

Biting the Hands that Feed Them?
Place-Based Policies and Decline of Local Support

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Abstract

Conventional wisdom presumes that place-based policies, such as regional development programs, increase political support in the benefiting areas. However, empirical evidence is limited, and economics literature is doubtful of the local economic benefit of such policies. Exploiting formulaic eligibility criteria for EU funding schemes in the UK, I analyze the support for the EU among the areas with different levels of EU funding availability for place-based policies. Using a Geographic Regression Discontinuity design, I find that residents in the well-funded areas become less likely to approve the EU, particularly if they have high socioeconomic status, high educational attainment, and local newspaper subscription. Moreover, using Genetic Matching with geocoded EU-funded projects in England, I reveal that residents in the area with visible, large-scale EU projects show lower support for the EU. This paper suggests the anti-pork attitudes among well-off and well-informed voters, which challenges the viability of pork-barrel politics.

9,830 words (including body of text, notes, references, and the headers of tables and figures.)

Introduction

It is well established that individually targeted, direct payment benefits, such as welfare payment or disaster relief, increase the recipients' political support for the incumbents (Manacorda, Miguel and Vigorito 2011, Golden and Min 2013, Bechtel and Hainmueller 2011). A wide range of studies have also uncovered how politicians and political organizations strategically allocate goods and services in geographic space (Mayhew 1974; Ferejohn 1974; Shepsle and Weingast 1981; Bates 1981; Stein and Bickers 1995). Thus, it might seem logical to assume that politicians can gain electoral support in certain areas by providing place-based, community level policies, such as infrastructure projects, locational subsidies, and special economic zone apparatus.

On the other hand, literature on urban economics and economic geography reveals the empirical record of place-based policies to have been disappointing, and its theoretical justification thin (Glaeser and Gottlieb 2009; Neumark and Simpson 2015; Kline and Moretti 2015). If the place-based policies' electoral impact depends on the economic benefits to the community, it is not clear why local voters would support the incumbents advocating policies with such a mediocre track record, from which they may not gain direct monetary benefit.

This paper investigates whether implementing place-based policies increases the support for the entity providing them. The term place-based policies in this paper will refer to, "government efforts to enhance the economic performance of an area within its jurisdiction, typically in the form of more job opportunities and higher wages (Neumark and Simpson 2015, p1198)." Such policies are typically targeted to economically underperforming areas and can be contrasted with people-based policies such as welfare programs and tax credits.

When studying the political impact of place-based policies, selection bias and omitted variables pose considerable challenges. Such programs are often allocated either implicitly or explicitly based on electoral concerns (Knight 2004). While the literature revealed that politicians mainly target their core supporters rather than swing or median voters, there is evidence that they will target the areas where they foresee an electoral struggle (Evans

2011). Moreover, the regions targeted by place-based policies are generally economically lagging areas, with many socioeconomic peculiarities and other disadvantages that might affect the area's political inclinations.

The European Union (EU)'s Structural and Investment Funds in the United Kingdom (UK) before the Brexit referendum provides an opportunity to address these concerns. The assessment mechanism of the EU fund eligibility was formulaic and discontinuous, making it more difficult for local, national, or the EU-level politicians to strategically target particular regions or manipulate the formula. Moreover, through a Geographic Regression Discontinuity design, voters in neighboring regions with different levels of exposure to the EU funding for place-based policies can be compared. The balance tests reveal that, while the treated areas are worse off on average, there is no discontinuity in geographic or demographic characteristics around the eligibility border. The borders between treated local authorities and controlled ones do not represent systematic differences in economic well-being or political culture, but they differ in the funding eligibility.

Using the geocoded data from the British Election Studies (BES), it is found that, on average, the voters in the well-funded areas became less supportive of the EU and became more interested in topics such as the EU's spending or bureaucracy. Moreover, the negative effect is more pronounced among voters with high educational attainment, high socioeconomic status, and those who gather information from local newspapers and radio. There was no discontinuity concerning their attitudes towards immigration, the support for the EU prior to the funding period, or support for local or national governments. RDD with different definitions of treatment areas, a difference-in-differences analysis, and a two-stage least squared design confirm the results. Given that well-informed, well-off groups tend to react negatively to the EU funded projects, I claim that either anti-pork barrel attitudes or welfare-chauvinistic attitudes among relatively well-off residents affects the observed results, rather than miss-attribution or miss-information. While the precise mechanism is not perfectly pinned down, I present suggestive evidence to support the anti-pork theory.

