



Can money buy EU love? ☆

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ABSTRACT

We explore the role played by Cohesion Policy in the Brexit referendum and the subsequent 2017 general election. Although the UK has been a net contributor to the EU, some regions receive significant amounts of regional aid funds. We find that while Cohesion Policy is positively correlated with the remain vote, this relationship is weak. Most of the variation in the remain vote is explained by economic factors. In contrast, there is a robust negative correlation between Cohesion Policy and voter turnout. We estimate that had there not been this negative relationship, some 2 million more voters would have participated in the referendum, which is more than the winning margin between the remain and leave votes. Our analysis of the 2017 election suggests that Conservatives lost and Labour gained votes in the regions that benefited from Cohesion Policy, while remain-supporting regions showed gains for the Liberal Democrats.

1. Introduction

On 23rd June 2016, the United Kingdom held a referendum on continuing its European Union membership. Opinion polls taken before the vote suggested a close victory for the remain side. For example, the Financial Times reported 48% in favor of staying, 46% supporting leaving, and the remaining 6% undecided on the day of the referendum.¹ Eventually, the outcome was a 51.9% support for leaving the EU, making the UK the first country ever to express an intention to renounce its membership in the European Union. This unexpected outcome precipitated a sharp depreciation of the pound as well as resignation of the Prime Minister.

The outcome of the Brexit referendum as well as similar successes of populist parties and politicians elsewhere (the most notable example being the election of Donald Trump as US president in November 2016) have engendered a growing body of literature on the causes for the rise of populism in Western countries. Pastor and Veronesi (2018) argue that the growth in electoral support for

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¹ See Brexit poll tracker on <https://ig.ft.com/sites/brexit-polling/>, accessed March 2019.

populist ideas and politicians can be explained by resistance to globalization on the backdrop of rising inequality. Guiso et al. (2017), similarly, suggest that economic insecurity makes voters more receptive to populist ideas and at the same time encourages new populist parties to emerge and mainstream parties to adopt populist ideas. Stockemer (2016), however, observes that the electoral support for populist parties can be shaped by perceived rather than by actual issues encountered by voters, and that perceptions do not necessarily correspond to actual salience of issues. Specifically, he finds that support for far-right parties is driven by subjective views about immigrants, which in turn are uncorrelated with the actual number of immigrants. In other words, populism seems to thrive on perceived rather than actually experienced threats and injustices. This view resonates also with the arguments of Inglehart and Norris (2016) who posit that cultural backlash brought about by the decline of traditional values and their replacement by cosmopolitanism and multiculturalism explains the growing success of populism better than economic insecurity.

Several recent studies address directly the factors explaining the unexpected outcome of the Brexit referendum. Multiple common patterns have been identified. Becker et al. (2017), Arnorsson and Zoega (2018) and Alabrese et al. (2019) all point out that the support for leaving the EU rises with age and falls with education.² Older and/or low skilled voters have struggled economically in recent times (Autor et al., 2019). Correspondingly, Brexit proved popular in less well-off regions which were adversely affected by the decline of manufacturing in the UK in recent decades.³ Eichengreen et al. (2018), furthermore, argue that economic fundamentals fail to explain fully the unexpectedly high support for leaving the EU in the referendum. They document large and volatile swings in voters' sentiment in the run-up to the referendum. These swings affected all voter cohorts and were therefore crucial for the eventual triumph of the Leave side. They predict that similar swings in sentiment will be critical also for the future relationship between the UK and the European Union.

Several contributors make the rather surprising observation that the support for remaining in the EU bears little relation to the potential benefits from maintaining close economic ties with Europe. On the one hand, Becker et al. (2017) find that the extent of immigration from the EU and strength of trade ties with the EU have had a significant impact on the voting in the Brexit referendum. However, they conclude that these variables have little additional explanatory power once voters' characteristics are controlled for. Furthermore, receipts of subsidies from the EU do not appear significant in their analysis. Los et al. (2017) go even further by positing that the regions that supported leaving in fact have more to lose by cutting trade ties with Europe than the remain-supporting regions. Similarly, Chen et al. (2018) observe that the UK will be hurt more by the economic consequences of Brexit than any other country in the EU with the exception of Ireland.⁴

The limited role of the potential benefits derived from closer economic ties with the EU was also mirrored in the salience of the main issues in the pre-referendum campaign. The Leave side focused on three main areas.⁵ First, the EU was presented as infringing on the sovereignty of the UK and its democratic institutions and undermining the British national identity. This was reflected in the slogan 'Take back control' adopted by Leave EU, the main campaign group supporting ending the UK's EU membership. Second, the EU membership was presented as costly (with this cost being estimated, and widely publicized, as £350 million per week) and this expense was presented as inefficient (with the proposed alternative being increased funding for the UK National Health Service). Finally, the scale of immigration from the EU to the UK was seen as 'out of control' and damaging for the British labor market, with the Leave campaign liberally conflating free mobility of labor within the EU Single Market with refugee flows from Syria and other non-EU countries. The economic benefits from closer integration with the EU, including gains that less-developed parts of the UK enjoy because of the EU regional aid, received limited attention.⁶ Likewise, there was virtually no discussion as to if and how the missing regional-aid funds would be made up for by the UK government in case of Brexit.

Less than a year after the referendum, Prime Minister Theresa May called a surprise general election, which took place on 8th June 2017. The election was justified by the Prime Minister by the need to strengthen her hand in negotiations on Brexit.⁷ Correspondingly, Brexit was one of the key issues over which the main parties tried to differentiate their positions. The Prime Minister promised to secure a negotiated exit agreement with the EU that would respect several of her 'red lines': no membership in the Single Market or the Customs Union in order to allow the UK to enter into trade agreements with third countries, end to the free movement of labor, and end to (most of) UK's contributions to the EU budget. The Labour Party held an intermediate position, promising that its government would respect the referendum result, while negotiating a new close relationship with the EU, with the customs union explicitly accepted as an option. The Liberal Democrats, finally, supported reversing Brexit and argued that any final

² Eichengreen et al. (2018) observes that the higher opposition to EU membership among older voters is explained by their lower educational attainments.

³ Similarly, Fetzter (2018) argues that the referendum would have resulted in a majority vote in favor of remaining had the UK not implemented costly austerity measures in the wake of the Global Financial Crisis.

⁴ See also Dhingra et al. (2017), Sampson (2017) and Dhingra et al. (2018) who assess the impact of leaving the EU on UK's trade, investment and welfare. They conclude that Brexit will make the UK worse off under every scenario considered. The size of the expected welfare loss depends on the nature of Brexit, with the worst outcome expected in case of a hard Brexit (WTO rules). The losses will be incurred by households along the entire income distribution: rather than giving rise to winners and losers, Brexit is anticipated to engender only losers.

