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European Funds and the Brexit
Referendum**

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Money Can't Buy EU Love: European Funds and the Brexit Referendum*

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Abstract

We explore the role of the transfers that UK regions received from the European structural and cohesion funds, as well as other economic and social factors, in determining the support for the Remain vote in the Brexit referendum. We find that past Cohesion Policy transfers have played virtually no role in the referendum. Economically strong regions tend to be in favor of remaining in the EU. Somewhat surprisingly, the intensity of immigration from the EU is positively correlated with the Remain vote.

Keywords: European integration; Economic voting; Cohesion Policy; Brexit.

JEL Codes: D72, F02, F15.

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1 Introduction

On 23 June 2016, the United Kingdom held a referendum on continuing its European Union membership. Throughout the run up to the vote, the outcome was consistently predicted to be a close win for the Remain side. Yet, the actual outcome was a 52% support for Leave, putting the UK on the path towards becoming the first country ever to leave the EU.

The referendum campaign proved highly confrontational, with the emphasis of the debate focused on few contentious issues: the financial cost of the EU membership, the burden of EU rules and regulations, and the labor-market impact of the free mobility of labor. The regional dimension was also important: England and Wales voted for leaving the EU while Scotland, Northern Ireland and Gibraltar supported staying in the EU.

Yet, one aspect of the UK-EU financial relations has received little coverage: the contributions that the less affluent UK regions receive through the EU's Cohesion Policy (henceforth CP, also often referred to as structural and cohesion funds). The CP is the second largest spending category of the EU, accounting for around one-third of the EU's budget, after the Common Agricultural Policy (CAP, over 40% of the budget). The objective of CP is to facilitate economic development and convergence among the member states.¹ To this effect, the EU uses CP to fund projects that improve the basic infrastructure, foster adoption of new technologies, improve education and research, and support the labor market. Compared to the CAP, the CP-funded projects have the potential to benefit broad numbers of people, unlike the CAP, which benefits primarily agricultural workers (of which there are few, as agriculture accounts for under 2% of the EU output and around 5% of its employment) and farm owners (many of whom are already well-off).²

Importantly, the eligibility for CP payments is determined at the level of regions rather than the member states, and it is the regions that are the final beneficiaries of CP-funded projects.³ These features help ensure that even relatively rich countries which are net contributors to the EU budget, such as the UK, receive non-negligible CP payments.

The UK economy should particularly benefit from regional aid, given that it displays large regional disparities, as Table 1 illustrates.⁴ The UK is the fifth least equal EU country, and most unequal from among the old member states. Moreover, regional disparity in the UK has been getting worse during the last three years.

Although the UK is a rich member state and a net contributor to the EU budget, two of its regions (Cornwall and Isles of Scilly, and West Wales and The Valleys) fall short

¹While the evidence on whether the CP succeeds in achieving this objective is rather mixed, recent contributions such as Becker et al. (2010) and Fidrmuc et al. (2016a,b) tend to present a generally positive view.

²For instance, the European Commission claims that its programs in the UK during the 2007-13 period helped create 87 thousand new jobs and improved the employability and skills of 4 million young workers (see Cohesion Policy and the United Kingdom, European Commission, October 2014).

³The main criterion of eligibility is GDP per capita. The regions below 75% of the EU average output per person are denoted as less developed, those between 75 and 90% are classified as transition regions, and the rest are deemed to be more developed. More than half of the CP budget is earmarked for less developed regions. Nevertheless, even more developed regions receive funds.

⁴Table 1 reports the coefficient of variation (standard deviation of output per person divided by its mean) at the NUTS2 level for the latest three years for all those EU member countries with at least two NUTS2 regions.

of the 75% of the EU average GDP per person threshold and are therefore designated as less developed regions. Another eleven regions are classified as transition regions: Tees Valley and Durham, Cumbria, Lancashire, Merseyside, East Yorkshire and Northern Lincolnshire, South Yorkshire, Lincolnshire, Shropshire and Staffordshire, Devon, Highlands and Islands, and Northern Ireland. Correspondingly, the UK received €52 per person on average during the last programming period, 2007-13, and even higher amounts during the two preceding periods, 2000-06 and 1994-99, when its receipts were €131 and €136, respectively. Moreover, the regional differences in the amounts received are considerable: during the 2007-13 period, the per-person payments ranged from €1.2 in Surrey and East and West Sussex to €550 per person in Cornwall and Isles of Scilly. The range was even wider in the past, the lowest/highest amounts for the 1994-99 and 2000-06 programming periods were €0/562 and €34/1,484, respectively (see Figure 1).⁵ Hence, many regions of the UK have benefited substantially from CP, and were set to continue to benefit had the UK chosen to remain in the EU.

In this paper, we ask whether voters living in regions receiving CP payments showed higher support for remaining in the EU in the Brexit referendum. Specifically, we relate the percentage of voters in favor of remaining in the EU, at the NUTS2 level, to CP receipts per person during the last three programming periods.⁶ We focus on NUTS2 regions as this is the level at which eligibility for CP payments is determined.

