



Can regional policies shape migration flows?

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Abstract: Our empirical analysis focuses on the effect of regional policies on migration attraction factors in Europe. We employ a regression discontinuity design to assess the causal relationship between the reception of large amounts of public funds and migration flows in the EU-15 regions. In highly-subsidized regions, we find a large increase in the share of foreign citizens from less-developed countries when compared to low-subsidized regions with similar pre-treatment characteristics. The analysis shows that such an increase is due to the positive impact of the European regional policy on job market opportunities as well as the improvement of public goods supply.

Keywords: migration, EU Cohesion Policy, regression discontinuity design

1. Introduction

From an economic point of view, migrations are the empirical expression of factor mobility across international borders and, therefore, globally increase the efficiency of production processes. However, from a social perspective, they are complex events, often costly and wasteful, which require resources and flexibility both from those emigrating and from those who welcome immigrants. Faced with a dramatic increase in migratory flows to high-income countries (United Nations, 2020), and the strong heterogeneity of migrations across countries and regions, the economic literature has investigated what the mechanisms are that guide the choice to migrate and the final destination, to help developed countries to govern this complex phenomenon.

The literature highlights that migration flows are driven mainly by economic and social opportunities.¹ Our hypothesis is that some of these opportunities might be modified across European

¹ In the seminal contribution by Todaro (1969), people compare the economic and social conditions of their native country with those possibly faced in the host country. This comparison leads to an income-maximizing behavior so that single economic agents, the migrant, take into account differentials in wages and employment conditions between countries. Whereas embracing this macroeconomic perspective emphasizes the key features of the labor market in different geographical areas, in the corresponding microeconomic framework (Todaro 1976), migration represents an investment in human capital.

regions by the availability and use of European Structural and Cohesion Funds (EUF). The EUF foster structural and economic homogeneity across European regions in the context of infrastructure, education, and labor markets. Our theoretical entry point is based on Hatton and Williamson (2005), where an individual is more likely to migrate, the higher the compensating differential is, i.e., the net wage in the destination country minus the net wage in the home country, and the lower the fixed migration cost is. An important addition to this model is the development of the so-called welfare magnet hypothesis, according to which migrants select the receiving country depending on the generous benefits they can get. Borjas (1999) shows that generous welfare programs offered by many US states have become a magnet for immigrants. Concerning the EU-15 countries, which also represent the focus of our empirical analysis, De Giorgi and Pellizzari (2009) estimate the extent to which welfare generosity affects the location decisions of migrants. The conclusions are that these welfare magnets are positive but relatively weak, compared to the role of labor market conditions, such as the unemployment rate and the level of wages. However, the paper suggests that the critical issue is to what extent the variation in the welfare institutions across the countries of the EU will generate changes in the spatial distribution of the migration flows. In a recent report by the World Economic Forum (Schwab, 2017), inadequate or limited urban services and infrastructure are indicated among the causes of migration (push factors), whereas affordable and accessible urban services (including health care, education, utilities, and transport) are among the pull factors.

In such a context, there is a clear role for government intervention (see, for example, Cebula, 2002). Policies to increase welfare or stimulate growth, with positive effects on the labor market, affecting the factors that attract migrants, are however often constrained by the limits placed on public spending and also, for the regions, by the resources from state funding. The availability of EUF can relax these constraints and thus partially change the direction of migratory flows in the European space.

Thus, the location choice is driven by a cost-benefit analysis considering the returns of moving, net of the cost of traveling, assimilating a new culture and an unknown language, among other things. The welfare system (Borjas 1999, see also Conte and Mazza 2019 for a survey), and healthcare services (Borjas and Hilton 1996, Preston 2014) provide migrants with the opportunities to attain better living standards. Further dimensions of analysis are represented by natural amenities (Graves 1976, Glaeser et al. 2001), such as proximity to lakes and green landscape, and religious and ethnic differences.

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There are two main channels through which EUF influence these flows, one direct and the other indirect. The direct channel concerns the financing by EUF of forms of welfare, such as health, education, funds for poverty and immigration. In the programming period 2000-2006, the share of EUF dedicated to these activities was almost one quarter. The indirect channel regards the positive effects of EUF on the growth and therefore on the economic well-being of the region, an important factor in attracting migrants. Several papers show that EU Cohesion Policy has had a positive impact on economic performance and on the convergence in income and wealth among European regions (see, among others, Basile et al., 2008; Becker et al., 2010, Pellegrini et al., 2013). For example, in Pellegrini et al. (2013) it is estimated that EUF had an average impact between 0.6% and 0.9% per year on the growth rate of the financed regions. Therefore, although EUF are certainly not a factor taken into account by migrants when deciding the region of destination, they do have a possible effect on the factors underlying this choice. Estimating this effect can be of crucial importance because it expands the range of information available to policy makers on the overall economic and social impact of EUF.

The identification of these effects is mainly an empirical question. The analysis is a very complex task, firstly because we need a causal identification, that separates the effects of EUF from those of the multiple factors affecting migrations, and secondly because the effects sought could be weak and statistically irrelevant. Our paper deals with the empirical identification of the direct and indirect impact of EU Cohesion Policy on migrations in the EU-15 regions, and the evaluation of their importance and significance, in a counterfactual framework. The impact we are looking for is on the margin (or discontinuity): given two ex-ante economically similar regions, the presence or absence of substantial funding due to EUF can affect welfare and regional growth and therefore the differences in the degree of attractiveness for migratory flows. The discontinuity present in the allocation of EUF gives us the opportunity to use a causal model such as the RDD, which is a quasi-experimental method with a very high internal validity (Lee and Lemieux, 2010). Comparing the economic scenario arising under the policy intervention with a counterfactual situation (what would have happened if the policy had not been implemented), this method isolates the impact of the EU Cohesion Policy from the confounding effects induced by other factors (see Mohl and Hagen, 2010), and then empirically evaluates the existence and significance of these effects in a statistically robust way. To this end, we exploit the allocation rule of regional EU transfers: less developed regions, with per capita GDP in Purchasing Power Standards (PPS)

below 75 percent of the EU average, qualify for Objective 1 (Ob.1) status, i.e., they receive most of the EUF (called “treated” regions). We assume that non-eligible regions, with a per capita GDP level just above the 75 percent threshold (called “non-treated” regions), represent a valid counterfactual scenario to those just below the threshold (Cerqua and Pellegrini, 2018). We analyze the impact of EUF on the share of foreigners with or without European citizenship in the EU-15 regions. We also split the estimation by continent of origin.

Our empirical results show a statistically significant increase in the share of foreign citizens in Ob.1 regions due to EUF. This impact on the spatial distribution of migration is mostly driven by the increase in the number of non-European immigrants coming from less developed countries. The results are robust to different specifications of the RDD and hold even when we take into account that regions with direct access to the sea or bordering with countries not belonging to the EU-15 might be more vulnerable to the arrival of legal and illegal migrants.

Our paper makes a twofold contribution. First, although there is a vast empirical literature on the economic impact of EUF (see the meta-analysis by Dall’Erba and Fang, 2017), the link between the EU regional policy and migration is arguably an under-researched topic, and regional data on migration are scarce. The two most relevant exceptions are Kessler et al. (2011), who adopt a model of residential and political choice, and Egger et al. (2014), whose analysis is based on a new economic geography model. However, the empirical analyses of these papers rely on country-level data, which - considering the regional nature of the policy and the large regional inequalities within most EU countries - lead to a limited explanatory power of the empirical models used on the spatial distribution of migrations. In our empirical analysis, we have created a new dataset containing migration flows among European regions at the NUTS 2 level for the years 2001 and 2011, considering intra- and extra-European migration flows. To the best of our knowledge, this is the first time that a similar dataset has been set up. Second, although the RDD has already been used to investigate the impact of EUF on GDP and employment growth (see, Becker et al., 2010; Pellegrini et al., 2013), as far as we aware such empirical approach has never been adopted to assess the causal relationship between EUF and migration flows. Given the increasing share of the EU budget devoted to the Cohesion Policy since the mid-1970s and the dramatic increase in

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migratory flows to Europe, the policy’s contribution to the attraction of migrants is crucial information to EU policy-makers in shaping the regional distribution of ESF.