⁵ The Leave and Remain campaigns were only partially aligned with political parties. Only one party with nation-wide presence, the UK Independence Party, adopted a clearly pro-Brexit stance. The Conservative Party assumed a neutral position. Some of its prominent members, including the Party Leader and Prime Minister at the time, David Cameron, and his successor, Theresa May, advocated remaining in the EU. Others campaigned actively for leaving. The Labour Party supported staying in the EU, although its leader, Jeremy Corbyn, was generally seen as lukewarm towards the UK's EU membership. The Liberal Democrats and Greens were strongly in favor of remaining. Among the regional parties, the Scottish National Party in Scotland, and Sinn Féin and Ulster Unionist Party in Northern Ireland supported the Remain side, while the Democratic Unionist Party (Northern Ireland) favored leaving.

⁶ One of the few exceptions was "Mapped: Where in the UK receives most EU funding and how does this compare with the rest of Europe?", The Telegraph, 1 June 2016, <https://www.telegraph.co.uk/news/2016/06/01/mapped-where-in-the-uk-receives-most-eu-funding-and-how-does-thi/>, accessed August 2018.

⁷ See, for example, "Theresa May calls for general election to secure Brexit mandate," The Guardian, 19 April 2017, <https://www.theguardian.com/politics/2017/apr/18/theresa-may-calls-for-general-election-in-bid-to-secure-brexit-mandate>, accessed August 2018.

Table 1
Summary statistics: NUTS 2.

	Obs	Mean	St.dev.	Min	Max
Vote Remain [%]	37	0.471	0.081	0.348	0.719
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 [€]	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	0.477	0.030	0.400	0.551
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.

agreement negotiated with the EU should have to be endorsed by the voters in a second referendum. Contrary to expectations, the Conservatives lost their majority and had to form a minority government. The main beneficiary of the election was the Labour Party, with the Liberal Democrats also recording modest gains.

In this paper, we revisit the role played by one aspect of the UK's economic ties with the EU: the financial gains that accrue to some UK regions due to transfers under the EU's Cohesion Policy. Although the UK is a net contributor to the EU budget, some of its regions have received considerable sums of regional aid from the EU Cohesion Policy. In the 2014–20 EU budget, the UK was set to receive some € 11 billion in Cohesion Policy payments.⁸ Out of these funds, one quarter has been set aside for the two less developed regions (Cornwall and the Isles of Scilly, and West Wales and the Valleys), with another quarter going to the eleven transition regions (Cumbria, Devon, East Yorkshire and Northern Lincolnshire, Highlands and Islands, Lancashire, Lincolnshire, Merseyside, Northern Ireland, Shropshire and Staffordshire, South Yorkshire, and Tees Valley and Durham).⁹ The remaining half of Cohesion Policy funds is to be shared by the other 27 regions (all of which are classified as developed). There are thus significant regional differences in how much the residents of UK regions benefit from regional aid funds (see also the discussion in the next section, and the per-capita figures in Table 1 and Fig. 1).

We carry out our analysis of the electoral impact of Cohesion Policy both in the context of the 2016 Brexit referendum and the 2017 General Election. We also look at the correlation between the regional pattern of voting in the Brexit referendum and the results of the 2017 General Election: this part is intended to show which parties benefited the most from pro-EU sentiment. We look at the actual vote shares in the two votes at the level of NUTS 2 and NUTS 3 regions: the former is the level at which eligibility for Cohesion Policy is determined, while the latter is closer to the level at which the funds are actually spent.

We introduce the data used in our analysis and explain our methodology in the next section. Thereafter, we present our results in section 3, and offer some concluding remarks in section 4.

2. Data and methodology

We combine information from a number of sources. The results of the 2016 Brexit referendum and the 2017 General Election were published by the Electoral Commission.¹⁰ The referendum results are available for 382 electoral districts of the UK (including Gibraltar, which we do not use as we lack economic data for it). The election results are reported for 650 parliamentary constituencies. We consider only the major parties that fielded candidates across the whole of the United Kingdom. Regional parties, most notably the Scottish National Party (running only in Scotland), Plaid Cymru (Wales), and Democratic Unionist Party and Sinn Féin (both Northern Ireland), participated only in a limited number of regions. We therefore do not consider them in our analysis.

The Cohesion Policy payments are reported by the European Commission at both NUTS 2 and NUTS 3 levels.¹¹ The regional Cohesion Policy figures were originally only reported for the whole programming periods (1994–99, 2000–06 and 2007–13) rather than for individual years. Subsequently, the data were also made available in annual frequency. Since we are interested in the effect of receipts from Cohesion Policy over longer periods rather than in the impact of short-term fluctuations, we use the programming-period totals. To ensure comparability of the Cohesion Policy figures across regions, we express them as receipts per person for each programming period.

The economic data are sourced from the European Regional Database compiled by Cambridge Econometrics.¹² We use the GDP per capita, average hourly wage, and the employment rate. Unlike with Cohesion Policy payments, these data are available annually:

⁸ See http://ec.europa.eu/regional_policy/en/atlas/united-kingdom/, accessed August 2018.

⁹ Less developed regions are those with GDP per capita below 75% of the EU average, while transition regions fall between 75% and 90% of the EU average.

¹⁰ See <https://www.electoralcommission.org.uk/our-work/our-research/electoral-data/>.

¹¹ See http://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/.

¹² See <http://www.camecon.com/SubNational/SubNationalEurope/RegionalDatabase.aspx>.

