The Effect of Brexit on Migration Flows towards Italy and Spain

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Abstract

The present paper aims to investigate if Brexit generated a return of migration from UK towards Italy and Spain. I collect data on immigration from OECD countries to Italian and Spanish provinces from 2006 to 2016. I present three migration models that include monadic and dyadic fixed effects, which enables to control various expression of multilateral resistance to migration. I merge migration data with various key factors: average wage, GDP per capita, unemployment rate, health spending and education level. To study the impact of Brexit on migration, I create a dummy variable for migrants leaving UK in 2016. Results suggest that in 2016 migration flows from UK to Italy and Spain increased of about 29% and 15% respectively, probably as a consequence of the Brexit referendum.

Keywords: Brexit, gravity model, international migration

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Contents

1 Introduction

Since the Maastricht Treaty in 1992, full labor mobility is guaranteed within the European Union (EU) for its citizens. In order to strengthen the integration of the people of Europe, in 2009 a single market for services was established within EU with the implementation of the so-called "Bolkestein Directive"[1] that ensured free movement of services. When Southern Europe countries have been hit by two recessions in sequence, these policies have certainly encouraged significant cross-country mobility from lower-wage to higher-wage countries. The first crisis in 2008 was triggered by the US great recession and the second by the Greek debt crisis between 2011 to 2013. While countries such as Italy, Greece, Spain, Portugal and France experienced a severe and strong contraction of income and employment during both periods, countries such as United Kingdom, Germany, Luxembourg, Sweden and Switzerland experienced much milder or no recession, especially in 2011-13. This asymmetry during the great recession led to large flows of people moving from Mediterranean countries towards Central and Northern Europe.

My analysis focuses on Italy and Spain. These two countries registered an exponential increase in the emigration flows towards other countries of Europe such as UK and Germany (Anelli and Peri, 2016). Since the beginning of the recession, the main destination for Italian and Spanish emigrants has been UK.[2] The number of Italian emigrants living in UK has more than tripled, going from 36 thousand in 2007 to 115 thousand in 2016, where the latter number corresponds to 17.1% of the Italian emigration.[3] The number of people with Spanish nationality living in UK doubled from 58 thousand in 2008 to 116 thousand in 2016 which represents 5% of the Spanish migration.[4] Following the result of the Brexit referendum in 2016, UK is now negotiating its withdraw from EU that will be officially implemented on 29 March 2019.

[1] The Services in the Internal Market Directive 2006/123/EC

[2] According to ISTAT (2016) and Ortega-Rivera et al. (2016)

[3] According to the Italian National Statistics Institute (ISTAT)

[4] According to PERE (Padrón de Españoles Residentes en el Extranjero) `http://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736177014&menu=resultados&idp=1254734710990`, retrieved April 20, 2018

Loosing its membership of EU, UK will no longer be able to benefit from the European single market and labor mobility. The decision of leaving EU is already affecting the UK economy which has started experiencing a significant reduction in the immigration flow.

This paper aims to investigate if Brexit generated a return of migration from UK to Italy and Spain. To better address the identification of Brexit effects on migration flows, I analyse the evolution of flows of people moving to Italy and Spain. I collect data on immigration from OECD countries to 111 provinces in Italy and to 52 provinces in Spain for the period 2006 - 2016. I estimate a model of migration which considers various key factors: average wage, GDP per capita, unemployment rate, health spending and education level. I include a dummy variable for migrants leaving UK in 2016 in addition to other two dummies for migrants departing from EU15 and from EU8 in 2016. I present three migration models that include monadic and dyadic fixed effects, which enables to control various expression of multilateral resistance to migration. The results suggest that the migration flow from UK to Italy and Spain increased following Brexit. Italy registered a raise of about 29% and Spain of about 15%.

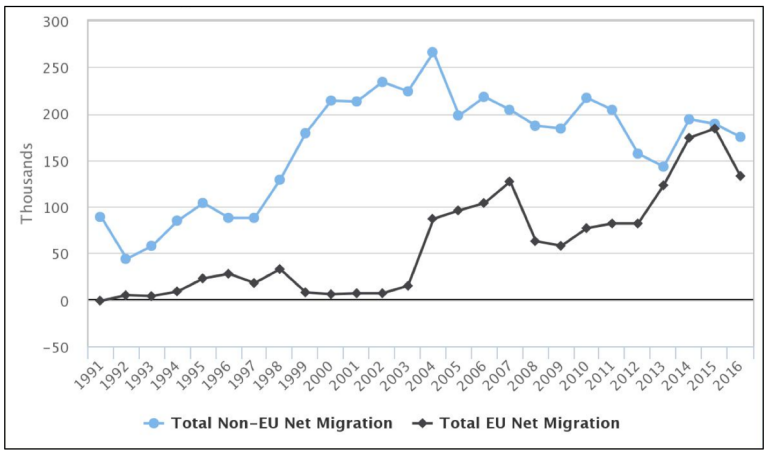
The outline of the paper is as follow. The next section presents the immigration situation in UK and Brexit. Section 3 explains the theoretical approach defining the empirical specifications. Section 4 describes and presents the data. The results are given in Section 5. Section 6 contains an analysis of the sensitivity of the calculations and Section 7 concludes.

2 Brexit

UK has experienced an increase in the immigration flow over the past 20 years, recording positive net migration since 1994. The level of immigration rose exponentially after the accession of the eight East European countries (EU8) in 2004, but it then fell back following the global recession in 2007. Since 2012, the net immigration flow in UK started to increase again, reaching its peak in June 2016 with 336 000. About half of them are from EU and the remaining part is from the rest of the World. However, following the results

of the referendum on EU membership of 23 June 2016, the net immigration level has decreased, reaching 244 000 in September 2017. An immigration level this low has not been recorded since 2014[5] (see Figure 1).

