differs according to these variables. Table 4.4 displays the results.

Our negative coefficient on β_1 seems to be driven by large cohorts with relatively high unemployment rates and large networks of many co-nationals living abroad, and it is stronger in recent years. Results on unemployment rates and stock of migrants seem intuitive. Especially during the last economic crisis in Europe, cohorts facing high unemployment rates were more likely to seek opportunities outside of their countries of origin and those who knew English might have been more likely to consider countries with fewer English speakers where potentially their English skills were more demanded. Furthermore, in destination countries where English is not

Table 4.4: Mechanisms: Heterogeneity of the effect of compulsory English classes and migrants' choice of destination country

	(1)	(2)	(3)	(4)	(5)
CEC×PES	0.072	0.134	-0.072	0.134	-.183
	(0.085)	(0.087)	(0.075)	(0.117)	(0.068)***
CEC×PES×					
$\times Pop_{oat}$	-1.58e-07				
	(5.53e-08)***				
$\times Diff - urate_{doat}$		-0.077			
		(0.011)***			
$\times Stock - migrants_{doat}$			-0.00004		
			(0.00002)***		
$\times time$				-0.048	
				(0.017)***	
$\times Diff - school_{do}$					0.047
					(0.039)
All simple interactions	X	X	X	X	X
Destination by origin by year	X	X	X	X	X
Destination by age by year	X	X	X	X	X
Origin by age by year	X	X	X	X	X
Number of observations	24,906	24,906	24,906	24,906	22,049
R-squared	0.642	0.642	0.642	0.641	0.656

The dependent variable is the natural logarithm of the number of individuals from a certain age group and country migrating to a given destination in a particular year, adjusted to avoid missing values in zero cells. The data is from Eurostat and covers the period 2008-2016. Data on years of schooling are from Barro and Lee [2010]. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5% and *** if the level of significance is less than 1%. Errors are clustered by country of origin, destination and age. All regressions contain dummy variables for age group, year, country of origin and country of destination, a variable for lagged age-specific differences in unemployment rates, the lagged population size of the age group, the lagged stock of migrants from each country of origin by age group and destination country, and the number of years individuals have lived in the EU and under communism as well as the variable CEC un-interacted. In addition, column (1) contains $PES \times Pop_{oat}$ and $CEC \times Pop_{oat}$, column (2) $PES \times Diff - urate_{doat}$ and $CEC \times Diff - urate_{doat}$, column (3) includes $PES \times Stock - migrants_{doat}$ and $CEC \times Stock - migrants_{doat}$, column (4) $PES \times Diff - school_{do}$ and $CEC \times Diff - school_{do}$ and column(5) $PES \times t$ and $CEC \times t$. The lower number of observations in column (5) is due to missing data for years of schooling for Liechtenstein.

widely spoken, being able to count on a larger stock of co-nationals can thus be particularly useful. Regarding differences in human capital between origin and destination countries, we find no clear pattern. When introducing the interaction with differences in average years of schooling, the negative coefficient on our variable of interest is still significant and even becomes a little stronger. The interacted term on the other hand is positive (although not significant at standard levels), suggesting that, if anything, the estimated negative effect is more present in countries for which most destination countries are characterized by lower levels of human capital. This is in line with the hypothesis that English could serve as a vehicle for the transmission of more general skills.

4.3 Robustness

We test the robustness of our results along four dimensions. First, we test the sensitivity of our results to the adjustment in our dependent variable. Second, we remove destination countries Norway, Macedonia, and Liechtenstein for which we imputed the proportion of English speakers. Third, we check that our findings are not only driven by countries where similar languages are spoken. Finally, we also run a Placebo test to make sure that the proportion of English speakers at destination is not a mere reflection of other socio-economic variables at destination.