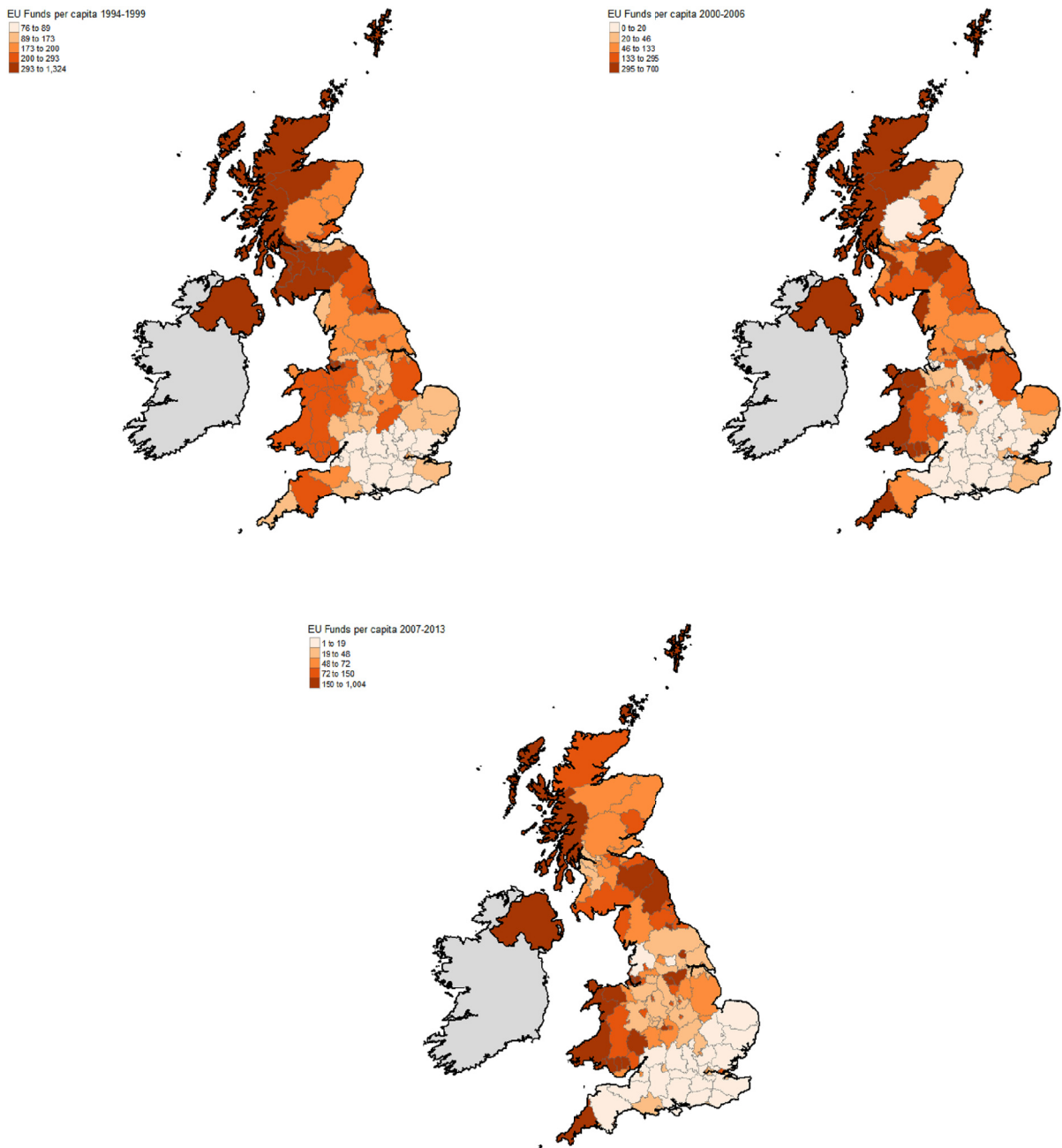


Fig. 1. Cohesion policy payments.

Sources: DG Regio, European commission (EU funds) and GISCO, Eurostat (shapefiles).

we use the figures for 2014, which is the latest year for which data are available.

We measure immigration using information from the UK Labor Force Survey (LFS). The LFS is a quarterly nationally-representative survey, covering around 60 thousand households and 100 thousand respondents per quarter. It contains detailed information on the respondents' characteristics, including their nationality.¹³ We use this information to compute the migrant shares 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 with free movement of

¹³ See <https://discover.ukdataservice.ac.uk/series/?sn=2000026>.

Table 2
Summary statistics: NUTS 3.

	Obs	Mean	St.dev.	Min	Max
Vote Remain	129	0.479	0.096	0.277	0.744
Turnout	129	0.718	0.046	0.563	0.793
CP Payments 07–13 [€]	129	129.0	195.5	1.5	1,003.6
GDP pc 2014 [€]	129	29,773	16,123	16,285	185,300
Employment rate 2014 [%]	129	0.471	0.042	0.359	0.613
Conservatives	129	0.401	0.141	0.005	0.609
Labour	129	0.397	0.159	0	0.820
Liberal Democrats	129	0.074	0.081	0	0.486
UKIP	129	0.019	0.018	0	0.136

Notes: See text for sources of data. GDP per capita is in 2005 €. Employment rate is the number of employed workers divided by the total population of the region.

labor privileges (which we denote as EU27),¹⁴ and those from the ten new member states (EU10) that joined in 2004.¹⁵ While there were relatively few EU10 nationals in the UK before 2004, it is estimated that there are now over 1 million EU10 workers in the UK, accounting for almost one-half of all EU workers.¹⁶ To account for the relative size of the immigration shock, we compute the ratio of the size of the migrant stock in 2013 and the corresponding stock in 2003 (the latter being the last pre-accession year) for both groups of migrants (EU27 and EU10).

The data are not all recorded at the same level of aggregation: the electoral data cover 381 districts (not including Gibraltar) for the referendum and 650 constituencies for the election, the European Regional Database features 37 NUTS 2 and 129 NUTS 3 regions (in their 2010 definitions), and the LFS provides information on 20 regions. We therefore aggregated the electoral districts and parliamentary constituencies up to the level of NUTS 2 or NUTS 3 regions: we added up the number of votes in favor of remaining in the EU across the region and divided this figure by the total valid votes in each region. Finally, we assigned the migration ratios observed for the LFS regions to all constituent NUTS 2 regions.¹⁷

Tables 1 and 2 present the summary statistics at the NUTS 2 and NUTS 3 levels, respectively (see also Figs. 1–5 for graphical representation). Note that the means are unweighted, which accounts for the slightly lower values of the average remain vote than the nation-wide figure of 48.1%.¹⁸ The Cohesion Policy payments are in euros; we report separate values for the three latest programming periods as well as the cumulative figure for all three periods together. 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 Cohesion Policy payments.

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 London, to a 34-fold increase in Northern Ireland.

As the referendum took place in 2016, projects financed from the current budget (2014–20) are unlikely to have had much effect on the voters. Therefore, we consider the last completed budget, 2007–13, as well as the preceding two periods, 2000–06 and 1994–99. 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 per-person 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 Fig. 1). The variation in Cohesion Policy is much greater when we look at the NUTS 3 level: the top NUTS 3 recipient enjoyed a transfer of €1,004 during the 2007–13 programming period (Gwynedd in Wales). Hence, many regions of the UK have benefited from Cohesion Policy, some substantially so, and were set to continue to benefit had the UK chosen to remain in the EU.