Obviously, the CP is not the only factor that could have affected support for EU membership, and omitting the other relevant determinants of voting could bias the results. To account for some of the other factors that may have affected the Brexit vote, we also include the regions' GDP per capita, average hourly wage, employment rate, and the regions' exposure to immigration from the rest of the EU as a whole, and from the new member states specifically. Our results suggest that only the regions' economic performance is significantly related to the support for remaining in the EU: both GDP per capita and the average hourly wage are positively correlated with it. The CP transfers or exposure to immigration from the EU, in contrast, play little role.

This paper contributes to the growing literature on the benefits of European integration in general (Campos et al., 2014, 2015) and the Cohesion Policy in particular (Becker, Egger and Von Ehrlich, 2010; Dall'Erba and Le Gallo, 2008), benefits from disintegration (Alesina and Spolaore, 2003; Fidrmuc, 2015) and determinants of support for European integration (de Vreese and Boomgaarden, 2005; Doyle and Fidrmuc, 2006; and Tillman, 2012). To the best of our knowledge, only two other papers, Arnorsson and Zoega (2016) and Becker, Fetzer, and Novy (2016), analyze the patterns of voting in the Brexit referendum. Arnorsson and Zoega (2016) focus on the economic determinants of voting and attitudes and discuss also the response of the foreign-exchange markets to opinion polls in the run-up to the referendum and its immediate aftermath. Becker et al. (2016) find that voters' characteristics, such as their age and education, as well as the impact of fiscal austerity, were the dominant factors, whereas the campaigning that immediately preceded the vote has played little role. They also suggest that the regional patterns of voting in the Brexit referendum correlate closely with the results of the 2014 European

⁵The figures quoted above always pertain to the entire programming period rather than to individual years. The data used in this calculation are discussed in greater detail in the next section.

⁶NUTS (*Nomenclature des unités territoriales statistiques*) regions are geographical subdivisions of EU countries used for statistical reporting. There are four levels, from NUTS0 (member states) to NUTS3 (smallest subdivisions).

Parliament election, and especially the support for the UK Independence Party (UKIP) in that election.

After outlining the data used in the next section, we present the results of our analysis in section 3, and offer some concluding remarks in section 4.

2 Data and Methodology

We combine information from a number of diverse sources. First, we use the regional Brexit referendum results, published by the Electoral Commission.⁷ These report detailed results, including the number of eligible voters, turnout, and the number of votes cast in favor of remaining and leaving, for 382 electoral districts in the UK, including Gibraltar (we do not use the latter, as we lack economic data for it). Second, the CP allocations have been reported by the European Commission.⁸ The regional CP receipts are only reported for the whole programming periods (1994-99, 2000-06 and 2007-13) rather than for individual years. Because of this, we use the total CP payments per person for each period. The remaining economic data are sourced from the European Regional Database compiled by Cambridge Econometrics.⁹ We use the GDP per capita, average hourly wage, and the employment rate. Unlike with CP payments, these data are available annually: we use the figures for 2014, which is the latest years for which data are available. Finally, we observe migration from the UK Labor Force Survey (LFS) statistics. The Labor Force Survey is a quarterly nationally-representative survey, covering around 60 thousand households and 100 thousand respondents per quarter. It contains detailed information on the respondents' employment status and socio-economic characteristics, including their nationality.¹⁰ We use the information on nationality to compute the migrant share for each region and quarter. Since the main issue concerning migration has been the influx of migrants from the new member states that joined the EU in 2004, we define two migrant shares: (1) nationals of all EU/EEA member countries (which we denote as EE27)¹¹, and those from the ten new member states (EU10) that joined in 2004.¹² While there were relatively few EU10 nationals in the UK before 2010, it is estimated that there are now over 1 million EU10 workers in the UK, accounting for almost one-half of all EU workers.¹³ The scale of EU10 immigration has had a profound effect on the UK society, culture and politics (though not on the labor market, see Tunahand Fidrmuc, 2016, and Tunali, Campos and Fidrmuc, 2016). To account for the relative size of the immigration shock, we compute the relative change in the size of the migrant stock between 2013 and 2003 (the latter being the last pre-accession year), for both groups of migrants (EU27 and EU10).

⁷See <http://www.electoralcommission.org.uk/find-information-by-subject/elections-and-referendums/past-elections-and-referendums/eu-referendum/electorate-and-count-information>.

⁸See http://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/.

⁹See <http://www.camecon.com/SubNational/SubNationalEurope/RegionalDatabase.aspx>.

¹⁰See <https://discover.ukdataservice.ac.uk/series/?sn=2000026>.

¹¹Specifically, we include the 14 old member states (other than the UK), the 10 countries that joined in 2004, as well as Iceland, Norway and Switzerland. We do not include Bulgaria and Romania, which joined the EU in 2007, as these two countries faced transitional restriction on free movement of workers within the EU until 2014. For the same reason, we do not include Croatia (EU member since 2013, and currently still subject to transitional restrictions on labor mobility).