Figure 1: Net migration to UK from 1991 to 2015



Source: Migration Watch UK - Office for National Statistics

The number of EU immigrants living in UK tripled from 0.9 million to 3.3 million between 1995 and 2015. The share of EU citizens grew from 1.5% to 5.3% of the total population and from 1.8% to 6.3% of the working age population (adults aged 16-64). If we analyse the composition of the EU migrants in 2015, the most common countries of origin in UK are Poland (29%) and Ireland (12%), while the other nationalities are quite evenly spread across the other countries of EU. Italy and Spain represent 6% and 4% of EU migrants in UK, respectively.[6] According to the British Labour Force Survey, EU immigrants are more educated and more likely to be in work than people born in UK. In particular, 43% of EU immigrants have high education against the 22% of UK-born and 78.2% of EU immigrants are employed.

Following the 2015 General Election, the Prime Minister David Cameron stated that one of the goals of the new Conservative government is to reduce

[5] `https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/datasets/tableofcontents`, retrieved May 30, 2018

[6] Van Reenen et al. (2016)

net migration.[7] The immigration issue was one of the major arguments of the so-called Leave campaign which argued that leaving the EU would allow more control over the flows of immigrants to UK from the rest of the EU. After Brexit, on 20 July 2016, Prime Minister Theresa May confirmed the same belief and stated "that we need to bring net migration down to sustainable levels, and the Government believe that that means tens of thousands".[8] According to the latest deal between the UK government and EU, the rights of EU citizens living in the UK and the Britons living the EU will be maintained after Brexit. A joint document[9] between UK and EU confirms that EU immigrants who come to Britain during the Brexit transition will have the right to settle permanent in the UK. However, it is still not certain what rights EU migrants will have moving to UK after the 29th of March 2019, the currently expected date for the UK withdraw from the EU. It is now evident that one of the main consequences of the referendum is the decrease of the immigration flow to UK, although there may be some short-run pressures to migrate to UK before the implementation of Brexit.[10]

Brexit has had a significant impact in many dimensions. It generated a financial shock that led to the appreciation of other currencies against sterling. The referendum result pushed the pound down from about 1.31 euro on 22 June 2016 to about 1.17 at the end of 2016.[11] The same goes for GBP/USD that declined from 1.48 dollars the day before the referendum to about 1.23 dollars at the end of 2016. Another consequence of Brexit it is that the Foreign direct investment (FDI) it is likely to decrease. Bruno et al.

[7] `https://www.gov.uk/government/speeches/pm-speech-on-immigration`, retrieved April 25, 2018

[8] `https://hansard.parliament.uk/Commons/2016-07-20/debates/0A5DDDFC-71A7-4532-827D-2334ABEDDBE3/Engagements`, retrieved April 25, 2018

[9] `https://ec.europa.eu/commission/sites/beta-political/files/joint_report.pdf`, retrieved April 25, 2018

[10] Indeed, according to the Italian and Spanish national statistics, migration towards UK has increased in 2016. However, Italian and Spanish citizens already living in UK may have decided to communicate that they left their country after the Brexit referendum, before the new migration polices are implemented. Nevertheless, because of the problems associated with collecting the data for a comprehensive study of flows towards the UK before and after Brexit, I have finally discarded studying this important phenomenon.

[11] `https://www.xe.com/it/currencycharts/?from=GBP&to=EUR&view=2Y`, Retrieved April 15, 2018

(2016) provides an empirical analysis using the synthetic control method and the gravity model that demonstrates that EU membership, and implicitly the Single Market access, increases FDI inflows by about 30%. It follows that a country leaving EU, would face a reduction in FDI inflows of around 22%. However, it has not been studied yet the impact of Brexit on migration flows and in particular on people living in UK during its withdraw from EU.

3 Theoretical Approach

The economics literature has developed models of migration that result in gravity specifications. Ravenstein (1885) is recognised by Anderson (2011) in his review of the gravity model as the pioneer of the use of gravity to model migration patterns. The migration literature is based on random utility maximization models (RUM). RUM was first proposed by Thurstone (1927) and named by Marschak (1959) in his analysis of the relationship between random utility functions and choice probabilities. According to RUM, individual i's utility U_{ij} from a generic choice j (moving to the j-th country) can be divided into two components:

$$U_{ij} = V_{ij} + \epsilon_{ij} \tag{1}$$

where V_{ij} is the deterministic part of the utility, given the same characteristics and constraints. It expresses the population tastes such as the effects of cost travelling or preference for mild weather. ϵ_{ij} is the random part of the utility and reflects the i's idiosyncratic tastes and the unobserved attributes of choice j.