The voting model that we estimate at the NUTS 2 level takes the following form:

$$R_i = \beta_0 + \beta_1 \ln P_i + \beta_2 \ln Y_i + \beta_3 E_i + \beta_4 M_i + \epsilon_i$$

¹⁴ Specifically, we include the national of 14 old member states (other than the UK), the 10 countries that joined in 2004 (see next footnote), 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). In total, therefore, this group counts 27 countries.

¹⁵ The Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia.

¹⁶ See “EU migration: Eastern European workers in UK pass one million,” <http://www.bbc.co.uk/news/uk-37109747>, accessed August 2018.

¹⁷ We do not use migration at the NUTS 3 level because the LFS regions are much larger than NUTS 3 regions. Assigning the average values prevailing in each LFS region to its constituent regions would be much more imprecise at the NUTS 3 level than at the higher NUTS 2 level: recall that we use information on 20 LFS regions, 37 NUTS 2 regions and 129 NUTS 3 regions. Other data sources on immigration to the UK, such as the statistics on newly issued national insurance numbers or the International Passenger Survey only measure the gross inflow of immigrants but not the net inflow or their stock.

¹⁸ In addition, the mean reported in Tables 1 and 2 does not include the votes cast in Gibraltar, where an overwhelming majority of voters supported remaining in the EU.

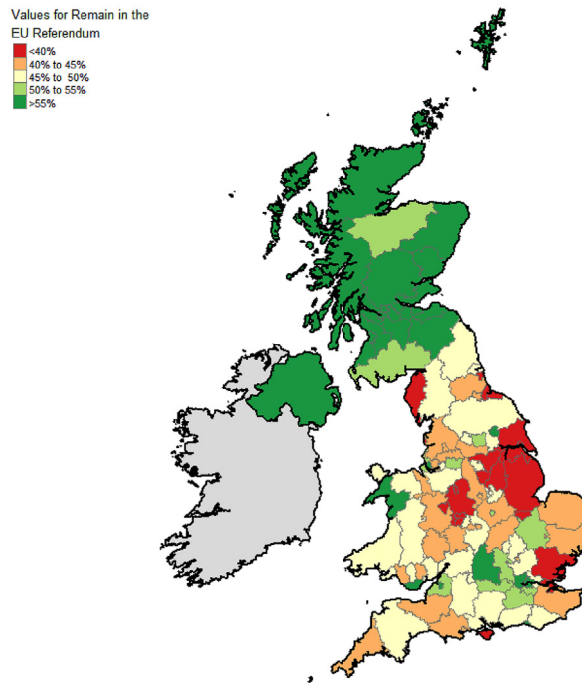


Fig. 2. Remain Vote.

Source: UK Electoral Commission (remain vote) and GISCO, Eurostat (shapefiles).

where R_i is the share of votes in favor of remaining in the EU in region i , P_i stands for Cohesion Policy payments per capita, Y_i is the GDP per capita (which we replace with the average hourly wage, W_i , in some specifications), E_i is the employment rate in 2014, and M_i is the ratio of migrant stock (from EU27 or EU10) in 2013 over their stock in 2003.¹⁹ As the dependent variable is the share of votes in each region (rather than an individual voting decision), we estimate all regressions using OLS (with heteroskedasticity-robust standard errors). Besides the full model described by the above equation, we also estimate more parsimonious models which omit some of the explanatory variables.

The NUTS 3-level model is analogous, but we omit immigration:

$$R_i = \beta_0 + \beta_1 \ln P_i + \beta_2 \ln Y_i + \beta_3 E_i + \epsilon_i.$$

We estimate two types of voting models for the general election, static and dynamic. Both are estimated with NUTS 3 data. The former is similar to the regression for the referendum:

$$V_{ij} = \gamma_0 + \gamma_1 \ln P_i + \gamma_2 \ln Y_i + \gamma_3 E_i + \epsilon_i$$

where V_{ij} is the share of votes for party j in region i . The dynamic model adds the regional share of the remain vote as a measure of the previous year's preference in the referendum:

$$V_{ij} = \gamma_0 + \gamma_1 \ln P_i + \gamma_2 \ln Y_i + \gamma_3 E_i + \gamma_4 R_i + \epsilon_i.$$

In this last voting model, we are interested to see both how the estimated coefficient for Cohesion Policy payments, γ_1 changes when we control for the referendum vote to remain in the EU, and also in the effect of the referendum remain vote, γ_4 , on votes for the main parties. The former should capture the effect of Cohesion Policy on support for the main parties, while the latter should reflect any swings in voting in remain-supporting regions.

3. Results

The results obtained at the NUTS 2 level are presented in [Tables 3 and 4](#). We start with a bivariate analysis, in [Table 3](#), relating the share of voters supporting remaining in the EU to one explanatory variable at a time. This reveals the nature and strength of the correlation between the remain vote and the various explanatory variables, but may be plagued by omitted variable bias if the determinants of voting are correlated with each other.

¹⁹ The nominal variables (GDP per capita, average hourly wage, and the Cohesion Policy transfers per person) are all in logs; the shares (vote shares and employment share) are expressed as ratios. Since some regions report zero receipts from Cohesion Policy, we add €0.000000001 to each amount.