¹²The Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia.

¹³See "EU migration: Eastern European workers in UK pass one million," <http://www.bbc.co.uk/news/uk-37109747>.

The data we used are not all at the same level of aggregation: the electoral data cover 381 districts (not including Gibraltar), the European Regional Database features 37 NUTS2 regions (in their 2010 definitions), and the LFS provides information on 20 regions. We therefore aggregated the electoral districts up to the level of NUTS2 regions: we added up the numbers of valid votes and votes in favor of remaining and took their ratio to get the percentage of remain votes at the NUTS2 level. Since we could not disaggregate the larger regions used by the LFS, we assigned the migration change rates observed for LFS regions to all constituent NUTS2 regions.

Table 2 present the summary statistics for the variables used in the analysis (see also Figures 1-3). Note that the means are unweighted, which accounts for the slightly lower value of the average remain vote than the nation-wide figure of 48%. The CP payments are in euros; we report both the cumulative figure for the three latest programming periods as well as separate values for each period. GDP per capita and the average hourly wage are also in euros, which is the currency used in the original data source. Output per person, average wage and employment rate all display substantial regional variations, as do CP payments (as already discussed in the Introduction). Finally, the change in the stock of EU immigrants is particularly noteworthy: while the stock of migrants from the EEA as a whole has increased by some 70%, the immigration from the new member states has increased more than nine-fold during the ten years immediately following accession! Again, we see substantial regional variation, from modest increases in Inner (and also Outer) London, to a 34-fold increase in Northern Ireland.

The maps depicting regional distributions of the CP receipts, remain vote and immigration exposure in Figures 1-3 are especially interesting. The main beneficiaries of Cohesion Policy in the UK have been peripheral regions: Northern Ireland, parts of Scotland and Wales, and Cornwall. Of these, Northern Ireland and especially Scotland supported remaining in the EU, but Wales had a moderate majority for leaving and Cornwall was rather strongly in favor of Brexit. The immigration exposure, furthermore, seems little correlated with the remain vote: London and South-Eastern England have experienced a relatively modest increase in immigration while Northern Ireland has been especially strongly affected (in relative terms) – yet both of these regions show majorities in favor of remaining in the EU.

The voting model that we estimate takes the following form:

$$R_i = \beta_0 + \beta_1 CP_i + \beta_2 Y_i + \beta_3 W_i + \beta_4 E_i + \beta_5 M_i + \epsilon$$

where CP stands for cohesion policy receipts per capita (either cumulative over all three programming periods or for one period). Y , W and E are the GDP per capita, average hourly wage and employment rate in 2014. Finally, M is the ratio of migrant stock (from EU27 or EU10) in 2013 over the corresponding number in 2003. As the dependent variable is the share of votes per region (rather than an individual voting decision), we estimate all regressions using OLS (with heteroskeasticity-robust standard errors). Note that besides the full model described by the above equation, we also estimate more parsimonious versions of the model. Finally, taking the logs of GDP, average wage and CP payments makes very little difference to the results; the results with logs are not reported but are available upon request.

3 Results

The results are presented in Table 3 (univariate analysis) and Table 4 (multivariate analysis). In columns (1)-(4) of Table 2, we relate the remain vote to the per-capita CP payments received by the UK regions in the last three programming periods, as well as to their sum over all three periods. Only the receipts for the 1994-99 period are significant and positive. Hence, there is little evidence that regions that have benefited from Cohesion Policy funding tend to be more in favor of remaining in the EU. Recent receipts of CP funds, especially, seem to have had no bearing on the referendum outcome.

The insignificant effect of CP transfers stands in sharp contrast to the economic performance of regions reported in columns (5)-(7): both GDP per capita and the average hourly wage are strong predictors of the remain vote; the employment rate is also positive but insignificant. Finally, despite the strong prominence of immigration in pre-referendum debate, its relative impact – whether from the new member states (column 8) or from all of the EEA (column 9) – appears to have had no significant effect on the pro-EU vote.

The univariate regression results, however, can be misleading because the various factors considered can be correlated with each other, potentially leading to omitted variable. Therefore, in Table 4, we consider all explanatory variables together. We do not include GDP per capita and average wage in the same regressions, as these are closely correlated with each other and have similar effects. Likewise, we only include the CP receipts per programming period one at a time: regions that were eligible for CP transfers in one period are likely to remain eligible in the next period too.

In columns (1) to (3), we relate the remain vote to CP payments during the last, 2007-13, programming period. The effect of CP receipts on the remain vote is positive but at best marginally significant. Using CP receipts from earlier programming periods, or the cumulative value over 1994-13, makes little difference (see columns 4-6): none of these coefficients are significant.