The paper is structured as follows. The EU Cohesion Policy and its potential relationship with migratory flows are presented in Section 2. The data and the evaluation method are discussed in Section 3. The results of the empirical analysis are presented in Section 4, while Section 5 assesses the robustness of the estimates. The final section concludes the paper.

2. The EU Cohesion Policy

The EU has invested locally through its regional policy since 1975 to improve the competitiveness of slow-growth regions, and correct regional unbalance. The relevance of the EU Cohesion Policy widely increased with the 1988 landmark reform, which followed the accession of Greece, Spain, and Portugal to the EU and the widening of regional disparities within the EU over the previous 15 years. Since then, the importance of the EU regional policy has not ceased to increase, and the reduction of regional disparities in development has become the key goal of Cohesion Policy. Indeed, ESF have been primarily assigned to less developed regions of the EU to compensate them for the absence of some preconditions for growth – infrastructure, accessibility, education, and health care (Camagni and Capello, 2015). Nonetheless, the targets of regional policy have changed over time. The initial priority was given to unemployment, industrial reconversion, and modernization of agriculture. The priorities have then been extended to include disparities in terms of innovation, level of education, environmental quality, and poverty, as shown by the funding composition under different types of expenditure. From the 1989-1993 to the 2000-2006 programming period, the share of funding allocated to the less developed regions for supporting human capital development (e.g., training, education, and social inclusion) has passed from 20.6% to 24.5%. The share of funding for environmental infrastructures has also increased (from 1.6% to 14%), while that directed to non-environmental infrastructures has decreased (from 36.3% to 30.9%) (European Commission, 2014). Interestingly, the focus on regional disparities has contributed to the development of welfare programs, which, in turn, might have raised the capacity to attract migratory flows.

The focus of the EU regional policy is on the least economically developed regions, the so-called Ob.1 regions (named Convergence regions in the 2007-2013 programming period), defined as regions, at

NUTS-2 level, with per capita GDP in PPS below 75 percent of EU average. The eligibility threshold is computed years before the beginning of the actual policy interventions. For the programming period 2000–2006, the European Commission computed the eligibility threshold on the basis of the average values observed for the period 1994–1996. The fact that the forcing variable is measured years before the beginning of the actual policy interventions guarantees that the treatment assignment mimics a randomization process around the threshold. The funding allocated to these regions consisted of almost 70 percent of total allocations for EUF for the period 2000–2006, amounting to some €136 billion.² The subsequent programming periods registered relatively small changes in these allocation rules, which means that this allocation system is still intact (Ferrara et al., 2017; Cerqua and Pellegrini, 2020).

It is worth noting that the “75 percent eligibility rule” allows the RDD approach to be used as an identification procedure of the policy impact on migration flows. Therefore, regions located just above or below the cut-off point are those suitable for our evaluation work as they share the same characteristics but the treatment. These regions are the focus of our analysis in the following sections.

3. Data and methodology

3.1 Data and descriptive statistics

The territorial level of interest in our analysis is the one defined by the EU 2010 nomenclature NUTS-2. To account for net migration, we use census data provided by Eurostat on the composition of the population in 2001 and 2011 in the EU-15 NUTS-2 regions.³ This choice allows us to glean significant differences in the composition of the population that can be ascribed, at least in part, to the effect of local policies financed by the EUF, e.g., to the increased public facilities supply in the highly-financed regions. Eurostat data provide accurate information on the number of citizens from the reporting country, other EU-countries, other European countries (those that do not belong to the EU), and non-European

² The remaining part of EUF in the 2000–2006 programming period targeted EU regions that did not comply with the “75 percent eligibility rule”, but were suffering from problems of economic backwardness (e.g., industrial decline or structural difficulties, long-term unemployment, rural underdevelopment, and low population density). However, these regions received a much lower regional aid intensity per head with respect to Ob.1 regions (Pellegrini et al., 2013).

³ We do not consider the accession countries (EU-12) of 2004 that did not receive EUF before 2004. This is due to the peculiarities of our evaluation strategy as well as the lack of citizenship data for most EU-12 countries in 2001.

countries. Using census data allows us to escape from problems regarding the fragmented definition of migrants across EU countries that often constitutes a limiting factor for this kind of analysis (see Westoff and Frejka, 2007).⁴ While data concerning the year 2011 were fully available, for the year 2001 data regarding Greece, Belgium, Germany, and French overseas-departments were not available: for the first two countries, missing data have been retrieved using the figures provided by the Hellenic Statistical Authority (<https://panorama.statistics.gr/en/>) and Statistics Belgium (<http://www.statbel.fgov.be>), respectively. Regarding Germany, although the collection of census data in 2001 was not implemented, the German Federal Statistics Office collected data on a micro-census covering 800,000 persons, i.e., a sample size of 1% of German population⁵ (see Schwarz, 2001). For our analysis, the 2001 micro-census enables us to retrieve an accurate estimate of German population data by nationality at the NUTS-2 level and thus fill in the missing census data. Lastly, data on the four French overseas territories (Guadeloupe, Martinique, Reunion, and Guyane) have been gathered from the *Atlas National des Populations Immigrées* of each region published by the *Institut National de la Statistique et des Etudes Economiques*.

The availability of data relative to two censuses allows us to calculate the percentage point difference in the share of citizens coming from the reporting country, other European countries and non-European countries as well as the absolute differences for each of the above groups. Such variables represent our main outcome variables. Unfortunately, it is not possible to directly calculate the change in the share of people with other EU citizenship as data in 2001 refer to EU-15, while data in 2011 refer to EU-27. However, we use the share of EU-27 citizens and the absolute number of EU-27 citizens in 2011 as additional outcome variables. In a subsequent analysis, we will then investigate the continent of origin of non-European citizens splitting between Africa, Asia, Central and South America, North America, and Oceania. We have also collected data on several demographic and economic pre-treatment covariates from the regional databases of Cambridge Econometrics and Eurostat, which might be linked to migration decisions. These variables are: the population density, the share of the population over 65, the

⁴ In this study, we use the change in the share of foreign citizenship as a proxy for migration. Although there are other potential proxies for migration (e.g., foreign-born data), in Europe, data on foreign citizenship are more usually employed, and more widely available, when immigration is considered (Coleman, 2003).

⁵ Data from the micro-census of 2001 allows us to trace out information in the time interval between two population censuses. Due to the reunification of Germany that occurred in 1989, the most recent census before 2011 was taken in 1987.

total employment divided by the active population,⁶ labor productivity (GVA per hour worked), the number of hours worked per employee, the share of employment in the primary sector, and the share of employment in the secondary sector.

As for the EUF, we split the EU-15 regions into “treated” and “untreated” following the Ob.1 status assignment process relative to the 2000-2006 programming period.⁷ We focus the empirical analysis on the split between Ob.1 and non-Ob.1 regions because Ob.1 expenditures account for more than two-thirds of the Cohesion Policy budget. Furthermore, we collected NUTS-2 regional data on EUF payments from 2001 to 2010 (see Roemisch, 2016). This continuous measure of treatment allows us to test the sensitivity of the binary analysis and gain more insights into the causal relationship between ESF and migration flows.