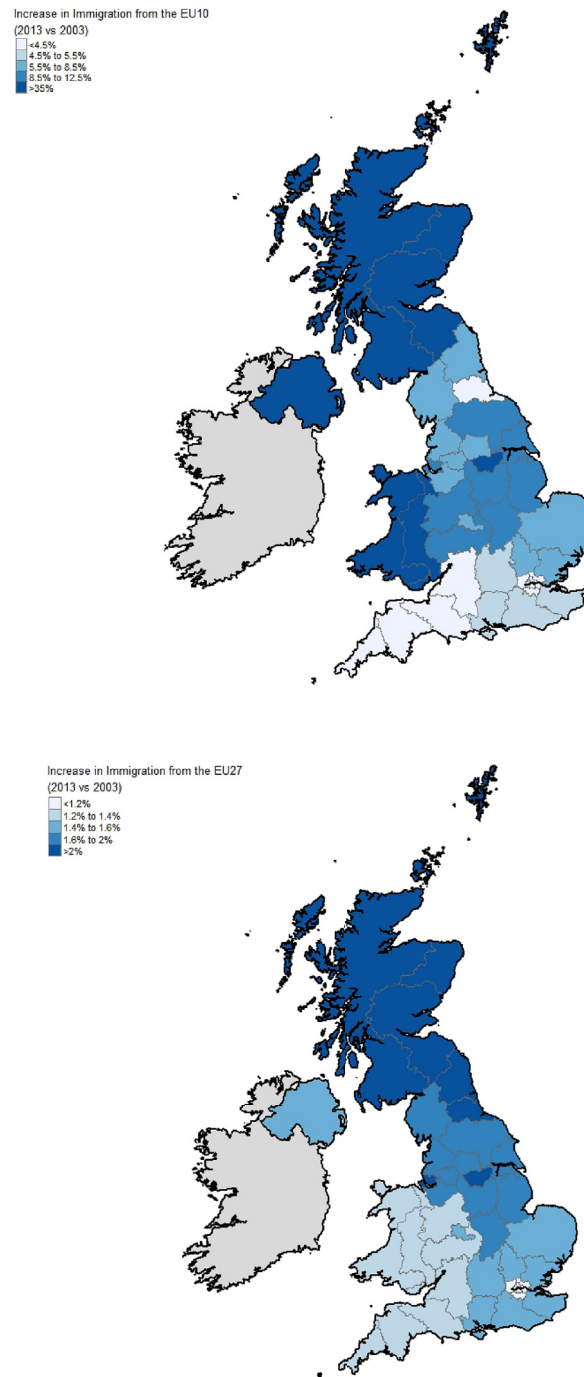


Fig. 3. Relative change in stock of immigrants: 2003 to 2013, EU10 and EU27
Source: UK Labour Force Survey, Office for National Statistics, and GISCO, Eurostat (shapefiles).

In columns (1–4) of [Table 3](#), we relate the remain vote to the Cohesion Policy payments received by the UK regions in the last three programming periods, as well as to their sum over all three periods. None of the estimated coefficients is significant, and the quality of statistical fit represented by these four regressions is very poor, as reflected in the very low values of the R-squared and the F-statistics. Hence, there is little evidence that NUTS 2 regions that have benefited from Cohesion Policy funding tend to be more in favor of remaining in the EU.

The insignificant effect of Cohesion Policy transfers stands in sharp contrast to the effects of economic variables reported in

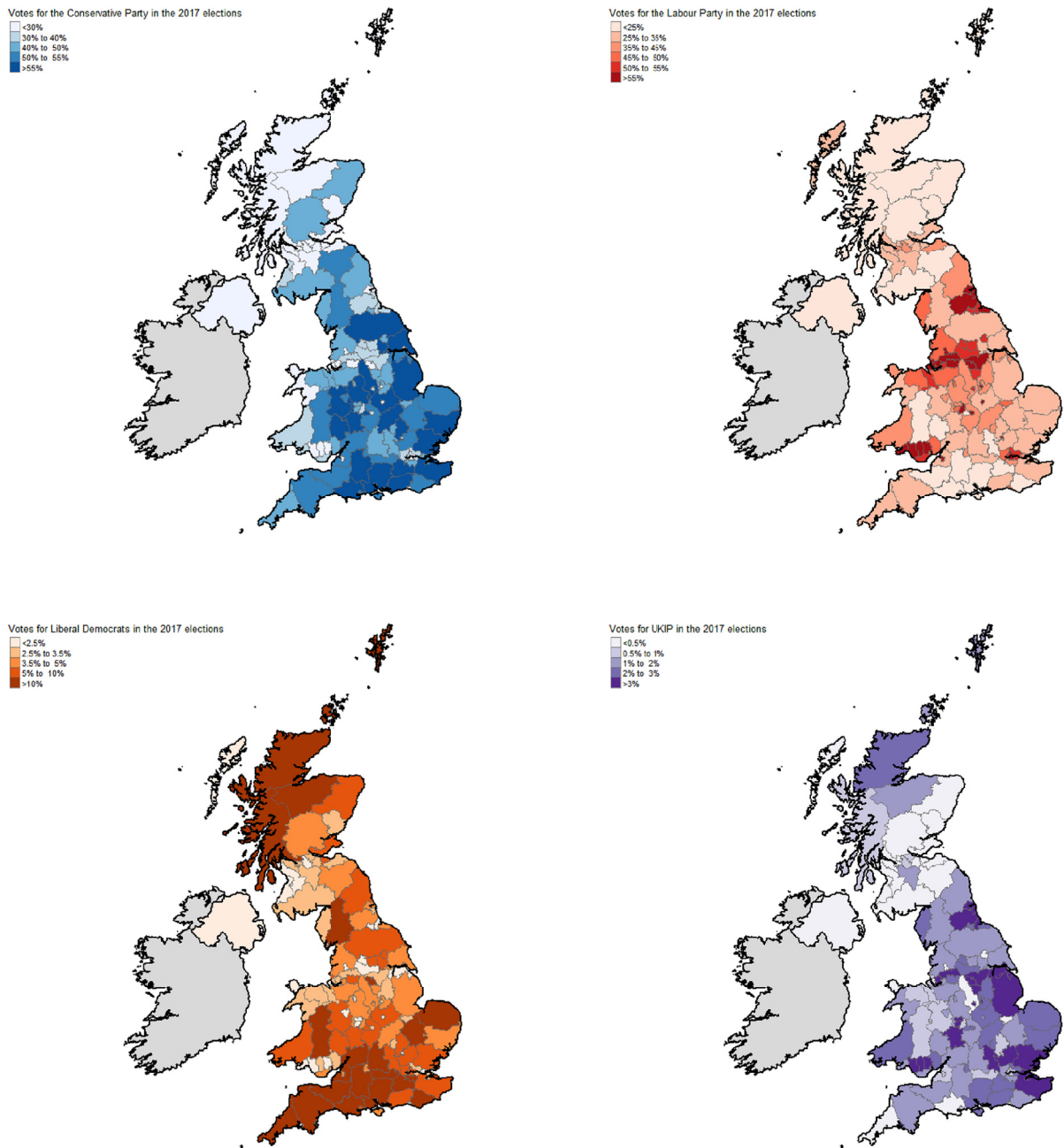


Fig. 4. 2017 General Election Results.

Sources: Electoral Commission (election results) and GISCO, Eurostat (shapefiles).

columns (5)–(7): GDP per capita, average hourly wage and employment rate are all positively correlated with the remain vote. The coefficient for GDP per capita is strongly significant and this variable alone explains 43% of the variation in the support for remaining in the EU. The remaining two variables, while also positive, are only marginally significant. Finally, despite the strong prominence of immigration in pre-referendum debate, its impact on the pro-EU vote appears negligible, regardless of whether we consider immigration from the new member states (column 8) or from all of the EEA (column 9).