My study follows the theoretical development in Beine et al. (2016). The migration m_{odt} from the country of origin o to the country of destination d in the period t is considered as a function of the share of people who migrate p_{odt} and the stock of population in the country of origin s_{ot}:

$$m_{odt} = p_{odt} s_{ot}. \tag{2}$$

The RUM model of migration describes the utility that individual i located

in country o at time $t-1$ derives from moving to country d at time t:

$$U_{iodt} = w_{odt} - c_{odt} + \epsilon_{iodt} \tag{3}$$

where w_{odt} is a deterministic component of utility and c_{odt} represents the time-specific cost of moving from o to d, and ϵ_{iodt} is an individual-specific stochastic component of utility. The stochastic term in (3) is assumed to follow an independent and identically distributed Extreme Value Type-1 distribution (McFadden, 1973). This assumption will determine the expected probability that opting for country d represents the utility-maximising choice of individual i. Then, the expected probability for migrate of individual i will be:

$$E(p_{odt}) = \frac{e^{w_{odt}-c_{odt}}}{\sum_{l \epsilon D} e^{w_{olt}-c_{olt}}} \tag{4}$$

Combining (2) and (4) allows rewriting the expected gross migration flow from country o to country d as:

$$E(m_{odt}) = \frac{e^{w_{odt}-c_{odt}}}{\sum_{l \epsilon D} e^{w_{olt}-c_{olt}}} s_{ot} \tag{5}$$

Assuming that the deterministic component of utility w_{odt} does not vary with the origin o, (5) can be rewritten as:

$$E(m_{odt}) = \frac{e^{w_{odt}-c_{odt}}}{\sum_{l \epsilon D} e^{w_{olt}-c_{olt}}} s_{ot} = \frac{\phi_{odt}\gamma_{dt}}{\Omega_{ot}} s_{ot} = \phi_{odt}\frac{\gamma_{dt}}{\Omega_{ot}} s_{ot} \tag{6}$$

where $y_{dt} = e^{w_{dt}}$, $\phi_{odt} = e^{-c_{odt}}$ and $\Omega_{ot} = \sum_{l \epsilon D} \phi_{olt} y_{lt}$. The expected migration flow $E(m_{odt})$ in (6) depends in a multiplicative way on (i) the ability s_{ot} of the country of origin o to send out migrants, (ii) the attractiveness y_{dt} of the country of destination d, (iii) on the accessibility $\phi_{odt} \leq 1$ of d for receiving migrants from o, (iv) inversely on $\gamma_{dt} = \sum_{l \epsilon D} \phi_{olt} y_{lt}$ which is the expected utility of prospective migrants from o. Since $\partial \Omega_{ol} / \partial \phi_{oll} = y_{lt} > 0$, a reduction in the accessibility of an alternative destination l invariably leads to an increase in the expected bilateral migration flow from o to d.

A consequence of the distributional assumption on the stochastic com-

ponent of utility (McFadden, 1973) in (3) is that unobserved attributes of all alternatives are perceived as equally similar. This failure of the model is called Independence from Irrelevant Alternative (IIA). In fact, taking the ratio between the expected amount of migrants $E(m_{odt})$ and the expected amount of stayers $E(m_{oot})$, normalising the accessibility of origin respect to the same origin ϕ_{oot} to one, we obtain:

$$\frac{E(m_{odt})}{E(m_{oot})} = \phi_{odt}\frac{\gamma_{dt}}{\gamma_{ot}} \tag{7}$$

It is evident that this ratio only depends on the attractiveness of the destination and the origin, and the accessibility ϕ_{odt}, while Ω_{ot} and s_{ot} cancel out. Following the property of IIA, (7) shows that a variation in the attractiveness or in the accessibility of an alternative destination induces an identical proportional change in both $E(m_{odt})$ and $E(m_{oot})$, leaving the ration unchanged.

The canonical gravity model in the literature of migration is obtained by adding to (6) an error therm η_{odt}, with $E(\eta_{odt}) = 1$:

$$m_{odt} = \phi_{odt}\frac{\gamma_{dt}}{\Omega_{ot}}s_{ot}\eta_{odt}. \tag{8}$$

The IIA assumption leads to another issue called Multilateral Resistance to Migration (MRM), since the rate of migration observed between two countries does not depend solely on their relative attractiveness as (7) indicates, but also on the one of alternative destinations. MRM is defined by Bertoli and Fernández-Huertas Moraga (2013) as the confounding influence that the attractiveness of alternative origin/destination exercises on the determinants of bilateral migration rates. If it increases, the likelihood of migration flows between the first two origin/destination decreases. MRM creates an endogeneity problem, as the regressors are correlated with the error term, which also exhibits serial and spatial correlation. As demonstrated in Bertoli and Fernández-Huertas Moraga (2013), to control for MRM we should allow for a correlation in the stochastic component of utility and introduce more general distributional assumptions. Changing the assumption *á la* McFadden (1973) on the distribution of the stochastic component, the resistance term

Ω_{odt} no longer cancels out. It implies that an increase of the attractiveness of another destination, perceived as a substitute of d, will reduce the expected amount of migrants more than the expected amount of stayers. In addition, the model should also include the future expectation of the characteristic of the alternative locations in $t+1$ to consider the sequential nature of migration decision.

Pesaran (2006), Bertoli and Fernández-Huertas Moraga (2013) and Bertoli et al. (2013) control for Ω_{odt} using a database with large panel and longitudinal dimension that allows the resistance term to conform with the structure of the Common Correlated Effects (CCE) estimator (Pesaran, 2006). However, the time dimension I use in my study it is not large enough to implement this approach. Therefore, I aim to capture the effect of MRM by introducing dummy variables structures following the applied migration literature. Mayda (2010) presents an alternative approach including fixed effects of the origin and destination to control for specific effects of each origin and destination that are not captured by deterministic components of utility. In a similar way, Ortega and Peri (2013) control for the MRM reducing the amount of variability used for identification through the inclusion of origin-destination dummies D_{od}. Further, Beine and Parsons (2012) introduce destination-year dummies D_{dt}. I present three models of migration flows based on three-dimensional data: origin o, destination d and time t.