Before carrying out the main analysis, we map and plot the population variables to start investigating possible patterns. Figure 1 illustrates the geographic distribution of the regional foreigner share deciles in 2001 (Panel A) and 2011 (Panel B). For instance, in 2001, the first decile of regions consists of the regions with foreigner shares between 0.6% and 1.3%. The regions in the first decile are indicated in light blue. The tenth decile consists of regions with shares between 9.2% and 26.6%. They are shown in dark navy. The intermediate deciles are indicated by intermediate shades of blue. In 2001 the highest shares of foreigners were localized at the core of the EU, in the UK, and Ireland. Ten years later, we observe a somewhat different pattern with a steep increase in the share of foreigners in many Italian, Portuguese, and Spanish regions. Panel C of Figure 1 depicts the percentage point difference between the percentage of foreigners in 2001 and the same variable in 2011, allowing us to identify the differences in migration trends among regions. A striking feature of this figure is the extent to which the top decile regions (the ones marked in dark orange) are concentrated in the periphery of the EU-15.

Insert Figure 1

⁶ This variable can take on values above 1 as it represents the number of individuals working in the region divided by the number of active individuals (in employment or looking for employment) residing in the region.

⁷ Although our data starts in 2001, i.e., one year after the beginning of the programming period under analysis, this is not a concern as the bulk of EUF are spent in the final years of the programming period, including up to two years after the end of the programming period.

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Figure 2 reports the Ob.1 status assignment for the 2000-2006 programming period (Panel A) and the amount of EUF per capita allocated during the 2001-2010 period (Panel B). Both panels show a pattern very similar to the one arising in Figure 1, suggesting the presence of a positive relationship between EUF and the change in the share of foreigners. Indeed, peripheral regions tend to have both a higher share of foreigners and a higher EUF per capita for the period under consideration.

Insert Figure 2

This positive relationship is even more evident in Figure 3, where we plot the relationship between the change in the share of foreigners from 2001 to 2011 and the amount of EUF per capita allocated for the 2001-2010 period using a kernel-weighted local polynomial smoothing regression. The green line shows that there is a positive relationship between EUF and the percentage points change in the share of foreigners, which flattens out only at the right-hand side of the fund distributions. Nevertheless, only a rigorous econometric causal model can determine whether this relationship is causal or due to a spurious correlation. With this intent, in the rest of the paper, we compare regions with similar characteristics but which received a much larger share of EUF due to an exogenous assignment rule.

Insert Figure 3

3.2 Methodology

We perform an empirical evaluation of the causal relationship between the EU regional policy and migration flows in the EU-15 regions. Our identification strategy exploits the allocation rule of regional EU transfers: only regions with a per capita GDP in PPS below 75 percent of the EU average (calculated as an average of three years before the beginning of the programming period) are qualified for Ob.1 funds, i.e., receive a considerable amount of the EUF. Therefore, regions with a per capita GDP level just above 75% of the EU average (which did not receive the Ob.1 funds) can be considered valid counterfactual comparisons to those just below the cut-off (which did receive the Ob.1 funds). Indeed, economies at similar per capita income levels share many structural attributes, including their levels of education, science and technology endowments, infrastructure quality, and institutional quality (Iammarino et al., 2019). This sharp discontinuity can be exploited via the RDD (see, inter alia, Hahn et al., 2001; Lee and Lemieux, 2010), an econometric method which compares regions lying closely on

either side of the threshold and delivers an estimation of the local average treatment effect (LATE), i.e., the average treatment effect around the threshold. For those regions in the interval just above and below this threshold, the treatment assignment (i.e., Ob.1 funds) is to be considered as good as randomized. In other words, the RDD is equivalent to a local random assignment around the cut-off point. Lastly, the use of the RDD overcomes the inverse causality problem, which implicitly affects this kind of analysis.

Given that the Ob.1 status assignment for the 2000-2006 programming period followed a clear assignment rule,⁸ we adopt the sharp RDD framework:

$$Y = a + f(x) + D[\tau + f(x)] + \varepsilon$$

where Y is the dependent variable (e.g., the percentage-points change in the share of foreigners with European citizenship between 2001 and 2011 for each region), x is the forcing variable (GDP per capita (EU-15=100, PPS) in 1994-1996), D is the treatment dummy and $f(\cdot)$ is a smooth polynomial functions of x . In our case, $f(\cdot)$ is a second-order polynomial allowed to have different parameters to the left and the right of the threshold. Consistent with the RDD approach, in the main analysis, we do not include the richest regions, defined as those regions with a pre-treatment GDP per capita of more than twice the Ob.1 assignment threshold.

We then repeat the same analysis with the addition of the pre-treatment covariates \mathbf{X} described in Section 3.1 to the RDD model. This addition increases the precision of the RDD estimator, accounting for the potential bias due to pre-treatment differences (see Frölich and Huber, 2019):

$$Y = a + f(x) + D[\tau + f(x)] + \gamma X + \varepsilon$$

⁸ In our sample, only the Finnish region of Pohjois-Suomi (FI1A) received the Ob.1 status (limited to part of its territory) despite a pre-treatment per capita GDP level above the 75% threshold. However, due to a change in borders of some regions across nomenclatures, we were forced to merge the Ob.1 region Itä-Suomi (FI13) with the partially Ob.1 region Pohjois-Suomi (FI1A) into the region Pohjois- ja Itä-Suomi (FI1D). We include this region in the main analysis taking the forcing variable value of FI13, which is below the 75% threshold. Alternatively, if we considered a weighted average of the two forcing variable values, we would get a forcing variable value that exceeds the 75% threshold, making it a non-complier region. Nevertheless, we will consider this alternative of the forcing variable value in the sensitivity analysis, where we adopt a fuzzy RDD.

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Besides, the use of percentage point and absolute differences of the three main dependent variables allows us to lower the variance in the RDD estimator (Lee and Lemieux, 2010) and to take into account pre-treatment differences in the dependent variable.

4. Results

4.1 The impact of EUF on migration flows

The estimation procedure begins with some graphical evidence, as suggested by Lee and Lemieux (2010). A simple way to evaluate the effect of EUF on migration is to plot the relationship between each dependent variable and the forcing variable (pre-treatment GDP per capita) for regions on either side of the 75% cut-off point.

Figure 4 plots each of the primary dependent variables for the period from 2001 to 2011 for Ob.1 regions against non-Ob.1 regions. In each graph, the cut-off line sharply separates the treated and untreated regions. Each figure superimposes the fit of a quadratic regression model (estimated separately on each side of the cut-off point). Figure 4 clearly shows that, on average, the share of foreigners in Ob.1 regions increased more than in non-Ob.1 regions. This change seems to be due to both European and non-European citizens.

Insert Figure 4

Although the graphical evidence is important in showing possible differences between treated and untreated regions around the Ob.1 assignment threshold, a formal RDD regression allows us to calculate the extent of the observed differences and whether they are statistically different from zero. The results obtained using the RDD specification detailed in Section 3.2 are presented in Table 1. Columns 1 and 2 report the EUF impact on the share of citizens with host country citizenship with and without pre-treatment covariates **X**. This impact is negative and statistically significant at the 5% level in both specifications. The extent of the difference in the share of citizens with host country citizenship over the period from 2001-2011 is -2.23 percentage points in Ob.1 regions. This corresponds to a substantial increase in the share of foreigners as in EU-15 NUTS-2 regions, the average share of foreigners was 4.84% in 2001 and 6.45% in 2011. In the remaining columns, we investigate whether this increase is mostly due to foreigners with European citizenship (columns 3 and 4) or to extra-Europeans (columns 5

and 6). Although all coefficients are positive, only the one concerning the increase in the share of non-Europeans citizens is statistically significant from zero at the 5% level in both specifications. This means that in the analyzed period, EUF brought about a wide expansion in the share of foreign citizens in Ob.1 regions, mostly driven by the increase in non-Europeans. Lastly, although we do not have data on the pre-treatment value for the share of people with other EU citizenship referring to EU-27, in columns 7 and 8, we check whether there are significant differences in the share of individuals with EU-27 citizenship in 2011. We find no statistically significant effect confirming that most of the immigrants come from non-Europeans countries.