The bivariate regression results, however, can be misleading because the various determinants can be correlated with each other, potentially leading to omitted-variable bias. Therefore, in Table 4, we consider the various explanatory variables together (except 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). We only consider the Cohesion Policy receipts in the most recent programming period.

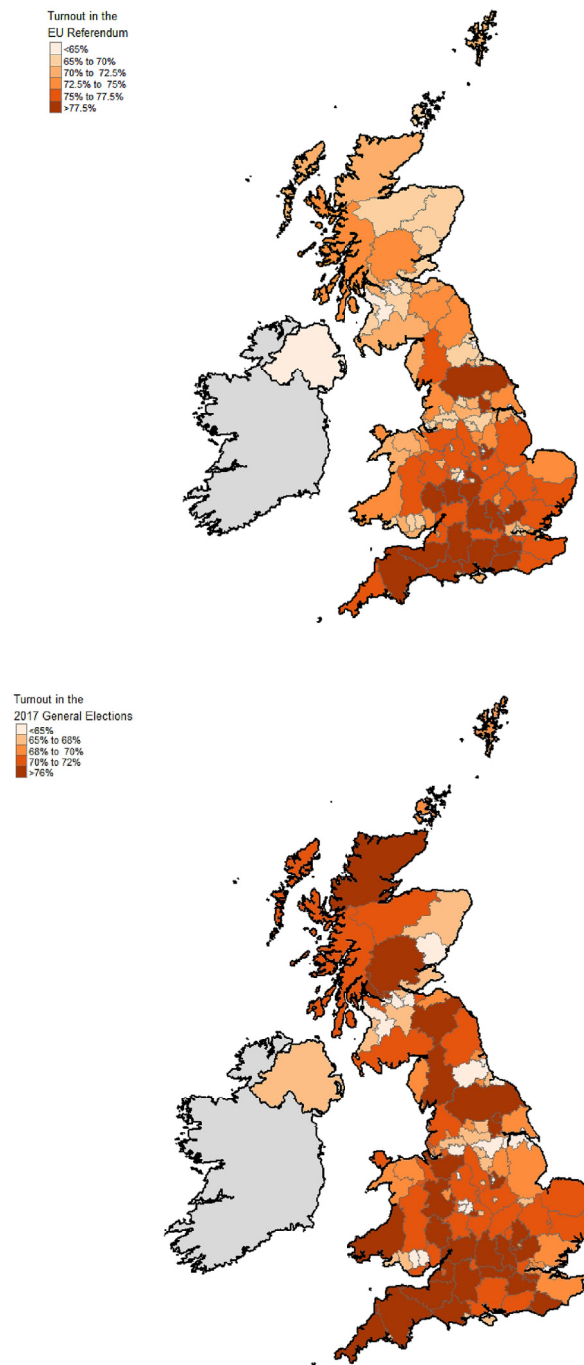


Fig. 5. Turnout in the Brexit Referendum and the General Election.
Source: Electoral Commission (election results) and GISCO, Eurostat (shapefiles).

In columns (1) to (4), we relate the remain vote to Cohesion Policy payments during the last programming period (2007–13), along with GDP per capita (columns 1–2), hourly wage (columns 3–4), employment rate (all four columns), and immigration from the EU10 (columns 1 and 3) and EU27 (columns 2 and 4) countries. The effect of Cohesion Policy receipts on the remain vote is positive but only significant in two regressions out of four (and in one of those two instances it is only marginally significant). Using Cohesion Policy receipts from earlier programming periods, or the cumulative value over 1994–13, makes little difference (results available upon request): none of these coefficients are consistently significant at conventional levels.

Table 3
Determinants of remain vote: Bivariate analysis, NUTS 2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CP Payments 07–13 [€log]	−0.001 (0.001)								
CP Payments 00–06 [€log]		−0.001 (0.007)							
CP Payments 94–99 [€log]			0.008 (0.013)						
CP Payments 94–13 [€log]				0.001 (0.011)					
GDP pc 2014 [€log]					0.190*** (0.021)				
Avg hourly wage 2014 [€log]						0.116* (0.063)			
Employment rate 2014							0.658* (0.336)		
EU10 migrant stock ratio 2013/03								0.0033 (0.0022)	
EU27 migrant stock ratio 2013/03									0.0168 (0.0374)
Constant	0.473*** (0.025)	0.472*** (0.013)	0.432*** (0.065)	0.463*** (0.064)	−0.172** (0.077)	0.128 (0.184)	0.157 (0.160)	0.440*** (0.265)	0.442*** (0.066)
R-sqrd	0.0001	0.002	0.01	0.0004	0.427	0.170	0.061	0.064	0.011
F-stat	0.01	0.24	0.41	0.02	80.50***	3.39*	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
Determinants of remain vote: Multivariate analysis, NUTS 2.

	(1)	(2)	(3)	(4)	(5)	(6)
CP Payments 07–13 [€log]	0.009* (0.006)	0.014** (0.006)	0.005 (0.007)	0.011 (0.008)		
GDP pc 2014 [€log]	0.238*** (0.027)	0.240*** (0.027)			0.228*** (0.029)	.227*** (0.030)
Avg hourly wage 2014 [€log]			0.129* (0.069)	0.126* (0.065)		
Employment rate 2014	−0.107 (0.302)	−0.183 (0.333)	0.886*** (0.278)	0.842** (0.326)	−0.222 (0.309)	−0.397 (0.339)
EU10 migrant stock ratio 2013/03	0.0045*** (0.0016)		0.528*** (0.0017)		0.0053*** (0.0016)	
EU27 migrant stock ratio 2013/03		0.0244 (0.0268)		0.015 (0.032)		0.039 (0.0251)
Constant	−0.358** (0.170)	−0.343** (0.168)	−0.392 (0.289)	−0.365 (0.276)	−0.243* (0.135)	−0.173 (0.163)
R-sqrd	0.610	0.536	0.358	0.271	0.592	0.499
F-stat	22.55***	24.32***	7.02***	2.99**	22.02***	23.70***
N	37	37	37	37	37	37

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

As before, the low significance of Cohesion Policy receipts stands in sharp contrast with the results for the economic variables: the coefficients for both GDP per capita and the hourly wage are significant and positive when included alongside Cohesion Policy (with the coefficient for GDP per capita being again significant at the 1% level). The coefficient estimated for employment rate is also positive but only significant in the regressions with the average hourly wage. Surprisingly, the relative change in immigration from the EU10 is significantly and positively correlated with the remain vote: the regions that have experienced large relative inflows of EU10 migrants appear to be more rather than less in favor of the UK remaining in the EU.²⁰ In contrast, the coefficient estimated for the EU27 immigration, while positive, is never significant.