As before, the low significance of the CP receipts stands in sharp contrast with the results for the economic variables: the coefficients for both GDP per capita and the hourly wage remain strongly significant and positive when included in regressions alongside the CP receipts. The employment rate is also positive but insignificant in most regression. Somewhat surprisingly, the relative change in immigration from the EU10 is significantly positively correlated with the remain vote: the regions that have experienced large relative inflows of EU10 migrants are more rather than less in favor of the UK remaining in the EU.

Often, it is possible to get a particular variable to have a significant coefficient by varying the covariates included alongside it. The last column of Table 4 demonstrates this: the cumulative CP transfers over the 1994-13 period do appear with a strongly significant and positive coefficient when include alongside only GDP per capita, without any other explanatory variables. Given the lack of significance in (almost) all of the other regression specifications, we do not assign much importance to this result.

In a further set of robustness tests, which are available upon request, we included a dummy for England and Wales, the two countries of the UK with an overall majority for leaving the EU. Not surprisingly, this dummy appears with a negative and strongly significant coefficient. English and Welsh thus show lower support for EU membership for reasons that cannot be explained by the economic variables, migration and CP receipts that we

include in our analysis. This support gap is large, between 13 and 19%. When including the England and Wales dummy, the CP receipts are never significant, and the relative change in EU10 immigration is either insignificant or, in some cases, appears with a significantly negative coefficient.

4 Conclusions

The EU Cohesion Policy has the potential to be a major tool for winning the hearts and minds of European citizens. Accounting for around one third of the EU budget (second largest share after the Common Agricultural Policy), its aim is to foster the well-being and facilitate convergence of less developed regions in the EU. To this effect, the CP finances infrastructure projects, supports research and education and creates employment in qualifying regions. In doing so, the EU acts as a modern Robin Hood, by collecting funds from the relatively rich regions to redistribute them to the relatively poor ones. By focusing on regions rather than countries, moreover, the EU ensures that virtually every member state benefits from this policy: even the net contributor countries, such as the UK, have regions that have received substantial transfers from Brussels. Unlike the Common Agricultural Policy, Cohesion Policy does not support inefficient producers or practices. These fact should help create constituencies in each country that benefit from, and support, European integration.

In this paper, we put this proposition to a test, using the regional distribution of pro-EU support in the recent Brexit referendum in the UK. Although the UK is a net contributor to the EU budget¹⁴, several of its regions have been on the receiving end of CP payments. In our analysis, however, we find little evidence that such regions display stronger pro-EU sentiment: the CP receipts, in per capita terms, are not correlated with the share of the vote to remain at the NUTS2 level (this is the level at which the CP payments are disbursed). Similarly, the exposure to immigration from the EU does not translate into lower remain vote. Instead, economic performance matters: both GDP per capita and the average hourly wage are strongly and positively correlated with the vote to remain. Arnorsson and Zoega (2016) and Becker et al. (2016) reach similar findings in their analysis of the economic determinants of Brexit.¹⁵

The support for EU membership, therefore, is highest in the regions that have done well economically in recent years. These benefited from globalization and the associated international flows of capital and labor. The regions with majorities of voters against the EU, in turn, are those that missed out on these benefits (see the discussion of economic insecurity as a driver of populism in Inglehard and Norris, 2016). The EU – and the UK government – can and should help such areas and this is indeed what the Cohesion Policy is designed to do, given its objectives. Moreover, there is evidence that this indeed works: the regions receiving transfers from Cohesion Policy indeed experience faster growth (Becker et al., 2010; Fidrmuc et al., 2016a,b). The fact that the regions receiving CP funds do not show greater support for EU membership than other regions suggests that the EU needs to

¹⁴The UK net contribution accounted for 0.25% of GDP during the 2007-13 programming period (see "EU expenditure and revenue 2007-2013". Europa. European Commission, http://ec.europa.eu/budget/figures/2007-2013/index_en.cfm). This puts the country in the ninth place in the EU, after Belgium, Germany, the Netherlands, Sweden, France, Luxembourg, and Italy.

¹⁵Neither paper considers the role of CP.

reconsider both how it spends its regional aid and how it communicates the fruits of its policies to the EU public. The lack of any impact of CP receipts on the voting in the Brexit referendum suggests that the EU may be underselling the benefits that member states derive from Cohesion Policy.