Insert Table 1

So far, we have looked at the difference in shares of groups of citizens with different citizenships, i.e., host country, European and non-European. Although this analysis is informative in showing the migration trends among regions, it might conceal other patterns. For instance, an increase in the share of foreigners might derive from the migration of citizens from the host country rather than from an actual increase in the number of migrants from other countries. In addition, internal migration of natives can reduce foreign employment shares and thus lead to underestimating the effects of EUF. For these reasons, we complement the empirical analysis by looking at the net migration changes between 2001 and 2011 for each group of individuals under analysis. The estimates are reported in Table 2.

Insert Table 2

The estimates reported in Table 2 show that our findings are mainly driven by the arrivals of foreign migrants - especially those coming from non-European countries - rather than by a reduction of individuals with a host country citizenship. The average increase of over 35,000 individuals from non-European countries for Ob.1 regions is sizable, especially considering that the average number of individuals with non-European citizenship living in Ob.1 regions close to the Ob.1 threshold (with a per capita GDP in PPS) in 2011 was 50,251.

We further investigate the origin of non-European migrants in Table 3, where Panel A shows the difference in shares of groups of citizens with different citizenships, i.e., Africa, Asia, Central and South

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America, North America, and Oceania or unknown, while Panel B is concerned with the net migration changes for each of the aforementioned group of individuals.

Insert Table 3

Overall, the estimates clearly show that most of the migrants are from Asia or Central and South America. There is also a sizable increase in the number of Africans, but the estimates are not statistically significant. Therefore, migrants mostly come from countries which are less-developed than the EU-15 Member States. Such finding comes with no surprise. Although the trend of migrant flows shows that migration is a complex phenomenon, with the number of migrants and their ethnic group differing dramatically among countries and over time, a vast amount of literature has confirmed two striking features of the recent international migration. First, since the middle 1960s, migrations stopped to be characterized by outflows from Europe, which instead became a receiving area (Stalker, 1994; Zlotnick, 1998). Second, within Europe, countries in southern Europe, that for a long time were host countries, changed in the last decades into receiving areas. For example, Italy, Spain, and Portugal have received, since the end 1970s, migrants from Latin America, the Far East, and sub-Saharan Africa (Venturini, 2004). Interestingly, these features are in line with our view that pull factors can determine migration flows: welfare benefits, relative wage structure, and labor market characteristics in the receiving areas compared with the origin ones. Considering the role of EUF, for example, allows explaining (at least partially) why migration is directed toward particular areas of Europe.⁹ Nonetheless, for the origin of such migration flows to be explained, we can borrow from the literature on push factors that typically captures “migration spurred by conditions in the home country” (Hatton and Williamson, 1998). Taken together, pull and push drivers enable to identify the economic, social, and cultural reasons of the twofold decision at the basis of migration choices: first, leaving the country of origin, and then deciding in which host country to settle (Stark and Bloom, 1985).¹⁰

⁹ Interestingly, a recent analysis shows that the tightening of US immigration policies after 9/11 should also be considered as a driver for redirecting migration flows to Europe (Pellegrino, 2004).

¹⁰ It is worth noticing that this set of drivers are better suited for explaining migration flows from less developed to developed countries, while intra-European movements are by far more intricate and may be concerned with other factors than economic ones (King, 2002; Favell, 2008).

4.2 Some further considerations: the impact of EUF on public good and service provision

EUF are expected to provide more and better employment opportunities as well as to increase the public good provision. Previous literature has clearly shown that EUF led to GDP and employment growth in intensively treated regions (see Becker et al., 2010; Pellegrini et al., 2013);¹¹ on the other hand, the impact of EUF on public good and service provision has never been analyzed by using the RDD. In this section, we fill this gap by investigating whether there is a positive relationship between the EUF and education, health, and infrastructure outcomes during the period under analysis. To this aim, we collected data on seven proxies of public good and service provision: i) change in the share of early leavers from education; ii) change in the share of adult population that received education or training; iii) change in the number of available beds per hundred thousand inhabitants; iv) change in the number of doctors per hundred thousand inhabitants; v) change in km of motorways per thousand square meters; vi) average road distance per person to the nearest generic local facility in 2011; and vii) average road distance per person to the nearest generic regional facility in 2011. The estimates are reported in Table 4.

Insert Table 4

All estimates suggest a positive impact of EUF on public good and service provision. Nevertheless, only adult participation in education or training and the number of doctors per hundred thousand inhabitants are statistically significant at the 10% level. This suggests that an increase in public good and service provision had a role in determining the increase in migrants to Ob.1 regions. It also suggests that part of the migratory phenomenon has been driven by other pull factors, most notably, the increase in job opportunities well documented in Becker et al. (2010) and Pellegrini et al. (2013).

5. Robustness and sensitivity checks

We begin this section by testing whether the pre-treatment covariates of the Ob.1 regions are similar to those of the control group at the threshold. As shown in the first two columns of Table 5, Ob.1 and non-Ob.1 regions are quite different - on average - concerning pre-treatment values on population,

¹¹ We have replicated Becker et al.'s analysis on employment for the period 2001-2011. We find that, on average, Ob.1 regions close to the threshold increased employment by 28,513 employees. This impact is statistically significant at the 5% level.

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3 citizenship composition, education, and economy. However, when comparing regions' characteristics on
4 either side of the cut-off, they do not vary discontinuously at the Ob.1 assignment threshold. Indeed, the
5 third column of Table 5 shows that there is no evidence of statistically significant pre-treatment
6 differences when applying the RDD on pre-treatment differences in terms of citizenship composition,
7 population density, share of the population over 65, labor productivity, hours worked, share of
8 employment in the primary and secondary sectors and education level. On the other hand, we find that
9 non-Ob.1 regions have a higher ratio of total employment divided by the active population (10%
10 statistical significance). These results confirm that Ob.1 and non-Ob.1 regions around the Ob.1 status
11 assignment threshold are quite similar with respect to pre-treatment covariates but also that some slight
12 differences remain. This is the main reason why we control for these variables in the primary analysis.
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24 Then the continuity of the density around the cut-offs is tested using the test proposed by Cattaneo et
25 al. (2020). As reported in Figure 5, there is no evidence of a discontinuity in the conditional density of
26 the forcing variable (GDP per capita in 1994-1996), which demonstrates the lack of manipulation in the
27 Ob.1 status assignment.
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34 Furthermore, as our analysis covers the period 2001-2011, this means that part of the EUF per capita
35 received by EU-15 regions during the years 2001-2010 originate from the following programming
36 period, i.e. the 2007-2013 programming period. The overlapping of two programming periods might
37 cause measurement error, potentially biasing our estimates. To determine the extent of this potential bias,
38 we computed the correlation between EUF per capita over the 2000-2006 and the 2007-2010 periods for
39 all 204 NUTS-2 regions. The correlation is equal to 0.9247 (0.9293 when considering only Objective 1
40 regions). This result confirms that, although several regions lost the Objective 1 status at the beginning
41 of the 2007-2013 programming period (see Cerqua and Pellegrini, 2020), these regions continued to
42 receive, for a few years, a yearly amount of funds similar to the 2000-2006 programming period. This is
43 due to the existence of transitional programs, which slowly reduce the amount of funds available to
44 former Ob.1 regions.
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We then check the sensitivity of the estimates in several regards and summarize the results of interest in Table 6. For the sake of brevity, we focus on sensitivity checks for the RDD model with covariates reported in columns 2, 4, and 6 of Table 1. Table 6 contains five blocks of results in a vertical dimension, numbered (I)-(V).

One concern with our empirical analysis is that we split regions according to the Ob.1 status assigned for the programming period 2000-2006, even if our migration variables refer to a longer time period. The availability of data on EUF per capita during the 2001-2010 period allows us to check whether our results depend on this choice. Dropping all non-Ob.1 regions which received EUF per capita larger than the least treated Ob.1 region, we obtain the estimates reported in block (I) of Table 6. The extent of these estimates suggests that EUF had an even larger impact on Ob.1 regions after we dropped the 11 “most financed” non-Ob.1 regions. This result is consistent with our finding that the larger the EUF per capita, the higher the increase in the share of foreigners.