To gauge the relative importance of Cohesion Policy as a factor in the referendum, we rerun the regressions reported in columns (1) and (2) while omitting regional aid. These results are reported in columns (5) and (6). The estimated effects and significance levels of the economic and immigration variables are virtually unchanged. Omitting Cohesion Policy has almost no impact on the R-squared and the F-statistics (comparing columns 5 and 6 with 1 and 2): the economic and immigration variables alone explain

²⁰ This stands in contrast with the findings of Becker et al. (2017) who find immigration from the EU10 to be positively correlated with the leave vote. The difference between their finding and ours can be due to measuring the immigration impact differently. Alternatively, it may indicate that the impact of immigration on voting patterns in the referendum is not robust.

Table 5

Determinants of remain vote, NUTS 3.

	(1) Remain	(2) Remain	(3) Remain	(4) Turnout	(5) Turnout	(6) Turnout
CP Payments 2007-13 [€log]	0.005 (0.471)	0.016*** (0.005)		−0.015*** (0.002)	−0.012*** (0.003)	
GDP pc 2014 [€ log]		0.101*** (0.031)	0.087*** (0.031)		−0.047*** (0.012)	−0.0357*** (0.014)
Employment rate 2014 [%]		0.382* (0.209)	0.234 (0.212)		0.5248*** (0.111)	0.640*** (0.122)
Constant	−0.471*** (0.009)	−0.803*** (0.289)	−0.521* (0.274)	0.778*** (0.009)	1.000*** (0.110)	0.782*** (0.114)
R-sqrd	0.001	0.160	0.122	0.185	0.352	0.254
F-stat	0.17	9.25***	9.77***	44.53***	26.99***	14.86***
N	129	129	129	129	129	129

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

most of the variation in the remain vote, and adding or omitting the regional-aid payments makes very little difference.²¹

In Table 5, we report the results obtained at the NUTS 3 level. First, in column (1), we again report the results of a bivariate regression with the 2007-13 Cohesion Policy payments as the only explanatory variable. As before, Cohesion Policy spending is insignificant and the explanatory power of the regression is very low. Adding economic factors (column 2) improves the explanatory power substantially. Cohesion Policy is now significantly positive, as is GDP per capita and the employment rate (the latter is only marginally significant). Finally, dropping regional aid (column 3) results in a modest drop in explanatory power. Cohesion Policy, it appears, does matter at the local level, but only weakly.

In the last three columns of Table 5, we look at the determinants of turnout: given the close outcome of the referendum, higher or lower voter participation could have been instrumental in delivering the final outcome. The results are striking: Cohesion Policy payments are negatively correlated with voter turnout, with the estimated coefficients being strongly significant both alone and alongside the economic factors. The differences across regions in Cohesion Policy receipts explain nearly one fifth of the variation in turnout (column 4) even without any other variables added. Together with GDP per capita (which has a negative impact on turnout) and the employment rate (positive effect), these three variables alone explain more than one third (column 5). Even after adding economic variables, the coefficient for Cohesion Policy remains negative and strongly significant (although its magnitude falls somewhat). In contrast, omitting the Cohesion Policy variable from the regression results in a sizable drop in the explanatory power (column 6). Unlike with the Remain vote, Cohesion Policy transfers are a strong predictor of turnout in the referendum.

Of course, the negative relationship between Cohesion Policy and support for remaining in the EU is not causal. Rather, the socio-economic and/or demographic characteristics which make regions eligible for regional aid are probably responsible for this result.²² We control for GDP per capita and the employment rate. Therefore, the negative relationship between Cohesion Policy and voter participation cannot be attributed merely to the recipient regions being less developed and/or having less dynamic labor markets. We discuss the potential practical significance of this negative relationship in the next section.

Next, we consider the role of Cohesion Policy in the General Election of 2017. In Table 6, we present our findings for the vote shares for the main national parties: Conservatives, Labour, Liberal Democrats, and the UK Independence Party (UKIP). The Cohesion Policy receipts per capita are negatively correlated with the share of voters for the Conservative party. The opposite effect obtains for the Labour Party, which gained votes in regional-aid receiving regions, although this effect is much less strongly significant and less than half in magnitude compared to the one for the Conservatives. The Cohesion Policy payments are not significantly correlated with support for the Liberal Democrats, and, somewhat surprisingly, UKIP. As with the referendum results, Cohesion Policy transfers are negatively correlated with turnout. The coefficient, however, is considerably smaller than that estimated for turnout during the referendum. Hence, regions that benefit from Cohesion Policy display lower support for the Conservatives, and there are also signs that the negative relationship between voter turnout and regional aid has weakened.

As a final step in our analysis, we add the referendum vote to the regressions for the General Election (Table 7). This turns the model into a dynamic one: we can observe how voters' preferences in 2017 are affected by their region's choice in 2016. The effect of Cohesion Policy is largely the same as in the static model: negative for the Conservatives, positive for Labour, mildly negative for turnout. The impact of the referendum vote, in turn, is negative for three parties out of four: Conservatives, Labour and UKIP: the effect is strongest for the Conservatives and weakest for UKIP. The only party that has gained votes in remain-supporting regions is the Liberal Democrats. Regions that supported remaining in the EU, furthermore, saw improvements in voter turnout. Hence, the

²¹ In a further set of robustness tests, which are available upon request, we include a dummy for England and Wales, the two countries of the UK with an overall majority for leaving the EU. This dummy appears with a negative and strongly significant coefficient: English and Welsh regions display lower support for EU membership for reasons that cannot be explained by the economic variables, migration and Cohesion Policy receipts that we include in our analysis. This support gap is large, between 13 and 20%. When including the England and Wales dummy, the Cohesion Policy receipts are never significant, and the relative change in EU10 immigration is either insignificant or, in some cases, it appears with a significantly negative coefficient.

²² In particular, poor regions may have low levels of social capital, civic engagement and display other unfavorable social outcomes.

Table 6
General election, NUTS 3.

	(1) Conservative	(2) Labour	(3) Lib-Dem	(4) UKIP	(5) Turnout
CP Payments 2007-13 [€log]	−0.056*** (0.008)	0.021* (0.012)	0.0056 (0.010)	−0.001 (0.001)	−0.004** (0.002)
GDP pc 2014 [€log]	−0.096*** (0.038)	0.168*** (0.040)	−0.0248 (0.017)	−0.007 (0.005)	−0.021** (0.010)
Employment rate 2014 [%]	0.699*** (0.272)	−1.459*** (0.452)	0.620*** (0.246)	−0.010 (0.047)	0.413*** (0.078)
Constant	1.282*** (.377)	−0.719* (0.413)	0.013 (0.225)	0.099 (0.039)	0.732*** (0.084)
R-sqrd	0.342	0.169	0.072	0.017	0.229
F-stat	26.70***	8.10***	3.54**	1.83	14.21***
N	129	129	129	129	129

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

Table 7
Regression results: NUTS 3, dynamic model.