References

- [1] Alesina, A., Spolaore, E. (2003). *The Size of Nations*. MIT Press, Cambridge, MA.
- [2] Arnorsson, A., and G. Zoega (2016). “On the Causes of Brexit.” CESifo Working Paper No. 6056, CESifo, Munich.
- [3] Becker, S.O., Egger, P. H., and Von Ehrlich, M. (2010). “Going NUTS: The Effect of EU Structural Funds on Regional Performance.” *Journal of Public Economics* 94(9):578–590.
- [4] Becker, S.O., Fetzter, T. and Novy, D. (2016). “Who Voted for Brexit? A Comprehensive District-Level Analysis.” Centre for Competitive Advantage in the Global Economy, Department of Economics, Warwick University, WP 305.
- [5] Campos, N. F., Coricelli, F., and Moretti, L. (2014). “Economic Growth and Political Integration: Estimating the Benefits from Membership in the European Union Using the Synthetic Counterfactuals Method.” IZA DP No. 8162.
- [6] Campos, N. F., Coricelli, F., and Moretti, L. (2015). “Norwegian Rhapsody? The Political Economy Benefits of Regional Integration.” IZA DP No. 9098.
- [7] Dall’Erba, S. and Le Gallo, J. (2008). “Regional Convergence and the Impact of European Structural Funds over 1989–1999: A Spatial Econometric Analysis*.” *Papers in Regional Science* 87(2):219–244.
- [8] de Vreese, C.H. and Boomgaarden, H.G. (2005). “Projecting EU Referendums: Fear of Immigration and Support for European Integration.” *European Union Politics* 6(1), 59-82.
- [9] Doyle, O. and Fidrmuc, J. (2006). “Who Favors Enlargement? Determinants of Support for EU Membership in the Candidate Countries’ Referenda.” *European Journal of Political Economy* 22, 520-543.
- [10] Fidrmuc, J. (2015). “Political Economy of Transfer Unions.” *European Journal of Political Economy* 40:147-157.
- [11] Fidrmuc, J., Hulényi, M. and Rimegová, K. (2016a). “Regional Economic Growth in the EU: Economic Integration and Redistribution.” Institute for Strategy and Analysis (ISA), Government Office of the Slovak Republic, mimeo.
- [12] Fidrmuc, J., Hulényi, M. and Zajkowska, O. (2016b). “Environmental Protection, Cohesion Policy and Regional Economies in the EU.” Institute for Strategy and Analysis (ISA), Government Office of the Slovak Republic, mimeo.
- [13] Inglehard, R.F., and Norris, P. (2016). “Trump, Brexit, and the Rise of Populism: Economic Have-Nots and Cultural Backlash.” RWP16-026, John F. Kennedy School of Government, Harvard University.

- [14] Tillman, E.R. (2012). "Support for the euro, political knowledge, and voting behavior in the 2001 and 2005 UK general elections." *European Union Politics*, 13(3), 367-389.
- [15] Tunalı, Ç.B., and Fidrmuc, J. (2016). "Labor-market Effects of EU Immigration to the UK: Individual-level Analysis." Brunel University, mimeo.
- [16] Tunalı, Ç.B., Fidrmuc, J. and Campos, N. (2016). "Flocking Eastern Europeans: Causality Analysis of EU Immigration to the UK." Brunel University, mimeo.

Table 1 Regional Disparities in the EU

| | 2012 | 2013 | 2014 |
|----------------|-------|-------|-------|
| Croatia | 0.042 | 0.042 | 0.042 |
| Greece | 0.121 | 0.107 | 0.099 |
| Austria | 0.190 | 0.186 | 0.181 |
| Sweden | 0.203 | 0.210 | 0.205 |
| Spain | 0.205 | 0.204 | 0.205 |
| France | 0.207 | 0.208 | 0.207 |
| Denmark | 0.225 | 0.219 | 0.219 |
| Germany | 0.216 | 0.214 | 0.221 |
| Portugal | 0.235 | 0.231 | 0.230 |
| Hungary | 0.220 | 0.228 | 0.236 |
| Netherlands | 0.237 | 0.243 | 0.238 |
| Slovenia | 0.251 | 0.249 | 0.241 |
| Finland | 0.237 | 0.237 | 0.248 |
| Poland | 0.248 | 0.245 | 0.251 |
| Italy | 0.280 | 0.289 | 0.287 |
| Belgium | 0.330 | 0.327 | 0.323 |
| Ireland | 0.348 | 0.362 | 0.377 |
| United Kingdom | 0.433 | 0.431 | 0.414 |
| Bulgaria | 0.426 | 0.411 | 0.429 |
| Czech Republic | 0.439 | 0.444 | 0.447 |
| Romania | 0.547 | 0.555 | 0.559 |
| Slovakia | 0.672 | 0.682 | 0.685 |

Notes: Coefficient of variation (standard deviation of GDP per capita divided by its mean), for those countries that have 2 or more NUTS2 regions.

Table 2 Summary Statistics

| | Obs | Mean | St.dev. | Min | Max |
|----------------------------------|-----|--------|---------|--------|--------|
| Vote Remain [%] | 37 | 47.1 | 8.1 | 34.8 | 71.9 |
| CP Payments 07-13 [€] | 37 | 68.6 | 110.1 | 1.2 | 549.6 |
| CP Payments 00-06 [€] | 37 | 152.6 | 169.1 | 0.0 | 561.9 |
| CP Payments 94-99 [€] | 37 | 188.8 | 290.6 | 32.1 | 1484.3 |
| CP Payments 94-13 [€] | 37 | 410.0 | 444.5 | 33.8 | 1561.6 |
| GDP pc 2014 [€ 000s] | 37 | 31.098 | 12.870 | 21.059 | 96.799 |
| Avg hourly wage 2014 [€] | 37 | 20.16 | 7.35 | 8.50 | 52.72 |
| Employment rate 2014 [%] | 37 | 47.7 | 3.0 | 40.0 | 55.1 |
| EU10 migrant stock ratio 2013/03 | 37 | 9.3 | 6.1 | 1.7 | 34.2 |
| EU27 migrant stock ratio 2013/03 | 37 | 1.7 | 0.5 | 0.9 | 3.0 |

Notes: See text for sources of data. Average wage and GDP per capita are in 2005 €. Average wage is computed as workers' compensation divided by annual hours worked. Employment rate is the number of employed workers divided by the total population of the region.