Regions with direct access to the sea might be more vulnerable to the arrival of legal and illegal migrants. The same rationale might apply to regions sharing a border with countries not belonging to the EU-15. We checked the sensitivity of our results by adding a dummy variable for each of the above factors to the RDD regressions. Results are reported in block (II) of Table 6 and show that our main findings hold. In such block, we also verify that dropping the French overseas-departments from the sample, as they are geographically far away from the rest of the European regions, does not substantially affect the extent of the estimates

Block (III) reports three sensitivity checks on the RDD specification. We start by checking whether our results depend on the chosen order of polynomial of $f(\cdot)$ by repeating the analysis for the 1st and the 3rd order polynomials. The estimates turn out to be very close to those reported in Table 1 even though if the ones obtained with the 3rd order polynomials are even larger. We also check whether, using a non-parametric estimator, we get similar estimates. Using a local polynomial non-parametric regression, we select an optimal bandwidth that minimizes the mean squared-error using the bias-corrected RDD estimator with robust confidence intervals developed by Calonico et al. (2014). Besides, we use a triangular kernel and control for pre-treatment covariates \mathbf{X} (see Calonico et al., 2018). All estimated coefficients are larger than those reported in Table 1 and also turn out to be statistically significant for

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citizens with European passports. Block (III) findings suggest that a more flexible specification of the forcing variable leads to more significant estimates which reinforce the hypothesis of enhanced attractiveness of treated regions close to the threshold engendered by the availability of more job opportunities as well as improved infrastructure, health system and education outcomes via EUF.

Although we are in a quasi-experimental evaluation framework, we have already seen that controlling for relevant pre-treatment covariates affects the extent of the estimates. Therefore, the addition of other relevant covariates might change our results. Eurostat provides data on average education levels of citizens aged 25-64 in all NUTS-2 regions except for the four French overseas-departments in 2001. Adding the share of citizens with low-level education (defined as lower secondary education or below) and the share of citizens with low medium-level education (defined as upper secondary or post-secondary non-tertiary education), we obtain the estimates reported in row 8 of Table 6. Again, these estimates are very close to those reported in Table 1. It is also possible that EUF take a long time before showing any impact on migration flows, as it takes a long time to improve infrastructures, the health system, and the education system. This is why we add to \mathbf{X} the per capita EUF that each region received during the period 1994-2000. As shown in block (IV), this additional covariate does not affect our estimates significantly.

In block (V), we check whether data and sample choices impacted on the estimates. First, as anticipated in footnote 8, we check whether considering the Finnish region Pohjois- ja Itä-Suomi (FI1D) as a non-complier alters our results. To this aim, we adopt the fuzzy RDD estimator. We then replicated the analysis excluding the upper quarter (in terms of the forcing variable) of the non-Ob.1 regions. Indeed, these regions are not close to the 75% threshold and their exclusion should not affect the main estimates very much. Both sensitivity checks result in estimates which are in the range of those of columns 2, 4, and 6 of Table 1. Lastly, in Block (VI) we exclude that each dependent variable is discontinuous at other values of the forcing variable (different from the threshold), using two placebo thresholds.

Insert Table 6

6. Conclusions

Europe is currently receiving a large flow of migrants, mostly from Asian countries and the southern Mediterranean coast. European policy-makers need to manage such migration flows by operationalizing the complex adjustment process of immigrants with the economic and social context of European regions. This paper has led to some results of interest for an evaluation of the forces that attract migrants. First, the welfare ensured by the EUF, in terms of access to education, health, and other sources of well-being, appears to be an important factor that affects the localization choices of migrants. Our estimates show that the productivity differential, and therefore the wages differential, is not in itself sufficient or the only motivation to direct the migratory flow. Welfare considerations matter, more than the impact estimated in De Giorgi and Pellizzari (2009). Second, the analysis carried out demonstrates that *ceteris paribus*, the EUF strongly influence the distribution of migratory flows. In particular, the EUF lead to a significant increase in the share of foreign citizens in the highly-subsidized regions of around 2 percentage points. This estimate corresponds to a large increase in the share of foreigners as in EU-15 NUTS-2 regions the average share of foreigners was 4.8% in 2001 and 6.5% in 2011. Such an increase is mostly driven by non-European immigrants coming from less developed countries, while the increase in the share of European foreign immigrants connected to the EUF is positive but not significant, consistently with the result that the EUF tend to reduce labor mobility within Europe (see Schmidt, 2013). We find that EUF increased job opportunities as well as the supply of high-quality welfare, which includes education, health, infrastructure, and facilities for welcoming immigrants. Our estimates suggest that previous empirical studies might have underestimated the importance of public goods and services in attracting immigrants. We argue that this is due to the use of detailed data at the regional level and to the adoption of an evaluation strategy that allowed us to convincingly isolate the role of public goods and services from economic factors.

Our findings may guide policy-makers in selecting the right interventions able to influence and canalize migration flows as a component of an integrated European regional development strategy (Mitze et al., 2017). While the rather low degree of geographical mobility within and across EU Member States has been a matter of concern for growth in past decades, the future question is how the new labor supply can be efficiently integrated into the local labor systems to sustain local development. An efficient use of public transfers can help in this direction.

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Table 1. RDD estimates for migration shares net changes outcomes

	Dep. Var.: Percentage points change in the share of citizens with host country citizenship (2001-2011)		Dep. Var.: Percentage points change in the share of foreigners with European citizenship (2001-2011)		Dep. Var.: Percentage points change in the share of foreigners with non-European citizenship (2001-2011)		Dep. Var.: Percentage of foreigners with EU-27 citizenship (2011)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dummy Ob.1	-2.54 (1.01)**	-2.23 (1.05)**	1.15 (0.58)**	0.59 (0.60)	1.39 (0.62)**	1.64 (0.66)**	0.79 (0.83)	0.56 (0.88)
Other covariates	No	Yes	No	Yes	No	Yes	No	Yes
R ²	0.0740	0.1877	0.0591	0.2871	0.0477	0.1253	0.1312	0.2177
Nb. of Ob.1 regions	54	54	54	54	54	54	54	54
Nb. of non-Ob.1 regions	150	150	150	150	150	150	150	150

Note: Heteroskedasticity-robust standard errors in parentheses. Parametric regressions include a second-order polynomial in the forcing variable. The polynomial functions are allowed to have different parameters to the left and the right of the threshold.

***p<0.01, **p<0.05, *p<0.1

Table 2. RDD estimates for migration flows net changes outcomes

	Dep. Var.: Change in the number of citizens with host country citizenship (2001-2011)		Dep. Var.: Change in the number of foreigners with European citizenship (2001-2011)		Dep. Var.: Change in the number of foreigners with non-European citizenship (2001-2011)		Dep. Var.: Number of foreigners with EU-27 citizenship (2011)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dummy Ob.1	20,505 (59,391)	-237 (64,674)	33,459 (24,440)	20,745 (29,376)	35,875 (18,438)*	37,833 (19,239)**	59,568 (32,304)*	45,922 (35,203)
Other covariates	No	Yes	No	Yes	No	Yes	No	Yes
R ²	0.1140	0.2610	0.0426	0.1662	0.0657	0.1439	0.0914	0.1609
Nb. of Ob.1 regions	54	54	54	54	54	54	54	54
Nb. of non-Ob.1 regions	150	150	150	150	150	150	150	150