Table A3 in the Appendix displays our estimation results without the adjustment to our dependent variable before taking logs. Without summing value one to all cells, we are left with around 80% of our observations after the logarithmic transformation of our dependent variable. However, our results hardly change. If at all they become stronger which indicates that our main results are not driven by cohort-specific pairs of destination and origin countries with no migration flows. Table A4 shows the estimation results for a sample that excludes destination countries Norway, Macedonia, and Liechtenstein for which the shares of individuals who speak English were imputed or taken from a different data set. While we loose about 10% of our observations, our results remain robust.

Potentially our findings could be driven for instance by Dutch or Austrian individuals who migrate to Belgium or Germany respectively where fewer individuals speak English but where due to a common official language individuals would avoid having to face any daily language barrier. To test if this is the case we interact our main regressor of interest $CEC \times PES$ with a measure of linguistic proximity from Melitz and Toubal [2014]. Table A5 in the Appendix displays the results. Our main negative coefficient becomes even stronger when including this interaction term. Unfortunately, the coefficient for the interaction of $CEC \times PES$ with linguistic proximity is not precisely estimated. It is positive although not significant at standard levels, indicating that if anything, our estimated negative effect is hence more present for countries

with distinct languages. This is in line with the idea that compared to individuals who did not learn English during compulsory education and most likely do not speak any foreign language, proficient English speakers may be less reluctant to migrate to countries where they have to learn an additional language.

Finally, one might be concerned that the share of English speakers in destination countries could be closely linked to other socio-economic variables (GDP per capita, economic growth, educational attainment) and that these could ultimately determine how migrants who are proficient in English choose their destination country. To check if this is the case we run a placebo regression where instead of "Share of English speakers at destination" we interact our variable "Compulsory English classes at origin" with "GDP per capita at destination", "Economic growth at destination," "Share of individuals with at least secondary education at destination," and "Share of individuals with tertiary education at destination" respectively. Table A6 in the Appendix shows the results from these regressions. The estimated coefficients for these alternative interaction terms are close to zero, and none is significant at the 10% level. We hence feel confident that our main estimates are not merely capturing other determinants of migration.

4.4 Endogeneity Concern

There are two ways in which education reforms that introduce English classes into compulsory education could be endogenous to migration: (i) Reverse causality: if such education reforms were enacted because of past migration outflows correlated with current migration patterns. (ii) Omitted variables: if determinants of cohort-specific migration patterns (e.g. differences in cohort-specific labor market conditions between origin and destination countries) persisted over time, and if they had influenced these reforms that were implemented when our cohorts were in school. Regarding reverse causality: Education reforms are predetermined with respect to migration patterns in 2008-2016, but migration patterns could be highly persistent over time.

However, education reforms, if at all, are likely to be driven by aggregate outmigration, while our approach considers cohort specific migration flows between pairs of countries.[11]

To formally test for reverse causality we estimate Equation 2.4 and check whether reforms are able to predict past migration rates. Results displayed in Table 4.5 show that none of the estimated coefficients is significant at the 10% level. Hence, we find no evidence that in European countries English was introduced into compulsory school curricula as a reaction to changes in migration rates. However, our estimated standard errors are large and hence our results can only be interpreted as suggestive.

Table 4.5: Exogeneity check: Predictive power for past migration of laws introducing English into compulsory education

	(1)	(2)	(3)
Reform compulsory English classes	-0.164	-0.384	-0.125
	(0.334)	(0.389)	(0.385)
Contemporaneous controls	X		X
Controls: 5-year-variation rate		X	X
Number of observations	669	473	576
R-squared	0.851	0.892	0.881

The dependent variable is the logarithm of outmigration measured five years before the reform. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5% and *** if the level of significance is less than 1%. All regressions include year dummies and country dummies and the following contemporaneous controls: population growth, urban over total population, GDP per capita, and average years of schooling. Column (2) includes their variation rates over the past 5 years instead and column(3) includes these controls in levels and 5-year variation rates. Errors are clustered by country.