Table 3 Regression Results: Univariate Analysis

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|----------------------------------|--------------------|--------------------|---------------------|--------------------|---------------------|---------------------|------------------|---------------------|--------------------|
| CP Payments 07-13 [€] | -0.001 (0.007) | | | | | | | | |
| CP Payments 00-06 [€] | | -0.001 (0.007) | | | | | | | |
| CP Payments 94-99 [€] | | | 0.008*** (0.002) | | | | | | |
| CP Payments 94-13 [€] | | | | 0.003 (0.002) | | | | | |
| GDP pc 2014 [€ 000s] | | | | | 0.407*** (0.038) | | | | |
| Avg hourly wage 2014 [€] | | | | | | 0.523*** (0.195) | | | |
| Employment rate 2014 [%] | | | | | | | 65.81 (33.69) | | |
| EU10 migrant stock ratio 2013/03 | | | | | | | | 0.335 (0.223) | |
| EU27 migrant stock ratio 2013/03 | | | | | | | | | 1.681 (3.741) |
| Constant | 47.20*** (1.58) | 47.25*** (1.88) | 45.53*** (1.58) | 45.74*** (1.87) | 34.45*** (1.96) | 36.56*** (3.93) | 15.72 (16.01) | 43.99*** (2.648) | 44.22*** (6.57) |
| R-sqrd | 0.0003 | 0.0004 | 0.089 | 0.033 | 0.417 | 0.224 | 0.061 | 0.064 | 0.011 |
| F-stat | 0.04 | 0.02 | 17.28*** | 1.92 | 116.91*** | 7.16*** | 3.82* | 2.26 | 0.20 |
| N | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 |

Notes: Estimated by OLS with heteroskedasticity-robust standard errors. Significance levels: *** 1%, ** 5% and * 10%.

Table 4 Regression Results: Multivariate Analysis

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|----------------------------------|----------|----------|----------|----------|----------|----------|-----------|
| CP Payments 07-13 [€] | 0.010* | 0.010 | 0.012* | | | | |
| | (0.005) | (0.006) | (0.007) | | | | |
| CP Payments 00-06 [€] | | | | 0.005 | | | |
| | | | | (0.008) | | | |
| CP Payments 94-99 [€] | | | | | -0.001 | | |
| | | | | | (0.005) | | |
| CP Payments 94-13 [€] | | | | | | 0.001 | 0.005*** |
| | | | | | | (0.003) | (0.002) |
| GDP pc 2012 [€ 000s] | 0.464*** | 0.460*** | | 0.462*** | 0.457*** | 0.451*** | 0.433*** |
| | (0.042) | (0.045) | | (0.040) | (0.045) | (0.039) | (0.042) |
| Avg hourly wage 2012 [€] | | | 0.619*** | | | | |
| | | | (0.193) | | | | |
| Employment rate 2012 [%] | 18.24 | 1.77 | 94.91*** | 20.15 | 8.73 | 11.53 | |
| | (21.23) | (27.65) | (24.43) | (27.95) | (22.22) | (24.55) | |
| EU10 migrant stock ratio 2013/03 | 0.532 | | 0.528*** | 0.488** | 0.566** | 0.495* | |
| | (0.163) | | (0.160) | (0.21) | (0.257) | (0.253) | |
| EU27 migrant stock ratio 2013/03 | | 3.80 | | | | | |
| | | (2.73) | | | | | |
| Constant | 18.36 | 24.71* | -16.38 | 17.84 | 23.57 | 22.46 | 31.527*** |
| | (10.42) | (13.54) | (12.92) | (13.53) | (10.81) | (11.60) | (2.261) |
| R-sqrd | 0.592 | 0.497 | 0.451 | 0.583 | 0.578 | 0.580 | 0.495 |
| F-stat | 34.71*** | 30.61*** | 9.24*** | 37.70*** | 40.46*** | 39.25*** | 52.65*** |
| N | 37 | 37 | 37 | 37 | 37 | 37 | 37 |

Notes: Estimated by OLS with heteroskedasticity-robust standard errors. Significance levels: *** 1%, ** 5% and * 10%.