While the eligibility border corresponds to the size and nature of the EU funding,

the respondents' exposure to the projects is measured indirectly. I compliment the RDD results with matching analysis using the geocoded locations of actual beneficiaries, not funding eligibility. With a Genetic Matching algorithm, I compare the BES respondents with identical characteristics. If the area had infrastructure projects and business development funded by the EU, residents would become less likely to approve of the EU. However, research-related projects and projects managed by the universities did not cause any reaction. The results suggest that people are reacting more negatively towards highly visible, large-scale projects.

This paper suggests that visible place-based policies can negatively impact political support, particularly among well-off voters who pay close attention to local affairs. The findings call conventional wisdom of pork-barreling into question. Major works in clientelism or vote-buying suggest that such practices are effective in gaining support among low-income voters. However, unlike cash transfers or providing public sector jobs, the impact of place-based policies may be more apparent to well-informed, well-educated voters, who may critically scrutinize the programs, and unaffected by the marginal benefits of the projects, if any. Given the relatively poor records of place-based policies in redeveloping lagging areas, expecting simple and straightforward gratitude from the locals could be naive. While place-based policies are widely used as compensatory measures for those adversely impacted by economic globalization or technological changes, this study also casts doubt on their effectiveness in alleviating the discontent.

Literature Review and Theory

This paper spots a theoretical disconnect in the relevant literature. Many political science works assume that voters voters will react positively to place-based policy interventions; presumably because their regions or communities benefit from them. Economics literature claims that such place-based policies do not always benefit the locals, and that they often turn out to be ineffective.

Following the classic arguments of Mayhew (1974) and Bates (1981), political scientists have produced numerous works on the mechanisms and incentives of politicians to target

the supporters, constituencies, or “selectorates” spatially (Ferejohn 1974; Shepsle and Weingast 1981; Stein and Bickers 1995, Harris and Posner 2019). However, studies on the voters’ reactions to such place-based policies have been scarce compared to politicians’ actions. A few researchers working on American congressional earmarks found mixed evidence for the electoral return (Rocca and Gordon 2013). Still, it is also known that the majority party tends to allocate such funding to electorally vulnerable areas (Knight 2004; Evans 2011), which would bias the findings based on the election outcomes. The studies on the EU cohesion fund are also contested (Accetturo et al., 2014; Borin et al., 2018), but they compare large regions with significant economic and social differences. Even if the place-based policies are allocated based on some formula, such rules are often susceptible to the incumbents’ political incentives. Such selection bias and omitted variable problems make it challenging to examine place-based policies rigorously.

On the electoral reward to direct payment, individually targeted policies, such as welfare programs and disaster reliefs, there are a couple of prominent papers that convincingly demonstrated positive political gains for the incumbents (Bechtel and Hainmueller 2011; Manacorda, Miguel, and Vigorito 2011). Coupled with the abundant evidence on how clientelism works with cash transfers and public sector jobs (e.g., Hicken 2011), one could easily assume that place-based policies would be similarly effective.

Meanwhile, economists have long been skeptical of place-based policies in general, and the economic effect of place-based policies on residents is known to be mixed, heterogeneous, and not always positive. Such policies tend to result in mere displacements of jobs and enterprises, rather than creation of new ones, and the relocated activities could find themselves in inefficient locations, or they could crowd out more locally suited ones. Moreover, place-based policies often fail to benefit the intended beneficiaries in the area with price and rent fluctuation (Glaeser and Gottlieb 2009, Kline and Moretti 2015). The empirical record of place-based policies, ranging from large-scale infrastructure programs to investment aid, is mixed at best and often ineffective (Neumark and Simpson 2015). There is no shortage of prominent failures, delays, cost overruns, unfinished projects, and suspected corruption (Acemoglu and Robinson 2008; Accetturo et al., 2014). Its

theoretical justification is thin, as it is seen as a worse substitute for cash transfer due to the difficulty in targeting the right beneficiaries and its distortions to economic activities (Kline and Morretti 2015).