Model 1: Panel model with monadic fixed effects of the origin and the destination and time fixed effects:

$$\ln m_{odt} = D_o + D_d + D_t + \beta_1 X_{ot} + \epsilon_{odt} \tag{9}$$

where D_o and D_d correspond to dichotomous variables for each country of origin and destination, respectively. X_{ot} is the vector of exogenous variables of the countries of origin and D_t is the vector of time fixed effects. This approach captures the MRM by including fixed effects of o and d to control specific effects of each origin and destination not captured by deterministic elements of utility (Mayda, 2010).

Model 2: Panel model with dyadic fixed effects of origin-destination:

$$\ln m_{odt} = D_{od} + D_t + \beta_1 X_{ot} + \epsilon_{odt} \tag{10}$$

where D_{od} is the vector of origin-destination dichotomous variables. This specification allows to capture specific deterministic effects of each pair of origin/destination. This structure also includes the specific constants in both origin and destination (Ortega and Peri, 2013).

Model 3: Panel model with dyadic fixed effects of origin-destination and destination-time

$$\ln m_{odt} = D_{od} + D_{dt} + \beta_1 X_{ot} + \epsilon_{odt} \tag{11}$$

where D_{od} is the vector of dyadic origin-destination dummy variables and D_{dt} is the vector of dyadic destination-time dummy variables. This approach allows to control all *pull* determinants of migration and especially the multilateral resistance heterogeneity derived from future prospects in target countries by capturing any specificity among potential d for any t (Beine and Parsons, 2012).

4 Data

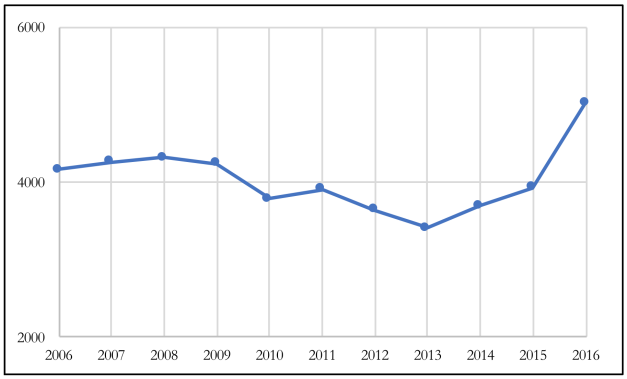
I study the evolution of flows of people moving to Italy and Spain to investigate if Brexit generated a return of migration from UK. I collect data for migration from OECD countries[12] towards Italy and Spain. The Italian migration data is from the Italian National Institute of Statistics (ISTAT)[13].

[12]OECD countries: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, Netherlands, New Zeeland, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

[13]`https://www.istat.it`, retrieved May 2, 2018

ISTAT provided me with a personalised dataset [14] including data on migration flows from OECD countries to Italy. In particular, this dataset has information on yearly migration inflows to 111 Italian provinces over the period 2006 - 2016. The Spanish migration data was retrieved from the Spanish National Institute of Statistics (INE)[15]. Also in this case, I collect inflow data from 2006 to 2016 selecting 35 OECD origin countries and 52 Spanish provinces of destination. In both datasets, immigrants are not defined on the basis of the place of birth and of the nationality, but they are associated to the country of origin. Figure 2 (Figure 3) displays the evolution of migration flows for the period 2006 - 2016 from UK towards Italy (Spain). Both countries experienced a jump in the number of incoming immigrants from UK in 2016. I include further controls to verify if this migration change is addressable to the decision of UK of leaving EU. I merge migration data with macro-economic and other information on the origin countries of immigrant flows.

Figure 2: Migration from UK towards Italy from 2006 to 2016

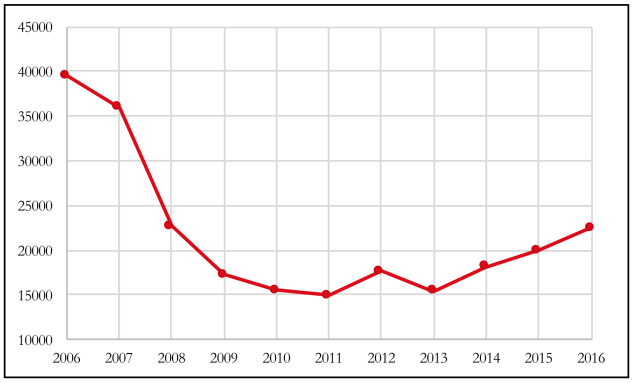


Source: ISTAT - Italian National Statistics Institute

[14]Since ISTAT only provides stock migration data in its website, I personally had to request flow data on yearly migration from OECD countries torwards Italian provinces.

[15]`http://www.ine.es/dynt3/inebase/es/index.htm?type=pcaxis&path=/t20/p307/a2016&file=pcaxis&dh=0&capsel=1`, retrieved May 2, 2018

Figure 3: Migration from UK towards Spain from 2006 to 2016



Source: INE - Spanish National Statistics Institute

A key factor in the decision to migrate is the probability of obtaining higher income levels. As used in Mayda (2010), I add the average salary of employees as a control variable. Following Ortega and Peri (2009) and Beine and Parsons (2012), I also include the GDP per capita as explanatory variables to make international comparisons representing the economic performance at country level. As an additional approximation to control for the propensity to migrate, I use the level of unemployment (Jennissen, 2003) and the total health spending. Finally, to control for the selectivity of migrants, I include the level of education (*Tertiary education level*) (Royuela and Ordóñez, 2016). Data on macroeconomic variables comes from the OECD data website.[16] The definition and the source of the main variables are reported in Table A1, while Table A2 shows some basic descriptive statistics (see Appendix). Both the dependent and the explanatory variables are expressed in logarithms, with the exception of variables that are already expressed as percentages. Zero values presented an issue for the migration flow variable. Since this variable comprises zeros, a log transformation would lead to missing values. Therefore, I add a value of one to all observations in order to maintain the zeros, as the logarithm of one is zero.