Note: See notes of Table 1

Table 3. RDD estimates split by continent of origin

Panel A: Migration shares net changes										
	Dep. Var.: Percentage points change in the share of foreigners with African citizenship (2001-2011)		Dep. Var.: Percentage points change in the share of foreigners with Asian citizenship (2001-2011)		Dep. Var.: Percentage points change in the share of foreigners with Central or South American citizenship (2001-2011)		Dep. Var.: Percentage points change in the share of foreigners with North American citizenship (2001-2011)		Dep. Var.: Percentage points change in the share of foreigners with citizenship from Oceania or unknown (2001-2011)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dummy Ob.1	0.49 (0.21)**	0.43 (0.24)*	0.37 (0.18)**	0.51 (0.21)**	0.59 (0.36)*	0.57 (0.37)	-0.03 (0.05)	-0.01 (0.04)	0.08 (0.08)	0.09 (0.07)
Other covariates	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
R ²	0.0552	0.1631	0.1016	0.2064	0.0392	0.1465	0.0414	0.2295	0.0267	0.1372
Nb. of Ob.1 regions	54	54	54	54	50	50	50	50	54	54
Nb. of non-Ob.1 regions	150	150	150	150	150	150	150	150	150	150
Panel B: Migration flows net changes										
	Dep. Var.: Change in the number of citizens with African citizenship (2001-2011)		Dep. Var.: Change in the number of foreigners with Asian citizenship (2001-2011)		Dep. Var.: Change in the number of foreigners with Central or South American citizenship (2001-2011)		Dep. Var.: Change in the number of foreigners with North American citizenship (2001-2011)		Dep. Var.: Change in the number of foreigners with citizenship from Oceania or unknown (2001-2011)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dummy Ob.1	7,730 (6,702)	7,348 (6,918)	8,410 (4,148)**	9,016 (4,202)**	22,240 (11,504)*	22,396 (11,941)*	500 (636)	771 (559)	93 (548)	366 (517)
Other covariates	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
R ²	0.0495	0.1617	0.1051	0.1983	0.0572	0.1265	0.0226	0.1086	0.0572	0.1015
Nb. of Ob.1 regions	54	54	54	54	50	50	50	50	54	54
Nb. of non-Ob.1 regions	150	150	150	150	150	150	150	150	150	150

Note: Heteroskedasticity-robust standard errors in parentheses. Parametric regressions include a second-order polynomial in the forcing variable. The polynomial functions are allowed to have different parameters to the left and the right of the threshold. We do not have data on the split of American citizens between North and Centre-South for the four French overseas-departments. ***p<0.01, **p<0.05, *p<0.1

Table 4. RDD estimates for public good provision proxies

	Education proxies		Health proxies		Infrastructure proxies		
	Dep. Var.: Change in the share of early leavers from education (2001-2011)	Dep. Var.: Change in the share of the adult population that received education or training (2001-2011)	Dep. Var.: Change in the number of available beds per hundred thousand inhabitants (2001-2011)	Dep. Var.: Change in the number of doctors per hundred thousand inhabitants (2001-2011)	Dep. Var.: Change in km of motorways per thousand square meters (2001-2011)	Dep. Var.: Average road distance per person to the nearest generic local facility in 2011	Dep. Var.: Average road distance per person to the nearest generic regional facility in 2011
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dummy Ob.1	-1.14 (2.91)	3.74 (2.08)*	6.14 (35.07)	84.30 (43.02)*	4.98 (4.36)	0.51 (2.40)	48.12 (31.26)
R ²	0.2961	0.1998	0.2848	0.3541	0.1202	0.3599	0.1432
Nb. of Ob.1 regions	45	45	34	44	29	47	45
Nb. of non-Ob.1 regions	137	143	91	82	102	149	148

Notes: Heteroskedasticity-robust standard errors in parentheses. Parametric regressions include a second-order polynomial in the forcing variable. The polynomial functions are allowed to have different parameters to the left and the right of the threshold. All specifications include control variables **X**. We miss information on Denmark (columns 1 and 5), some French regions (columns 1, 2, 3, 6 and 7), some Portuguese regions (columns 2, 5, 6 and 7), some Hellenic regions (columns 3 and 5), some British and German regions (columns 3 to 5), some Finnish regions (columns 1 and 4).

***p<0.01, **p<0.05, *p<0.1

Table 5. RDD estimates of the pre-treatment differences in migration-related covariates between Ob.1 and non-Ob.1 regions

	Average in Ob.1 regions	Average in non-Ob.1 regions	Differences at the margin
Pre-treatment variables	(1)	(2)	(3)
Share of citizens with host country citizenship in 2001	96.21	94.84	-1.16 (129)
Share of citizens with EU-15 citizenship (different from host country) in 2001	0.58	1.42	0.04 (0.37)
Share of citizens with European citizenship (different from host country) in 2001	1.96	2.80	1.20 (0.93)
Share of citizens with a non-European citizenship in 2001	1.83	2.36	-0.04 (0.77)
Population density in 2001	393	299	601 (399)
Share of the population over 65 in 2001	15.56	14.85	0.27 (1.58)
Total employment/Active population in 2001	0.87	0.94	0.05 (0.03)*
Productivity (GVA per hour worked) in 2001	22,142	32,895	-3,434 (2,865)
Share in the primary sector in 2001	10.68	3.34	-1.23 (1.94)
Share in the secondary sector in 2001	13.58	18.43	-0.06 (2.21)
Hours worked per employee in 2001	1.84	1.61	0.16 (0.11)
Share of the population from 25 to 64 years with a low- level of education in 2001	51.77	34.37	6.23 (6.04)
Share of the population from 25 to 64 years with a medium-level of education in 2001	30.99	43.39	-3.59 (4.74)

Note: The share of citizens with EU-15 citizenship and education variables are not available for the four French overseas-departments. Besides, we exclude Belgian regions for the share of citizens with EU-15 citizenship as Statistics Belgium provided the EU-27 value instead of the EU-25 value. Low-level education is defined as lower secondary education or below; medium-level education is defined as upper secondary or post-secondary non-tertiary education; high-level education is defined as tertiary education or above. Statistics on the non-Ob.1 regions do not include the richest regions defined as those regions with a pre-treatment GDP per capita more than twice the Ob1 assignment threshold.

***p<0.01, **p<0.05, *p<0.1

Table 6. Robustness and sensitivity checks

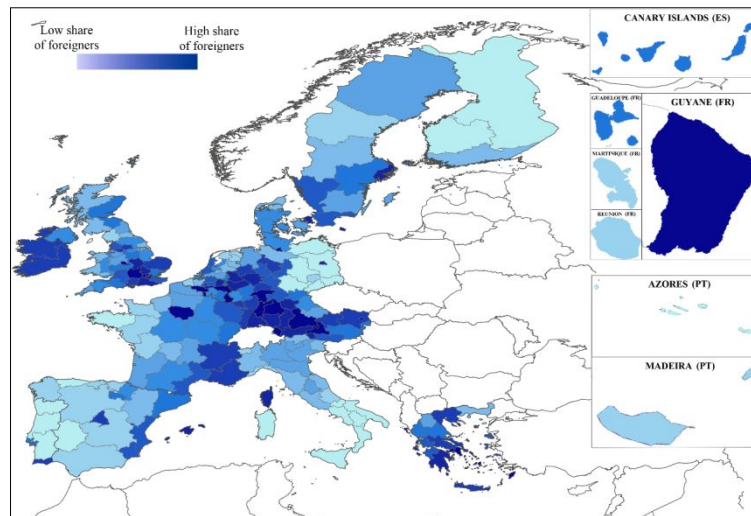
Type of sensitivity/robustness check	Percentage points change in the share of citizens with host country citizenship (2001-2011)	Percentage points change in the share of foreigners with European citizenship (2001-2011)	Percentage points change in the share of foreigners with non- European citizenship (2001-2011)
(I) Intensity of treatment			
- Drop non-Ob.1 regions receiving more per-capita EUF than the least treated Ob.1 regions	-2.77 (0.99)***	0.81 (0.61)	1.96 (0.64)***
(II) Border dummies			
- Add coastline dummy	-2.27 (1.05)**	0.59 (0.60)	1.69 (0.66)**
- Add dummy border with non-EU-15 countries	-2.42 (1.06)**	0.78 (0.60)	1.64 (0.68)**
- Drop French overseas-departments	-2.15 (1.08)**	0.53 (0.61)	1.62 (0.67)**
(III) RDD specification			
- $f(\cdot)$ specified as 1 st order polynomial	-2.28 (0.79)***	0.71 (0.43)*	1.57 (0.52)***
- $f(\cdot)$ specified as 3 rd order polynomial	-2.65 (1.28)**	0.84 (0.74)	1.81 (0.75)**
- Non-parametric RDD	-3.62 (1.56)**	2.02 (0.79)**	1.77 (1.03)*
(IV) Add supplementary control variables			
- Add education variables	-2.24 (0.91)**	0.61 (0.54)	1.63 (0.60)***
- Add past per capita EUF intensity	-2.12 (1.02)**	0.54 (0.59)	1.58 (0.64)**
(V) Data and sample issues			
- Fuzzy RDD	-2.10 (1.03)**	0.54 (0.58)	1.56 (0.66)**
- Remove the regions with the largest values of the forcing variable (top 25%)	-2.51 (1.23)**	0.77 (0.65)	1.74 (0.80)**
(VI) Placebo thresholds			
- Threshold moved 20 units to the left	-1.33 (4.26)	0.16 (1.54)	1.17 (2.91)
- Threshold moved 20 units to the right	-0.82 (1.11)	-0.21 (0.60)	1.03 (0.88)