Regarding omitted variables, to proxy labor market conditions in our specification we control for differences in cohort-specific unemployment rates in the year before migration, and our estimated coefficients remain unchanged. This suggests that differences in labor market conditions between countries are not driving education reforms implemented in the past. One could think that unemployment rates at the time of the reform could be a relevant omitted variable, however

[11]There exist a significant number of studies that analyze the endogenity of education reforms. However, to the best of our knowledge all of them focus on education reforms that changed the length of compulsory schooling. Results from these studies are mixed; e.g. Lleras-Muney [2002] for US laws passed between 1915 and 1939, and Nasif Edwards [1978] for US laws passed in 1960, establish that those were exogenous to educational attainment. However, findings for other periods in US history point out that compulsory law changes might have been endogenous to educational attainment (see e.g. Stigler [1950] Appendix B, Landes and Solmon [1972], Eisenberg [1988], Nasif Edwards [1978] for 1940-1955).

those are unlikely to affect migration patterns in 2008-2016, in particular once controlling for contemporaneous unemployment. In general, in order to address these concerns, one would like to know more about the determinants of education reforms. Our exogeneity check as specified in Equation 2.5 does exactly that, testing whether variables related to migration are correlated with the introduction of English into compulsory education. Results from this estimation – displayed in Table 4.6 – suggest that education reforms that made English compulsory and that were passed during the second half of the 20th century in Europe are not systematically related to any of the most plausible socio-economic factors that could affect migration.

Table 4.6: Exogenity check: Relationship between education reforms introducing English into compulsory education and potential drivers of migration

	(1)	(2)	(3)
Emigration (logs)	-0.013	-0.016	-0.011
	(0.013)	(0.013)	(0.015)
Population growth (annual %)	-0.011	-0.004	-0.019
	(0.017)	(0.015)	(0.019)
Urban population (% of total)	-0.004	-0.003	-0.005
	(0.002)	(0.002)	(0.003)
Avg years schooling		-0.035	-0.029
		(0.025)	(0.026)
GDP per capita (log)			-0.071
			(0.044)
5 -year variation rates			
Emigration (logs)	0.002	0.005	0.004
	(0.023)	(0.023)	(0.024)
Population growth	-0.008	-0.011	-0.004
	(0.011)	(0.009)	(0.010)
Urban population	-0.022	0.040	0.055
	(0.284)	(0.337)	(0.314)
Avg years schooling		0.143	0.104
		(0.088)	(0.088)
GDP per capita (log)			0.013
			(0.102)
Number of observations	576	576	576
R-squared	0.096	0.104	0.111

The dependent variable is an indicator for whether English language classes became part of compulsory education in a particular year. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5% and *** if the level of significance is less than 1%. All regressions include year dummies and country dummies. Errors are clustered by country.

5 Conclusion

Our paper is the first to empirically address the question whether immigrants take into account how their skills relate to those of natives when deciding where to migrate. In particular, we apply the question to English language skills which are highly comparable across countries. We consider the introduction of English classes into compulsory school curricula as an exogenous determinant for migrants' English proficiency, and we thus define language skills as a variable that can be manipulated through education policies rather than a fixed characteristic of populations. In particular, when foreign languages are learned during compulsory education, their acquisition is unlikely to be influenced by individuals' future migration decisions.

In previous work (Aparicio Fenoll and Kuehn [2016]) we showed that languages learned during compulsory education increase migration especially towards countries where these languages are official, easing migrants' integration. The current paper is motivated by findings in literature that the impact of immigrants on natives' labor market outcomes crucially depends on the substitutability or complementarity of natives' and migrants' skills. We ask ourselves if and how migrants take into account the interaction between their skills and those of natives when choosing where to move. In particular, we focus on English proficiency, which in countries where English is not the official language is an acquired skill for both natives and potential migrants. Our findings show that immigrants who learned English during compulsory education are more likely to migrate to countries where few individuals speak English, and where hence their skills are scarce.