I create the dummy *Brexit* that takes the value of 1 for migrants leaving UK in 2016, 0 otherwise. The variable *Brexit* allows to verify if the migration

[16] `https://data.oecd.org`, retrieved May 2, 2018

flow from UK towards Italy and Spain have significantly changed following the Brexit referendum in 2016. In addition, I define the dummy *EU15_2016* that includes migrants departing from EU15 countries[17] in 2016. I also create the dummy *EU8_2016* for migrants coming from EU8 countries[18] in 2016. The dummies *EU15_2016* and *EU8_2016* work as a further control for *Brexit* and allow to study whether migration flows from EU15 and EU8 countries to Italy and Spain have been affected by the decision of UK to leave EU.

5 Results

In this section, I present the results of the models described in Section 2. Table 1 shows the estimates, using fixed-effects methods, of the determinants of migration flows (*ln flows*) to Italy from OECD countries. The first three columns refer to *Model 1*, the fourth to *Model 2*, the fifth and the sixth to *Model 3*. As expected, in all the models the average wage (*ln wage*) and the GDP per capita (*ln GDP*) have a negative and significant effect on migration. This results indicate that an increase in the average wage and in GDP per capita in the country of origin will decrease the migration flow to Italy. Estimating the preferred model (column 6), I find that when the average wage and the GDP per capita in the country of origin doubles, the migration flow to Italy decreases of about 22% and 133% respectively. Unemployment (*Unempl*) has a positive and significant effect on migration. According to the preferred model, if the unemployment ratio in the country of origin doubles, the migration flow to Italy declines of about 12%.

[17]The EU15 is composed by the first 15 member countries in the European Union: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.

[18]The EU8 consist of 8 countries that joined the European Union in 2004 and are commonly grouped together because of their relatively lower per capita income levels in comparison to the EU average. The EU8 are Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia.

Table 1: The effect of Brexit on migration flows towards Italy

		Model 1		*Model 2*	*Model 3*	
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. variable	ln flows	ln flows	ln flows	ln flows	ln flows	ln flows
ln wage	-0.289***	-0.467***	-0.379***	-0.409***	-0.422***	-0.225*
	(0.107)	(0.128)	(0.129)	(0.113)	(0.112)	(0.115)
ln GDP	-1.519***	-1.247***	-1.267***	-1.334***	-1.352***	-1.334***
	(0.0851)	(0.132)	(0.132)	(0.134)	(0.132)	(0.132)
Unempl		0.0125***	0.0131***	0.0128***	0.0127***	0.0122***
		(0.00258)	(0.00257)	(0.00223)	(0.00221)	(0.00223)
Health_exp		0.0476***	0.0418***	0.0424***	0.0438***	0.0322***
		(0.00954)	(0.00962)	(0.00853)	(0.00847)	(0.00863)
Educ_TRY		-0.0100***	-0.0123***	-0.0132***	-0.0140***	-0.0139***
		(0.00332)	(0.00337)	(0.00313)	(0.00307)	(0.00303)
Brexit			0.319***	0.317***	0.319***	0.287***
			(0.0495)	(0.0367)	(0.0325)	(0.0337)
EU15_2016						-0.00959
						(0.0223)
EU8_2016						-0.241***
						(0.0298)
Observations	28,189	26,880	26,880	26,880	26,880	26,880
R-squared	0.707	0.712	0.712	0.874	0.882	0.883
Province FE	yes	yes	yes	no	no	no
Country FE	yes	yes	yes	no	no	no
Time FE	yes	yes	yes	yes	no	no
Prov_Coun FE	no	no	no	yes	yes	yes
Prov_Time FE	no	no	no	no	yes	yes

Notes: Robust standard errors in parentheses. *,**,*** significant at 10%, 5% and 1% confidence level.

The coefficient associated to health spending (*health_exp*) is positive and significant. Health care is financed through a mix of financing arrangements including government spending, compulsory and voluntary health insurance. It follows that health spending is related to the tax level. Therefore, this result may show the desire of citizens to emigrate to countries with lower tax levels as a result of less health spending. Tertiary education level

(*Educ_TRY*) has a negative and significant parameter. This result reveals that countries that are experiencing an increase in the education level do not find Italy as an attractive destination.

Regarding the main variable of interest, Table 1 shows that the dummy *Brexit* has a positive and significant impact on migration in all the models. This coefficient remains positive and significant when adding two additional dummies: *EU15_2016* and *EU8_2016*. The preferred model estimates that the migration flow from UK to Italy increased of about 29% in 2016. The coefficient associated to *EU15_2016* is not significant and it seems to indicate that the migration flow to Italy from the EU15 countries has not been affected by Brexit. Finally, the *EU8_2016* parameter is negative and significant. This result shows that the migration flow with origin EU8 countries and Italy as destination has decreased in 2016 of 24%.