Certainly, there are arguments in favor of place-based policies, but they may not please all of the local voters. Some economists support place-specific job training and educational programs in deprived regions (Austin et al., 2018), but newly trained workers are notably mobile and tend to relocate, limiting the targeted regions' benefit (Duranton and Venables 2018). Even if such programs ameliorate certain people's well-being, they may not generate lasting benefits among broad segments of residents.

Therefore, place-based policies' positive impact on the local economy is far from guaranteed, and if there is a tangible benefit, it may affect residents differently. If such policies are as ineffective as records suggest, they cannot be political equivalents to cash transfers or disaster relief. While voters would like to have particularized benefits, if they find those projects socially inefficient, they may have little reason to support the incumbent who sponsored them (cf. Coate and Morris 1995).

Economic ineffectiveness may not directly translate into political ineffectiveness. Jensen and Malesky (2018) demonstrate that elected mayors are more likely to provide locational investment incentives than appointed mayors, even though those mayors seem to know the drawbacks of such policies. Nonetheless, they claim that politicians could identify themselves with the success of private investments only if investment incentive schemes are in place, thereby creating the credit claiming opportunities that economically efficient policies may not provide. Importantly, Jensen and Malesky also suggest that voters may not be aware of the policies' trade-offs. If similar mechanisms are in place, voters may react differently depending on the level of information access.

Different socioeconomic groups may react divergently regarding potentially inefficient place-based policies. In the context of patronage politics in Columbia, Weitz-Shapiro (2012) found that non-poor voters are critical of clientelistic policies targeted toward poor voters, thereby incentivizing some politicians to refrain from such practices. Indeed, most works on vote-buying measures focus on the impoverished as they are cheaper to

buy. However, the less targeted nature of place-based policies may trigger reactions from the affluent as well, and it is far from certain that they would appreciate such policy measures. Dellmuth and Chalmers (2018) also claim that the fit between the local demand and place-based policies may alter the policies' impact, which could suggest that different types of policies affect different demographic or socioeconomic groups divergently.

The electoral return on investment in place-based policies could be ambiguous and heterogeneous. Furthermore, this effect could be negative, and there is anecdotal evidence to suggest a potentially adverse electoral return. For example, it is well known that the voters in the net-beneficiary states of federal transfer in the US, such as Alaska, are hostile to the federal government's involvement and claim to prefer a smaller federal budget. In the countries whose growth was widely attributed to the EU cohesion funds and single market access, such as Poland and Hungary, voters are increasingly hostile towards the EU.

I outline five different possible mechanisms - dislike for inefficient pork-barrel politics, welfare chauvinism, misinformation, misattribution, information bias - that could lead to negative electoral return. The first and second hypotheses imply that well-informed, well-off people are likely to feel antipathy towards the entity providing support. The third and fourth are the opposite, and the fifth depends on the information source's bias.

The first potential mechanism is a dislike for inefficient pork-barrel politics and poor management. Besides their mediocre track record, infrastructure projects and other redevelopment programs are often associated with a cost overrun, delayed schedule, and suspicion of corruption (Accetturo et al., 2014; Duranton and Venables 2018). More astute voters may question the competence and contribution of the governments or parties responsible to their community. This may make people dislike the institution that spends a significant amount of tax revenue on what they deem to be unsuccessful, useless, or wasteful.

The second possibility is a variant of welfare chauvinism. Regional development programs, especially those targeted at the backward regions, are often aimed at benefiting relatively worse-off or unskilled people in the area. Some relatively better-off people may

perceive that others are “undeservingly” getting subsidized jobs (cf. Weitz-Shapiro 2012). In the case of anti-pork attitude or welfare chauvinism, people with high socioeconomic status people would dislike the entity. The marginal gain in local employment or salary that such projects bring is unlikely to affect the better-off.