The following mechanism could be driving our results. Individuals who are proficient in English might be more likely to search for jobs internationally and could observe a higher demand and better wages for positions that require English skills in destination country with fewer English speakers. Somewhat in line with this observation, when testing formally for the heterogeneity of our effect we find it to be stronger for cohorts who experienced relatively larger unemployment

rates and as such were more likely to search for jobs abroad.[12]

Our result thus can be interpreted in the context of previous studies, indicating that better language skills not only foster migration but that they also redirect migration towards countries where those skills are scarce. Our main application is limited to English language proficiency, a particular type of skill which is highly comparable across countries. Given that English language skills are complementary to many other labor market skills, it seems natural that the propensity of individuals to migrate to countries where English language skills are scarce would apply to other types of labor market skills as well. In line with this observation, we find evidence that our results extend to general skills obtained during compulsory education.

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[12]It may also be the case that individuals who are proficient in English and migrate to countries where fewer individuals speak English to take advantage of a higher demand for their skills and potentially higher wages, are mostly temporary migrants and hence more likely to return to their countries of origin or to move to third countries. However, note that our data on migration by citizenship excludes migration to one's country of nationality and thus most return migration. Neither are we able to check if migrants arrived directly from their countries of origin. These data limitations hence imply that we cannot test empirically if and how migrants take into account the possibility of returning to their countries' of origin or moving to third countries when deciding where to migrate. We thank one anonymous referee for pointing out this additional mechanism.

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A Appendix

Table A1: Reforms: English in compulsory school curricula

	reform year	first affected cohort
Austria	1983	1975
Belgium	1989	1977
Bulgaria	1985	1974
Croatia	1960's	1950's
Cyprus	1965	1956
Czech Republic	1989	1979
Denmark	1970	1958
Estonia	1992	1983
Finland	1977	1963
France	1963	1952
Germany	1964	1954
Greece	1976	1964
Hungary	1989	1979
Italy	1963	1952
Latvia	1991	1982
Liechtenstein	1996	1988
Lithuania	1990	1980
Luxembourg	1968	1955
Macedonia	1960's	1950's
Malta	1964	1959
Netherlands	1963	1952
Norway	1969	1959
Poland	1990	1979
Portugal	1986	1976
Romania	1969	1959
Slovakia	1989	1979
Slovenia	1960's	1950's
Spain	1990	1982
Sweden	1962	1952

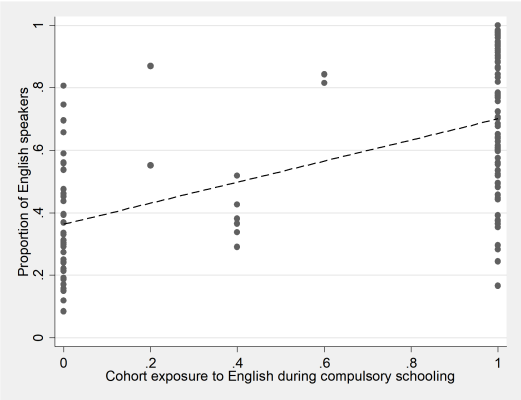
Sources: Braham [1972], Council of Europe [2015], Eurydice country reports [2001a], Eurydice [2009], Eurydice [2012], Eurydice [2001b], National Center on Education and the Economy [2006], State Statistical Office, Republic of Macedonia [2015], Tomich [1963], for additional details see the online appendix of Aparicio-Fenoll and Kuehn [2017]