	(1) Conservative	(2) Labour	(3) Lib-Dem	(4) UKIP	(5) Turnout
CP Payments 2007-13 [€log]	−0.043*** (0.006)	0.027** (0.012)	0.003 (0.010)	0.001 (0.001)	−0.006*** (0.002)
GDP pc 2014 [€log]	−0.009 (0.027)	0.206*** (0.043)	−0.0417** (0.021)	0.006 (0.004)	−0.031*** (0.011)
Employment rate 2014 [%]	1.029*** (0.185)	−1.317*** (0.471)	0.557** (0.242)	0.037 (0.046)	0.378*** (0.083)
Remain Vote 2016 [€]	−0.861*** (0.090)	−0.371*** (0.141)	0.166** (0.084)	−0.124*** (0.022)	0.091** (0.040)
Constant	0.591** (0.268)	−1.017** (0.418)	0.147 (0.236)	−0.0002 (.030)	0.805*** (0.095)
R-sqrd	0.631	0.211	0.104	0.388	0.275
F-stat	56.54***	10.13***	4.62***	13.46***	14.07***
N	129	129	129	129	129

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

regions that support remaining in the EU turned away from Conservatives, Labour and UKIP and towards Liberal Democrats, and experienced also a modest increase in voter participation.

4. Conclusions

In this paper, we revisit the relationship between the regional receipts of Cohesion Policy payments and the support for remaining in the EU in the recent Brexit referendum in the UK. We carry out our analysis at two levels of regional aggregation: NUTS 2, the level at which eligibility for Cohesion Policy is determined, and NUTS 3, which should be closer to the level at which the local impact of most regional-aid financed projects is felt. At the NUTS 2 level, Cohesion Policy receipts are essentially uncorrelated with the share of voters supporting remaining in the EU. Most of the variation in the referendum results is instead explained by economic factors, especially GDP per capita. Including Cohesion Policy in the regressions adds very little explanatory power. The picture is more positive at the NUTS 3 level, where Cohesion Policy transfers appear positively correlated with the remain vote. Hence, Cohesion Policy may matter, but only at the local level. Nevertheless, even at the local (NUTS 3) level, most of the variation in support for remaining is explained by economic factors, and the explanatory power of regional aid payments is limited.

The support for remaining in the EU is thus highest in the regions that have done well economically in recent years: this is in line with the previous findings by [Becker et al. \(2017\)](#), [Alabrese et al. \(2019\)](#) and [Arnorsson and Zoega \(2018\)](#). These are the regions that benefited from globalization and the associated international flows of capital and labor. The regions that are against UK's membership in EU, in turn, are those that missed out on these benefits. Rather than follow their economic self-interest, the voters in these regions appear to have used the Brexit referendum as an opportunity to cast a vote of protest against the government and its policies ([Altomonte et al., 2019](#)).

The weak relationship between Cohesion Policy and electoral support can also reflect the low degree of awareness about projects financed by the EU in the UK. Such awareness is lower in the UK than in any other EU member state: in 2015, only 9% of UK respondents knew of any EU-financed projects in their area (for comparison, the EU28 average was 34%).²³ Another possibility is that the projects that the EU has financed in the UK are not visible enough: examples of recent projects funded by Cohesion Policy include improvements to communications infrastructure, support for employment and small businesses, and cleaning up the

²³ See "Citizens' awareness and perceptions of EU Regional Policy," Flash Eurobarometer 423, Directorate-General for Communication, European Commission, 2015.

environment.²⁴ Faster broadband connections, more small businesses, cleaner environment and lower carbon emissions improve quality of life but are less visible than large-scale physical infrastructure projects such as new highways and bridges.

The most striking finding emerging from our analysis, however, is the negative correlation between Cohesion Policy receipts and turnout: regions that have benefited from redistribution within the EU have significantly lower voters' participation than the other regions. To gauge the economic (and political) significance of this relationship, we can consider what would be the level of turnout if Cohesion Policy were unrelated with voter participation. Our back-of-the-envelope calculation suggests that nearly 2 million more votes could have been cast in the UK as a whole in the absence of the negative relationship between Cohesion Policy and voter participation.²⁵ The winning margin in the referendum was just under 1.3 million votes. It is not very likely that higher turnout would have been enough to overturn the outcome of the referendum, unless the vast majority (around two thirds) of the additional voters backed remaining.²⁶ The outcome of the referendum, nevertheless, could have been much closer, with corresponding implications for the democratic legitimacy of the decision to leave the EU.

The EU Cohesion Policy should have the potential to win the hearts and minds of Europeans. By redistributing its spending to regions rather than countries, virtually every member state can benefit from this policy, even the net contributor countries. Cohesion Policy funds expenditure likely to benefit broad sways of people: infrastructure projects, research and education, employment support and the like. In doing so, it acts as a modern Robin Hood: collecting funds from the rich to redistribute them to the poor. All of this should help create constituencies in each country that benefit from and support European integration. The results of our analysis suggest that the EU (and member state governments) needs to improve how they sell the benefits of Cohesion Policies to European voters. The evidence from the UK Brexit referendum shows that there is scope for improvement especially when it comes to mobilizing the voters who benefit from European integration so that they turn out and vote in elections and referenda that can affect the success of the European integration project.

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²⁴ “Cohesion Policy and the United Kingdom,” European Commission, http://ec.europa.eu/regional_policy/sources/information/cohesion-policy-achievement-and-future-investment/factsheet/united_kingdom_en.pdf, accessed August 2018.

²⁵ This calculation is based on column (5) in Table 5: we use the actual allocation of Cohesion Policy funds and the estimated coefficient of -0.012 to compute by how much the turnout rate in each region is lower due to the negative relationship. To get the total number of missing votes, we multiply these differentials by the number of eligible voters. These numbers of additional votes cast are then added up for the UK as a whole. The resulting figure of the hypothetical increase in the votes cast in the absence of the negative relationship between Cohesion Policy receipts and turnout is 1,971,494.

²⁶ Becker et al. (2017) conclude that a higher turnout by remain-supporting young voters would not have overturned the outcome of the referendum. This conclusion is mainly based on the observation that young voters' participation in the referendum was already higher than in previous elections.