Table 2 reports the determinants of migration flows to Spain from OECD countries. The three models described in Section 2 are presented as before. The coefficient associated to the average wage is negative and significant at 10% just in *Model 3* and including the dummies *EU15_2016* and *EU8_2016*. Since GDP per capita is correlated with international wage differentials, the impact of the average wage is likely to be captured by the coefficient of GDP per capita which is negative and highly significant in all the models. The preferred model (column 6) estimates that, when the GDP per capita doubles in the country of origin, the migration flow to Spain increases of about 136%. Contrary to before, unemployment has a negative and significant impact on migration. This result indicates that Spain remains an attractive destination even if the unemployment rate in the country of origin increases compared to Spain. As for Italy, health spending has a significant and positive impact on migration flows to Spain. The parameter associated to the tertiary education level is not significant in all the models. This seems to suggest that the education level does not influence the choice of migration to Spain.

Table 2: The effect of Brexit on migration flows towards Spain

		Model 1		*Model 2*	*Model 3*	
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. variable	ln flows	ln flows	ln flows	ln flows	ln flows	ln flows
ln wage	-0.0245	-0.224	-0.202	-0.202	-0.202	-0.295*
	(0.159)	(0.195)	(0.196)	(0.157)	(0.150)	(0.155)
ln GDP	-0.993***	-1.321***	-1.324***	-1.324***	-1.324***	-1.356***
	(0.133)	(0.196)	(0.196)	(0.218)	(0.211)	(0.212)
Unempl		-0.0173***	-0.0171***	-0.0171***	-0.0171***	-0.0166***
		(0.00430)	(0.00430)	(0.00401)	(0.00386)	(0.00385)
Health_exp		0.0782***	0.0769***	0.0769***	0.0769***	0.0803***
		(0.0152)	(0.0152)	(0.0133)	(0.0128)	(0.0130)
Educ_TRY		0.00102	0.000519	0.000519	0.000519	0.000772
		(0.00511)	(0.00513)	(0.00409)	(0.00388)	(0.00387)
Brexit			0.102	0.102*	0.102*	0.149***
			(0.134)	(0.0585)	(0.0529)	(0.0542)
EU15_2016						-0.0472*
						(0.0275)
EU8_2016						0.123***
						(0.0336)
Observations	18,460	17,576	17,576	17,576	17,576	17,576
R-squared	0.830	0.832	0.832	0.929	0.936	0.936
Province FE	yes	yes	yes	no	no	no
Country FE	yes	yes	yes	no	no	no
Time FE	yes	yes	yes	yes	no	no
Prov_Coun FE	no	no	no	yes	yes	yes
Prov_Time FE	no	no	no	no	yes	yes

Notes: Robust standard errors in parentheses. *,**,*** significant at 10%, 5% and 1% confidence level.

Regarding the *Brexit* dummy, it has a positive and significant coefficient in all the models besides in *Model 1*. *Brexit* increases its significancy level to 5% including the dummies *EU15_2016* and *EU8_2016*. This result shows that the migration flows from UK to Spain increased in 2016 of about 15%,

probably as a consequence of the Brexit referendum. *EU15_2016* is negative and significant only at 10%, while *EU8_2016* is positive and significant at 1%. From the estimates, I deduct that the migration flows from EU15 countries to Spain has slightly decreased in 2016, while the emigration from EU8 countries to Spain has risen in the same period of about 12%.

6 Sensitivity analysis

I estimate the specifications of the model using different sub-samples. The database has information on migration inflows to provinces in Italy and Spain. This gives me the possibility to divide the sample into *rich* and *poor* regions. I collect data on GDP per capita at region level for 2016 from the Spanish and Italian National Statistic Institutes.[19] I compute the average GDP per capita at country level as the average of the regional GDP per capita within a country. I define a *rich* region as the region that recorded a GDP per capita above the average and a *poor* region as the region with a GDP per capita under the average. I then run again the specifications of the model considering *rich* regions and *poor* regions separately for both Italy and Spain. Table 3 displays the results estimating the preferred model (*Model 3*) of the main variable of interest *Brexit* and of the dummies *EU15_2016* and *EU8_2016*. Tables A3 and A4 (A5 and A6) show the full estimation of the models for the Italian (Spanish) provinces belonging to *rich* and *poor* regions respectively.

[19]The Italian National Statistics Institute does not give free access to data on GDP per capita at province level but just at regional level. This lack of information led me to decide to divide the sample in regions.

Table 3: Sensitivity analysis

	ITALY		SPAIN	
Dep. variable	**Rich**	**Poor**	**Rich**	**Poor**
Brexit	0.342***	0.215***	0.191**	0.135**
	(0.0397)	(0.0575)	(0.0820)	(0.0671)
EU15_2016	-0.00879	-0.0111	-0.0261	-0.0545*
	(0.0280)	(0.0368)	(0.0506)	(0.0326)
EU8_2016	-0.255***	-0.216***	0.179***	0.101***
	(0.0361)	(0.0521)	(0.0583)	(0.0382)
Number provinces	62	49	14	38

Notes: Robust standard errors in parentheses. *,**,*** significant at 10%, 5% and 1% confidence level.

The *Brexit* parameter is still positive and significant estimating separately *rich* and *poor* regions for both Italy and Spain. As expected, the coefficient associated to *Brexit* is higher when only provinces in *rich* regions are considered. In Italy, the number of emigrants from UK in 2016 increased of about 34% in *rich* regions, 13% more than in *poor* regions where it rose of 21% in the same year. The *EU15_2016* parameter is still not significant in both Italian sub-samples. The migration flow to Italy from EU8 countries in 2016 decreased of about 25% in *rich* regions and of about 22% in *poor* regions. In Spain, the increase in the migration inflow from UK in 2016 in *poor* regions is 6% lower than in *rich* regions where it increased of 13.5%. The *EU15_2016* parameter is now significant at 10% considering just *poor* regions that recorded a decline in the number of emigrants from EU15 countries in 2016 of about 5%. Regarding the migration flow from EU8 countries in 2016, it rose of about 18% in *rich* regions while of 10% in *poor* regions.