Table A2: Eurobarometer: % of English speakers by country

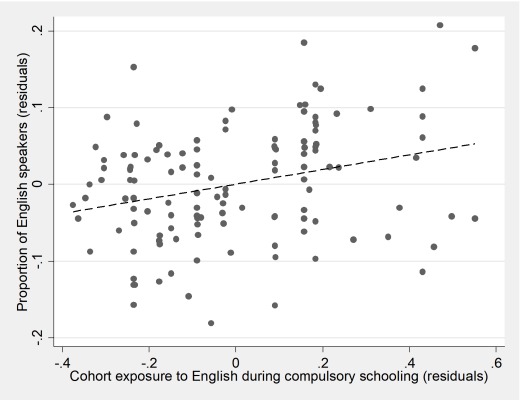
	% of English speakers	
	2006	2012
Austria	58%	73%
Belgium	59%	52%
Bulgaria	23%	25%
Croatia	49%	49%
Cyprus	76%	73%
Czech Republic	24%	27%
Denmark	86%	86%
Estonia	46%	50%
Finland	63%	70%
France	36%	39%
Germany	56%	56%
Greece	48%	51%
Hungary	23%	20%
Italy	29%	34%
Latvia	39%	46%
Lithuania	32%	38%
Luxembourg	60%	56%
Malta	88%	89%
Netherlands	87%	90%
Poland	29%	33%
Portugal	32%	27%
Romania	29%	31%
Slovakia	32%	26%
Slovenia	57%	59%
Spain	27%	22%
Sweden	89%	86%

Source: Eurobarometer [2012] and [2006]. Share of individuals who indicate English when asked about "Languages that you speak well enough in order to be able to have a conversation."

Figure A-1: Share of proficient English speakers 2012 and cohorts' exposure to English in compulsory education: (a) Original data (b) Controlling for age and origin fixed effects



(a)



(b)

Table A3: Robustness Check: Compulsory English classes and migrants' choice of destination country - Without adjustment to our dependent variable to account for the presence of zero cells.

	(1)	(2)	(3)	(4)
Compulsory English classes origin×				
Proportion English speakers destination	-0.133	-0.120	-0.134	-0.130
	(0.068)**	(0.062)*	(0.064)**	(0.065)**
Single dummies	X	X	X	X
All simple interactions	X	X	X	X
Destination by origin by year		X	X	X
Destination by age by year			X	X
Origin by age by year				X
Number of observations	20,068	20,068	20,068	20,068
R-squared	0.963	0.696	0.712	0.731

The dependent variable is the natural logarithm of the number of individuals from a certain age group and country migrating to a given destination in a particular year. Data are from Eurostat for 2008-2016. Different from our main estimation, here we do not adjust all cells by adding 1 such as to preserve cells with zero migration upon a logarithmic transformation. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5% and *** if the level of significance is less than 1%. All regressions contain dummy variables for age group, year, country of origin and country of destination, a variable for lagged age-specific differences in unemployment rates, the lagged population size of the age group, the lagged stock of migrants from each country of origin by age group and destination country, and the number of years individuals have lived in the EU and under communism. Lower values for R^2 in columns (2) through (4) are due to the fact that different from column (1) which has been estimated by OLS these are estimated by fixed effect regressions. Errors are clustered by country of origin, destination, and age.

Table A4: Robustness Check: Compulsory English classes and migrants' choice of destination country - Excluding destination countries with imputed proficiency values: Norway, Macedonia and Liechtenstein

	(1)	(2)	(3)	(4)
Compulsory English classes origin×				
Proportion English speakers destination	-0.133	-0.141	-0.138	-0.134
	(0.076)*	(0.070)**	(0.073)*	(0.074)*
Single dummies	X	X	X	X
All simple interactions	X	X	X	X
Destination by origin by year		X	X	X
Destination by age by year			X	X
Origin by age by year				X
Number of observations	22,434	22,434	22,434	22,434
R-squared	0.961	0.604	0.622	0.643

The dependent variable is the natural logarithm of the number of individuals from a certain age group and country migrating to a given destination in a particular year adjusted to avoid missing values in empty cells. Data are from Eurostat for 2008-2016. With respect to our main sample here we exclude data for destination countries Macedonia, Liechtenstein, and Norway for which we had imputed the share of proficient English speakers. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5% and *** if the level of significance is less than 1%. All regressions contain dummy variables for age group, year, country of origin and country of destination, a variable for lagged age-specific differences in unemployment rates, the lagged population size of the age group, the lagged stock of migrants from each country of origin by age group and destination country, and the number of years individuals have lived in the EU and under communism. Lower values for R^2 in columns (2) through (4) are due to the fact that different from column (1) which has been estimated by OLS these are estimated by fixed effect regressions. Errors are clustered by country of origin, destination, and age.