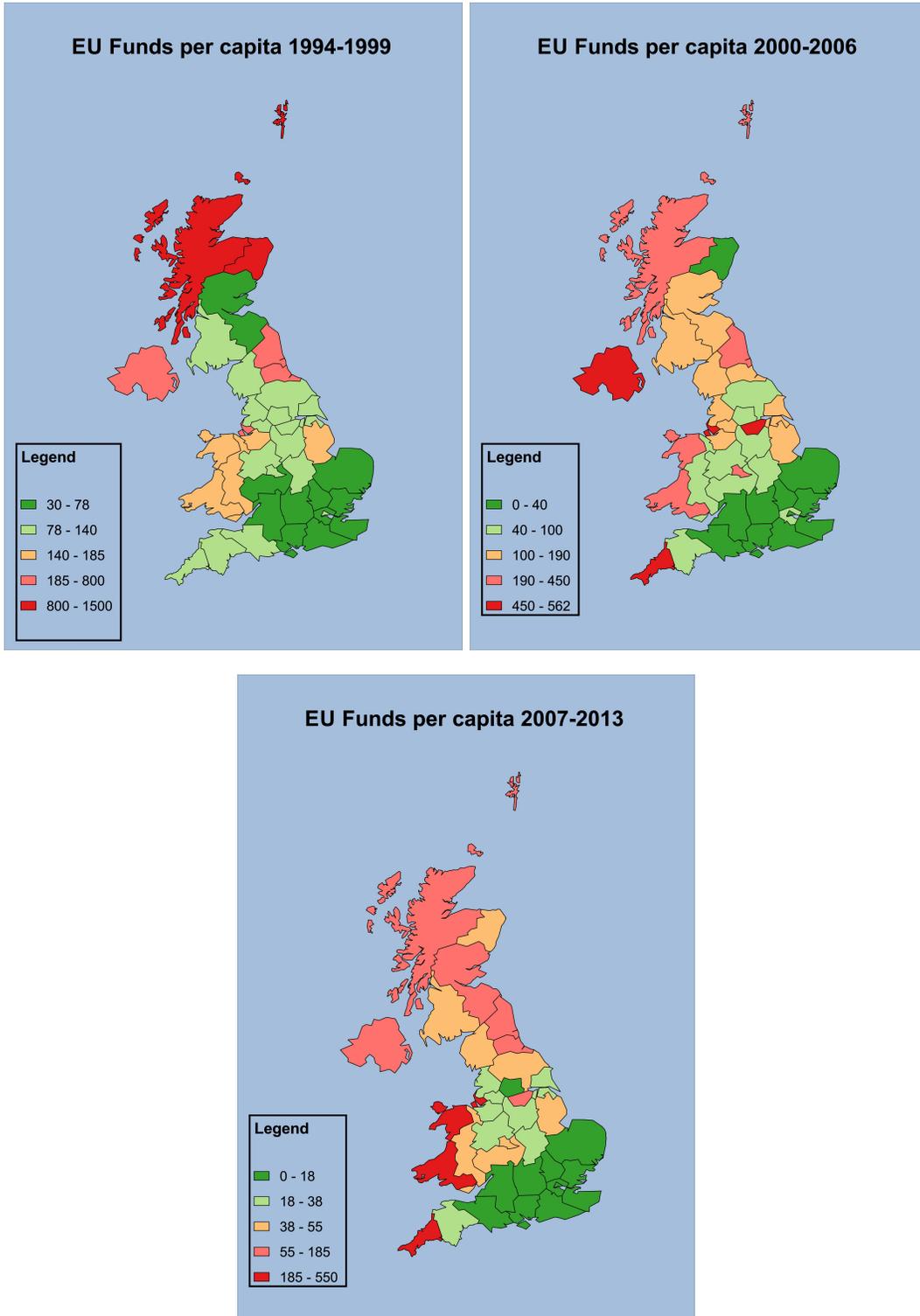


Figure 1: Cohesion Policy Payments.
 Sources: DG Regio, European Commission (EU Funds) and GISCO, Eurostat (shapefiles)