7 Conclusion

The deep economic crisis have significantly affected the Italian and Spanish dynamic of migration. Following the beginning of the recession in 2008, Italy and Spain have experienced an exponential increase in emigration flows to-

wards other European countries, having UK as main destination. The result of the Brexit referendum led to a decline in the migration flow to UK. This paper presents a panel analysis that studies the effect of Brexit on migration flows towards Italy and Spain by estimating gravity models. To control for multilateral resistance to migration, I estimate three models using different fixed effects structures. I reduce the amount of variability used for identification through the inclusion of origin-destination and destination-time dummies. To study the impact of Brexit on migration, I create a dummy variable for migrants leaving UK in 2016. Results suggest that Brexit increased the migration flows from UK towards Italy and Spain. In 2016, the number of people departing from UK to move to Italy and Spain rose of about 29% and 15%, respectively.

Given the proximity of the UK decision of leaving EU, it has been possible to study the effect of Brexit only in the very short run, since migration data are available just until 2016. I expect migration data in 2017 to be published shortly. Including more recent data would allow a better estimation of the impact of Brexit, giving the opportunity to also analyse the sequence of the episode. For future research, it would be interesting to estimate not only the out-coming flow of migrants from UK but also the incoming flow to UK. This additional study would provide a complete picture of the Brexit impact on migration flows towards Italy and Spain.

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A Appendix

Table A1: Main Variables

Label	**Definition**	**Source**
Migration flows (Italy)	Yearly migration flows from OEDC Countries to 110 Italian provinces	ISTAT - Instituto Nazionale di Statistica
Migration flows (Spain)	Yearly migration flows from OEDC Countries to 52 Spanish provinces	INE - Instituto National de Estatistica
Wage	Average wages measured in USD constant prices using 2016 base year and Purchasing Power Parities (PPPs) for private consumption of the same year	data.OECD.org
GDP	GDP per capita data measured in US dollars at current prices and PPPs	data.OECD.org
Unempl	Unemployment rate	data.OECD.org
Health_exp	Total health spending measured as a share of GDP	data.OECD.org
Educ_TRY	Tertiary education level	data.OECD.org
Brexit	Dummy for United Kingdom in 2016	Own calculation
EU15_2016	Dummy for EU15 Countries in 2016. EU15 includes Australia, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and UK	Own calculations
EU8_2016	Dummy for EU8 Countries in 2016. EU8 includes Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia	Own calculations

Table A2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev. overall	Std. Dev. between	Std.Dev. within	Min	Max
Migration flows to Italy	29111	17.56817	48.19612	37.92999	20.82107	1	1608
Migration flows to Spain	18668	71.61587	633.3001	129.0243	392.1917	0	20032
Average wage	43713	37128.3	13011.9	12659.04	23282.277	10575	62636
GDP per capita	45130	32912.41	14106.93	8017.801	11464.65	509.5167	102553.9
Unemployment	42815	8.013386	4.332329	2.235352	2.235352	-3.19824	27.46715
Health spending	45130	8.469251	2.258123	1.991366	0.8097638	3.999	17.214
Tertiary education level	42420	28.86998	10.21989	9.632735	12.01204	8.346184	56.26507

Table A3: Italian rich regions

		Model 1		*Model 2*	*Model 3*	
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. variable	ln flows	ln flows	ln flows	ln flows	ln flows	ln flows
ln wage	-0.304**	-0.465***	-0.369**	-0.375***	-0.378***	-0.167
	(0.136)	(0.161)	(0.163)	(0.142)	(0.140)	(0.143)
ln GDP	-1.558***	-1.361***	-1.383***	-1.418***	-1.428***	-1.412***
	(0.105)	(0.161)	(0.161)	(0.160)	(0.157)	(0.157)
Unempl		0.0119***	0.0126***	0.0126***	0.0127***	0.0122***
		(0.00308)	(0.00308)	(0.00270)	(0.00269)	(0.00270)
Health_exp		0.0479***	0.0418***	0.0433***	0.0447***	0.0324***
		(0.0119)	(0.0120)	(0.0107)	(0.0106)	(0.0107)
Educ_TRY		-0.0120***	-0.0146***	-0.0139***	-0.0148***	-0.0147***
		(0.00395)	(0.00401)	(0.00384)	(0.00366)	(0.00360)
Brexit			0.380***	0.376***	0.379***	0.342***
			(0.0519)	(0.0440)	(0.0380)	(0.0397)
EU15_2016						-0.00879
						(0.0280)
EU8_2016						-0.255***
						(0.0361)
Observations	17,335	16,494	16,494	16,494	16,494	16,494
R-squared	0.735	0.740	0.740	0.877	0.885	0.885
Province FE	yes	yes	yes	no	no	no
Country FE	yes	yes	yes	no	no	no
Time FE	yes	yes	yes	yes	no	no
Prov_Coun FE	no	no	no	yes	yes	yes
Prov_Time FE	no	no	no	no	yes	yes

Notes: Robust standard errors in parentheses. *,**,*** significant at 10%, 5% and 1% confidence level.