Thirdly, it could be possible that some people are misinformed about the benefits and costs of those projects (Mettler 2011). Even if the national or federal entities fund or subsidize the local projects, the residents may believe that the locals are paying for something that the national or federal government decided to do in their areas, which may trigger negative feelings. Similarly, they may not notice the potential benefit they receive while they are concerned about the cost to taxpayers.

Alternatively, people may misattribute any local hardship to the national or federal entity instead of to local authorities (Hobolt and Tilley. 2014). The place-based policies and billboards are easy targets for those looking to lay blame for local difficulties, and it would be easy to associate anything negative in the region with those who claim credit for intervening on behalf of locals. If misinformation or misattribution is driving the negative feelings against the providers, I expect that the effects are more prominent among less-informed groups.

The last possibility is information bias. People may have been affected by certain discourse about the entity providing the place-based policies and see projects in the local area in a different light. For example, those exposed to anti-EU rhetoric may dismiss a local EU project as a symbol of waste and bureaucracy, while those who use pro-EU sources of information may regard the same project as an emblem of the European ideal. In this scenario, people accessing different information sources will react differently to the policies.

One important factor that underlies the five mechanisms and distinguishes place-based policies or pork-barrel politics from other forms of “vote buying” methods is that these types of programs have high visibility to non-beneficiaries. While cash transfers or public sector job allocations could be invisible to the non-beneficiaries, except for the costs, virtually everyone in an area are exposed to visible infrastructure projects. In addition,

while most place-based policies try to benefit relatively worse-off residents, the benefits are often indirect compared to cash transfers or guaranteed jobs, if any.

In summary, most works on place-based policies assume a positive political return for the entities that provide them, but its theoretical justification is shaky as such policies do not always bring tangible benefits. Relying on the well-established positive return on the cash transfers could be misleading, but political gains on geographically targeted policies are understudied. Rather than expecting everyone in a targeted area to react positively, I anticipate that the aggregate political return may well be null or negative. The heterogeneity may depend on the information sources, level of education, or socioeconomic status.

ESIF Funding Schemes and their Eligibility Criteria

The EU funding scheme in the United Kingdom before the Brexit referendum provides an excellent test case for this topic because of its design. The European Regional Development Fund (ERDF) and the European Social Fund (ESF) are the primary tools that the EU uses to foster regional development in relatively advanced member states, which together are collectively referred to as European Structural and Investment Funds (ESIF). ERDF covers most of the conventional regional development policies, such as support for small and medium-sized enterprises (SMEs) and infrastructure upgrades, while ESF support training and employment. Online Appendix A has the detailed descriptions. Applications for the funding are project-based. As shown in Table 1, various public and private actors may apply for the funding as long as their projects are located in a designated area and adhere to stated objectives.

Table 1: Percentage of the ESIF recipient types (UK; 2014/1-2020/7; N=1305)

City councils and Borough councils	County councils and Combined authorities	National-level public institutions	Private firms and Chambers of Commerce	Public-Private Partnerships	Charities and Trusts	Universities and Research Institutes
17.16	18.86	11.11	11.19	11.57	7.203	22.53

ERDF and ESF provided a large amount of funding for regional development policies in the UK. In the period 2014-2020, the ERDF available for the UK was 3.6 billion Euros (2.6 billion Pounds) and ESF 3.5 billion Euros (2.53 billion Pounds). These amounts are significant compared to nationally-funded programs, particularly after the UK government abolished earmarking and scaled down its own regional development programs in 2012 (see Online Appendix A for the details).

To inform relevant parties and residents of the EU’s contribution, the EU promotes and advertises its projects, much like typical pork-barrel politics. Indeed, the EU regional policies have an explicit political goal to promote social and political cohesion in the lagging areas of Europe. The beneficiaries bear the legal obligation to demonstrate to the public and relevant parties the EU’s contribution via billboards, placards, posters, brochures, websites, and emails.¹ Given the scale of the funding and the public relations efforts involved, it is reasonable to assume that those in the benefiting areas are likely to be aware of the EU’s contribution.