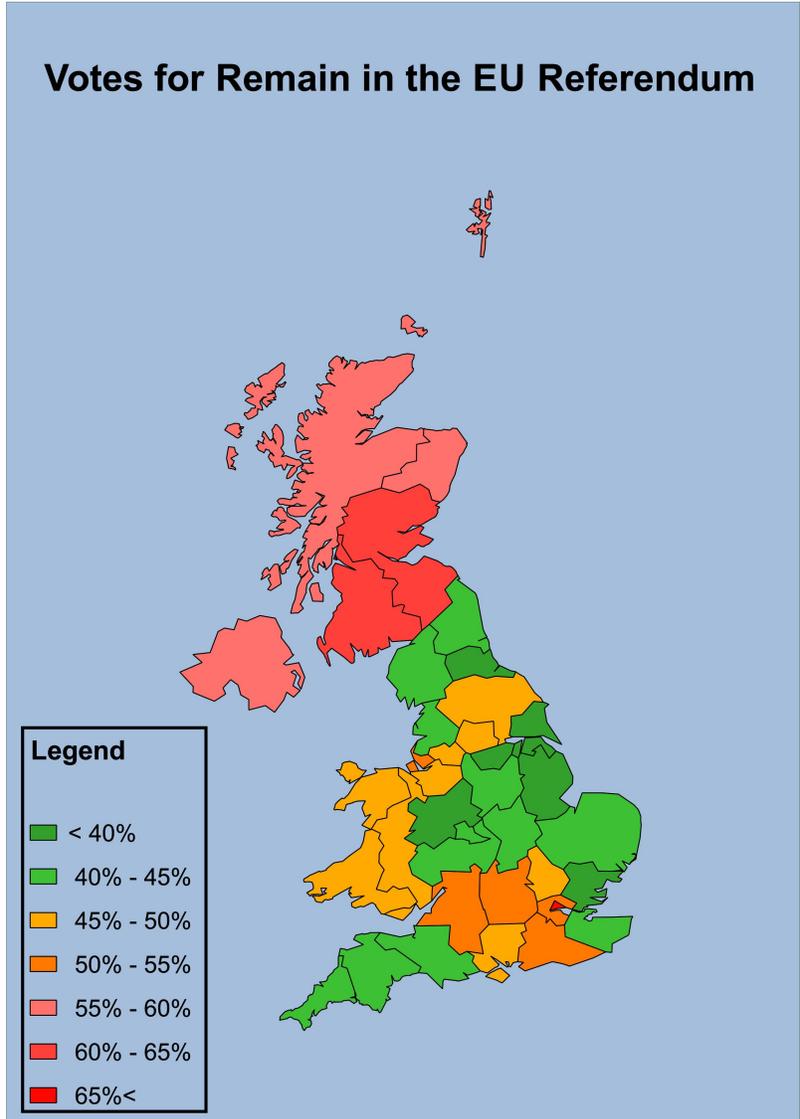


Figure 2: Remain Vote
Source: UK Electoral Commission (remain vote) and GISCO, Eurostat (shapefiles)

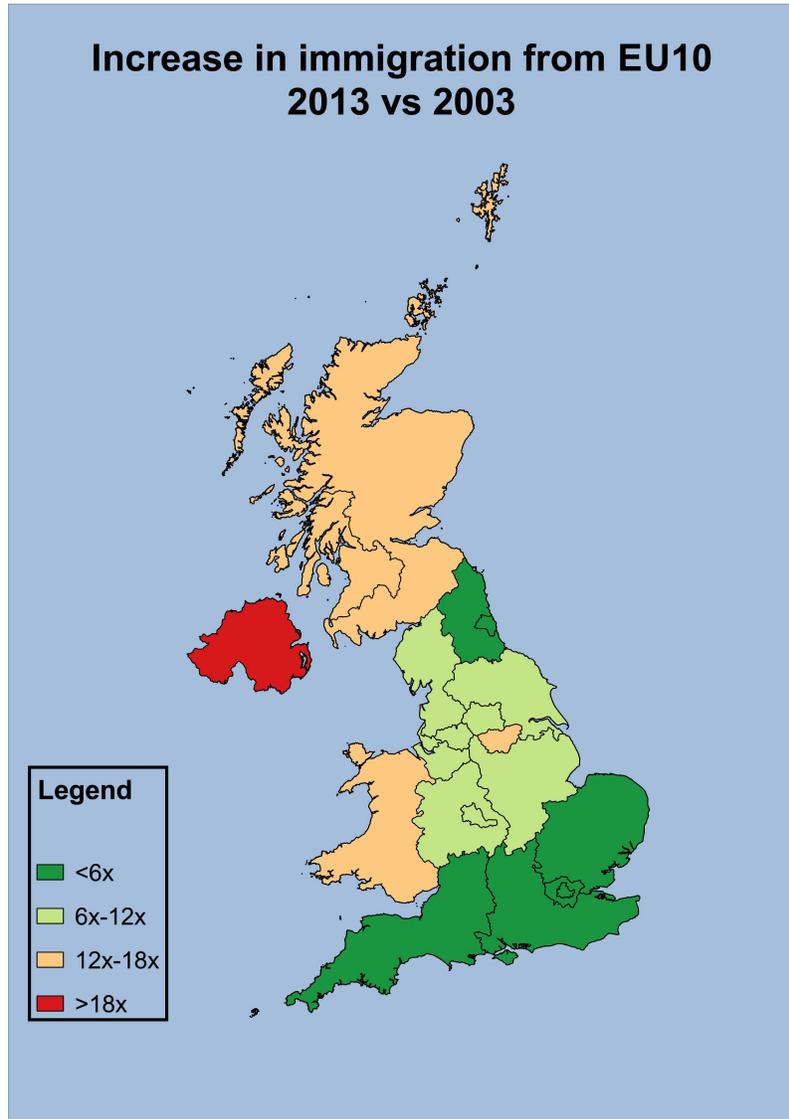


Figure 3: Exposure to Immigration
Source: UK Labour Force Survey, Office for National Statistics, and GISCO, Eurostat (shapefiles)