Table A5: Robustness Check: Interacting main variable of interest - CEC×PES - with measure for linguistic proximity

	(1)	(2)	(3)	(4)
Compulsory English classes origin×				
Proportion English speakers destination	-0.293	-0.210	-0.210	-0.197
	(0.104)***	(0.097)**	(0.100)**	(0.102)*
CEC×PES×				
× linguistic proximity	0.081	0.035	0.035	0.031
	(0.036)**	(0.033)	(0.034)	(0.035)
CEC×linguistic proximity	-0.041	-0.011	-0.010	-0.008
	(0.023)*	(0.021)	(0.022)	(0.022)
PES×linguistic proximity	-0.141			
	(0.097)			
Single dummies	X	X	X	X
All simple interactions	X	X	X	X
Destination by origin by year		X	X	X
Destination by age by year			X	X
Origin by age by year				X
Number of observations	24,906	24,906	24,906	24,906
R-squared	0.963	0.604	0.622	0.641

The dependent variable is the natural logarithm of the number of individuals from a certain age group and country migrating to a given destination in a particular year, adjusted to avoid missing values in zero cells. The data is from Eurostat and covers the period 2008-2016. Data for linguistic proximity are from Melitz and Toubal [2014]. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5% and *** if the level of significance is less than 1%. All regressions contain dummy variables for age group, year, country of origin and country of destination, a variable for lagged age-specific differences in unemployment rates, the lagged population size of the age group, the lagged stock of migrants from each country of origin by age group and destination country, and the number of years individuals have lived in the EU and under communism. Lower values for R^2 in columns (2) through (4) are due to the fact that, different from column (1) which has been estimated by OLS, these are estimated by fixed effect regressions. Errors are clustered by country of origin, destination and age.

Table A6: Placebo Test: Compulsory English classes and migrants' choice of destination country - Interacting Compulsory English classes with socio-economic variables at destination

	(1)	(2)	(3)	(4)
Compulsory English classes origin×				
×GDP at destination	-0.0004			
	(0.0003)			
CEC×growth at destination		-0.308		
		(0.375)		
CEC×% secondary educ. at destination			-0.0008	
			(0.002)	
CEC×% tertiary educ. at destination				0.002
				(0.002)
Single dummies	X	X	X	X
All simple interactions	X	X	X	X
Destination by origin by year	X	X	X	X
Destination by age by year	X	X	X	X
Origin by age by year	X	X	X	X
Number of observations	24,906	24,906	23,646	23,646
R-squared	0.640	0.640	0.651	0.651

The dependent variable is the natural logarithm of the number of individuals from a certain age group and country migrating to a given destination in a particular year adjusted to avoid missing values in zero cells. The data is from Eurostat and covers the period 2008-2016. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5% and *** if the level of significance is less than 1%. All regressions contain dummy variables for age group, year, country of origin and country of destination, a variable for lagged age-specific differences in unemployment rates, the lagged population size of the age group, the lagged stock of migrants from each country of origin by age group and destination country, and the number of years individuals have lived in the EU and under communism. CEC stands for "Compulsory English classes at origin," GDP at destination refers to GDP per capita in PPS terms, growth at destination denotes 5-year GDP growth rates, % secondary educ. and % tertiary educ refers to the share of individuals with at least secondary education and with tertiary education in destination countries respectively. All columns are estimated by fixed effect regressions. Errors are clustered by country of origin, destination and age.