Note: All specifications include control variables X. Education variables are not available for the four French overseas-departments.

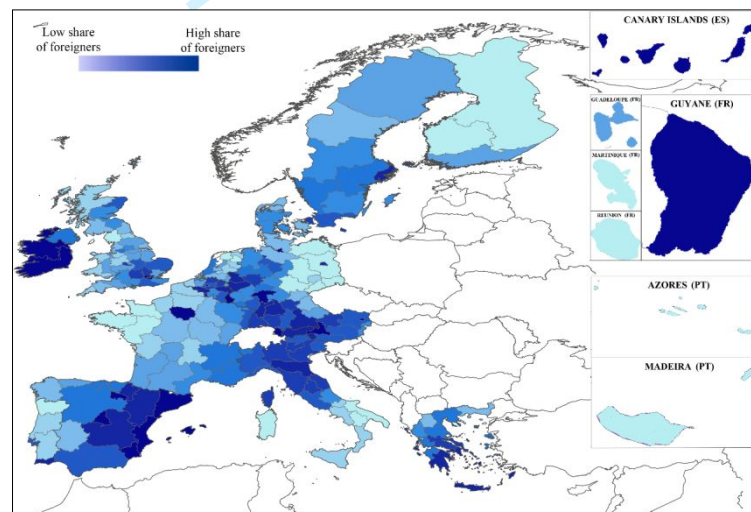
***p<0.01, **p<0.05, *p<0.1

Figure 1. Share of the population with a nationality different from that of the host country (NUTS-2 regions in the EU-15)

Panel A - Year 2001



Panel B - Year 2011



Panel C - Growth in the share of the foreigner population during the period 2001-2011

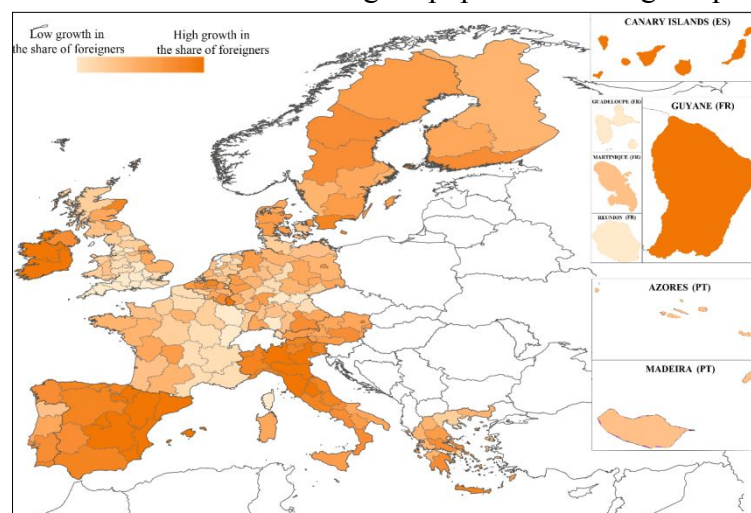
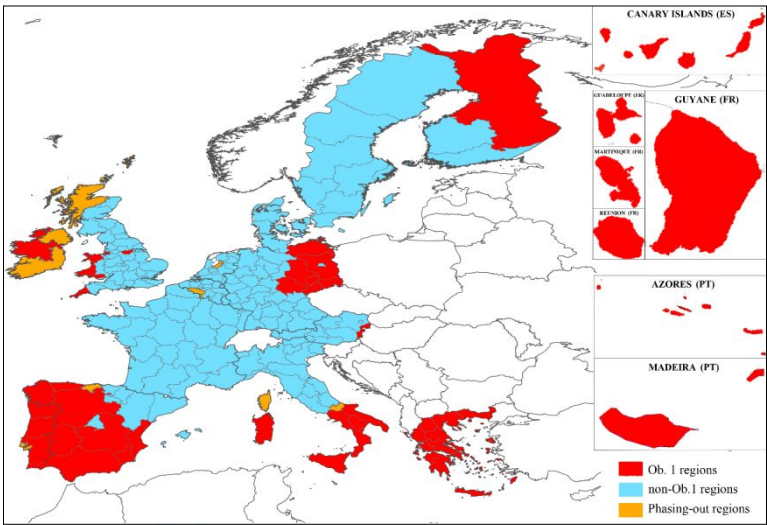
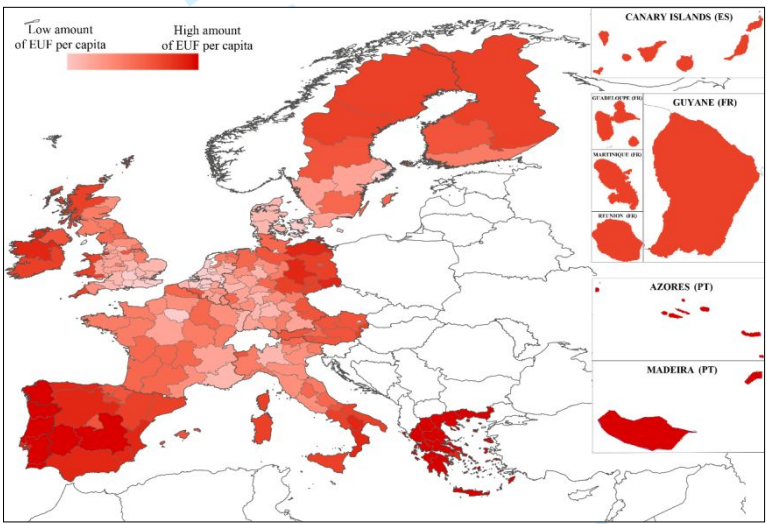


Figure 2. EUF per capita during the period 2001-2010 (NUTS-2 regions in the EU-15)