Table A4: Italian poor regions

		Model 1		*Model 2*	*Model 3*	
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. variable	ln flows	ln flows	ln flows	ln flows	ln flows	ln flows
ln wage	-0.279*	-0.502**	-0.429**	-0.465**	-0.494***	-0.320
	(0.165)	(0.196)	(0.198)	(0.184)	(0.184)	(0.195)
ln GDP	-1.463***	-1.047***	-1.064***	-1.205***	-1.226***	-1.206***
	(0.137)	(0.218)	(0.218)	(0.237)	(0.237)	(0.237)
Unempl		0.0138***	0.0142***	0.0130***	0.0128***	0.0124***
		(0.00404)	(0.00404)	(0.00384)	(0.00383)	(0.00387)
Health_exp		0.0510***	0.0460***	0.0400***	0.0423***	0.0319**
		(0.0152)	(0.0154)	(0.0142)	(0.0141)	(0.0146)
Educ_TRY		-0.00708	-0.00900*	-0.0126**	-0.0128**	-0.0127**
		(0.00537)	(0.00545)	(0.00532)	(0.00538)	(0.00533)
Brexit			0.235***	0.246***	0.241***	0.215***
			(0.0883)	(0.0604)	(0.0555)	(0.0575)
EU15_2016						-0.0111
						(0.0368)
EU8_2016						-0.216***
						(0.0521)
Observations	10,854	10,386	10,386	10,386	10,386	10,386
R-squared	0.707	0.708	0.708	0.867	0.877	0.877
Province FE	yes	yes	yes	no	no	no
Country FE	yes	yes	yes	no	no	no
Time FE	yes	yes	yes	yes	no	no
Prov_Coun FE	no	no	no	yes	yes	yes
Prov_Time FE	no	no	no	no	yes	yes

Notes: Robust standard errors in parentheses. *,**,*** significant at 10%, 5% and 1% confidence level.

Table A5: Spanish rich regions

		Model 1		*Model 2*	*Model 3*	
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. variable	ln flows	ln flows	ln flows	ln flows	ln flows	ln flows
ln wage	-0.0167	-0.429	-0.398	-0.398	-0.398	-0.534*
	(0.280)	(0.344)	(0.348)	(0.289)	(0.267)	(0.276)
ln GDP	-1.191***	-1.174***	-1.179***	-1.179***	-1.179***	-1.206***
	(0.224)	(0.346)	(0.346)	(0.405)	(0.392)	(0.393)
Unempl		-0.0167**	-0.0164**	-0.0164**	-0.0164**	-0.0160**
		(0.00784)	(0.00786)	(0.00761)	(0.00711)	(0.00706)
Health_exp		0.0877***	0.0859***	0.0859***	0.0859***	0.0924***
		(0.0270)	(0.0271)	(0.0272)	(0.0251)	(0.0257)
Educ_TRY		0.00123	0.000529	0.000529	0.000529	0.000921
		(0.00929)	(0.00937)	(0.00767)	(0.00723)	(0.00722)
Brexit			0.145	0.145**	0.145*	0.191**
			(0.149)	(0.0694)	(0.0779)	(0.0820)
EU15_2016						-0.0261
						(0.0506)
EU8_2016						0.179***
						(0.0583)
Observations	5,180	4,732	4,732	4,732	4,732	4,732
R-squared	0.870	0.877	0.877	0.940	0.946	0.947
Province FE	yes	yes	yes	no	no	no
Country FE	yes	yes	yes	no	no	no
Time FE	yes	yes	yes	yes	no	no
Prov_Coun FE	no	no	no	yes	yes	yes
Prov_Time FE	no	no	no	no	yes	yes

Notes: Robust standard errors in parentheses. *,**,*** significant at 10%, 5% and 1% confidence level.

Table A6: Spanish poor regions

		Model 1		*Model 2*	*Model 3*	
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. variable	ln flows	ln flows	ln flows	ln flows	ln flows	ln flows
ln wage	0.162	-0.142	-0.124	-0.124	-0.124	-0.210
	(0.183)	(0.228)	(0.227)	(0.185)	(0.178)	(0.183)
ln GDP	-1.103***	-1.356***	-1.359***	-1.359***	-1.359***	-1.387***
	(0.151)	(0.228)	(0.228)	(0.256)	(0.248)	(0.248)
Unempl		-0.0177***	-0.0175***	-0.0175***	-0.0175***	-0.0172***
		(0.00501)	(0.00501)	(0.00468)	(0.00456)	(0.00455)
Health_exp		0.0737***	0.0726***	0.0726***	0.0726***	0.0754***
		(0.0179)	(0.0179)	(0.0151)	(0.0147)	(0.0150)
Educ_TRY		0.000144	-0.000260	-0.000260	-0.000260	-0.000283
		(0.00596)	(0.00596)	(0.00481)	(0.00456)	(0.00455)
Brexit			0.0839	0.0839	0.0839	0.135**
			(0.177)	(0.0754)	(0.0657)	(0.0671)
EU15_2016						-0.0545*
						(0.0326)
EU8_2016						0.101***
						(0.0382)
Observations	14,060	12,844	12,844	12,844	12,844	12,844
R-squared	0.806	0.812	0.812	0.922	0.929	0.929
Province FE	yes	yes	yes	no	no	no
Country FE	yes	yes	yes	no	no	no
Time FE	yes	yes	yes	yes	no	no
Prov_Coun FE	no	no	no	yes	yes	yes
Prov_Time FE	no	no	no	no	yes	yes

Notes: Robust standard errors in parentheses. *,**,*** significant at 10%, 5% and 1% confidence level.