Panel A - EUF assignment status

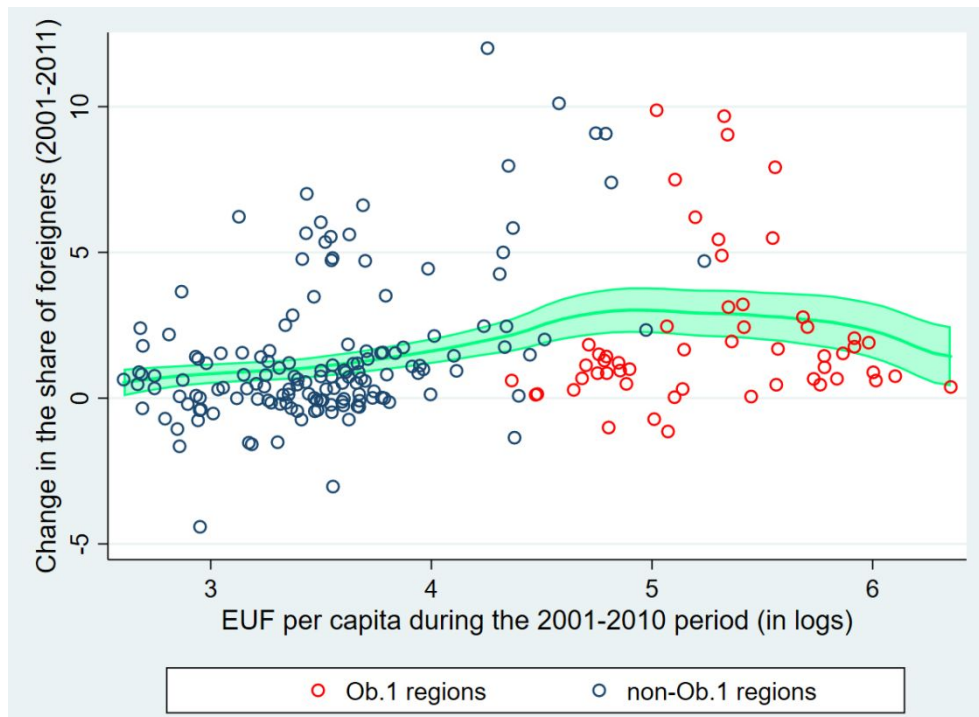


Panel B - EUF per capita during the period 2001-2010



Notes: A phasing-out system is granted to those regions which were eligible for Objective 1 funding in the previous programming period, but that had a per capita GDP higher than 75 percent of the EU average for the 2000-2006 programming period.

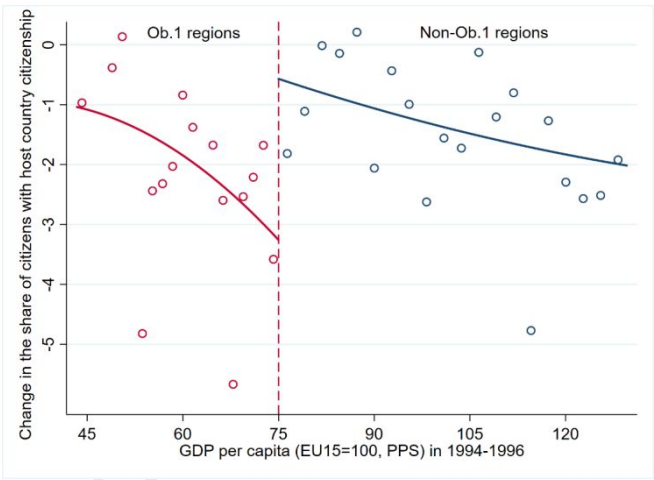
Figure 3. Relationship between EUF per capita during the 2001-2010 period and the percentage points change in the share of foreigners between 2001 and 2011



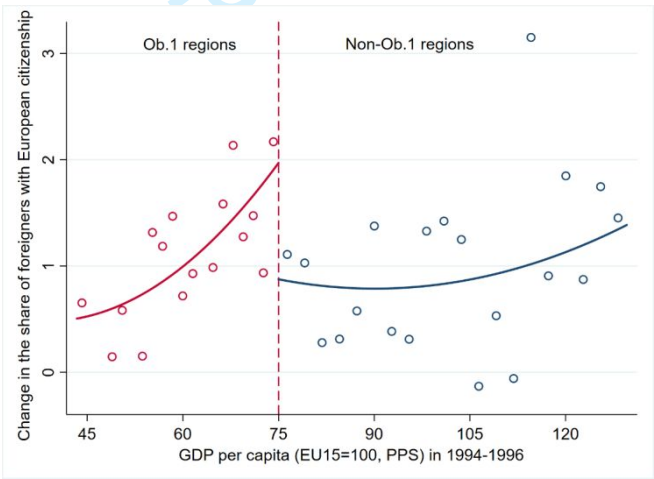
Notes: We used a local polynomial smooth curve and its 95% confidence interval (computed using Stata's command `lpolyci`).

Figure 4. Percentage points change in the share of citizens with host country citizenship, European citizenship, and non-European citizenship at the discontinuity between Ob.1 and non-Ob.1 regions in EU-15 during the 2001-2011 period.

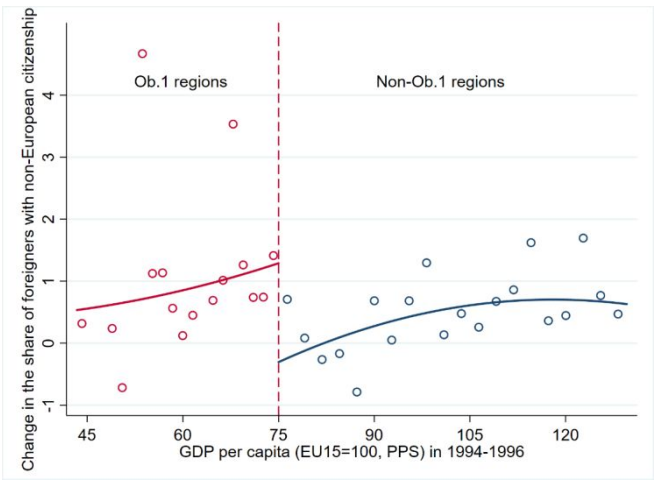
Panel A - Percentage points change in the share of citizens with host country citizenship



Panel B - Percentage points change in the share of foreigners with European citizenship (different from host country)

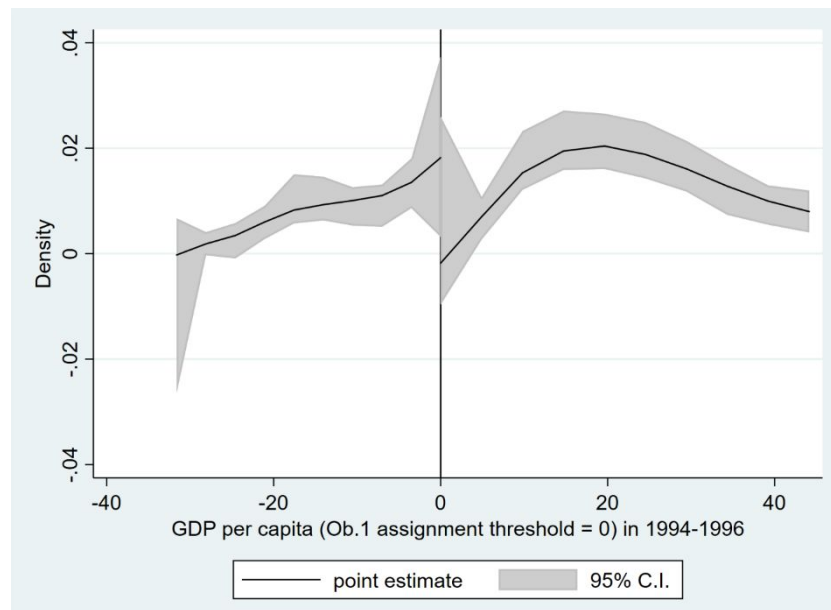


Panel C - Percentage points change in the share of foreigners with non-European citizenship



Notes: Histogram-style conditional mean with 20 bins by Ob. 1 status obtained using the Stata module “cmogram.ado.” Each figure superimposes the fit of a quadratic regression model (estimated separately on each side of the cut-off point).

Figure 5. Kernel density plot of the forcing variable.



Notes: The null hypothesis is that there is no discontinuity in the density of EU regions at the threshold. The p -value of the Cattaneo et al. (2020) density test is 0.3429.