Geography and formula determine the eligibility criteria of the ESIF funds, and how funding is distributed is imperative to the research design.² The ESIF had three funding categories, which differ by: what type of projects are eligible, the amount of EU funding available per project, and the earmarked amount of the funding for the region. The UK is divided into 40 statistical regions called *NUTS 2 regions*, and their regional Gross Domestic Products (GDP) per capita in 2011 decided the eligibility of each region.³ Most *NUTS 2 regions* corresponds to a group of counties, but most counties have little authorities over regional development policies. According to the formula, the 40 *NUTS*

¹ The details are set in Annex XII of CPR 1303/2013

² The beneficiaries need to be located in the designated areas, and the recipient firms that relocated elsewhere within five years have to repay the funding. The same applies to cession or substantial change of operation, and change of ownership giving undue advantage.

³ “NUTS” is the acronym for *Nomenclature des Unités Territoriales Statistiques*

2 regions in the UK are divided into the following three categories.

- ***Less Developed Regions*** refers to the poorest regions with a GDP per capita below 75% of the EU average. Funding is available for a broad range of projects. The level of matching funds by local, national, or private actors can be less than 25%. Only two rural regions in the UK fall into this group: West Wales and Cornwall.
- ***Transition Regions*** include those regions whose GDP per capita is between 75% and 90% of the EU average. The level of matching funds should be at 40%. Although the proposals need to be “more targeted” than those in the *Less Developed Regions*, there are few formal constraints, and a wide range of projects are approved. Ten of the UK NUTS 2 regions belong to this category.
- ***More developed regions*** are comprised of regions where GDP per capita is equal to or higher than 90% of the EU average. This category includes West London, the wealthiest region in the EU. The required level of matching fund under this category is 50%, but crucially, funded activities in these areas need to adhere to the specified shortlist of priorities, such as research and innovation or institutional capacity building. Therefore, typical regional development policies, such as the generic aid for employment and investment aid for private enterprises, are severely restricted.

These different categorizations resulted in a diverging availability of the funding, both quantitatively and qualitatively. In per capita terms, the average *Transition Region* had the funding package that was 59% larger than the average *More Developed Regions*. People in *Transition Region* received 31% more from the EU than the neighboring *More Developed Regions* whose GDP per capita was less than 100% of the EU average. Crucially, however, *Transition Regions* were able to use the funding for conventional place-based policies while applicants from *More Developed Regions* were obliged to focus on specific activities. Indeed, a substantial portion of the EU fundings to *More Developed Regions* went to universities and affiliated institutions, and not to regional development programs. Therefore, for most of the UK, whether a region had a GDP per capita

higher than 90% of the EU average in 2011 made a significant difference in terms of EU funding eligibility for conventional regional policies. Moreover, unlike other place-based policy interventions, this difference in eligibility criteria corresponds to the clearly defined geographic border.

The introduction of *Transition Regions* in 2013 was due to the EU-wide policy changes and had little to do with any manipulation by the UK's representatives. There were only two eligibility categories in the previous 2007-2013 ESIF budget cycle, and 75% of the EU average was the threshold. The UK had only three "Convergence" areas - equivalent of *Less Developed Regions* - during this period: West Wales, Cornwall, and Scottish Highlands. However, the accession of Romania, Bulgaria, and Croatia to the EU during this budget cycle significantly lowered the average GDP per capita of the EU used for the 2014-2020 cycle evaluation. Consequently, the traditional ESIF beneficiaries in western Europe, such as Eastern Germany, Southern Spain, and Southern Belgium, were about to be pushed out from the "Convergence" categories. In response to this development, *Transition Regions* were created to keep these regions eligible for ESIF funding schemes (Downes 2019). Thanks to this development, nine regions in the UK that did not receive the preferential treatment in the previous ESIF budget cycle suddenly found themselves in the categories with a higher possibility of using ESI fundings. There was little indication of any active manipulation of the formula by the British representatives.⁴

This setting provides a fruitful opportunity to test the political implication of place-based policies. As the EU provided a significant amount of money and claimed credit, different eligibility classifications inevitably lead to divergent exposure of the residents to EU funding, with clear geographic demarcation and no sign of major manipulation.

Brexit referendum and the micro-level data

The UK in this period provides fitting dependent variables for this study as well. On June 23, 2016, British electorates voted in the United Kingdom European Union Membership

⁴ Possible exception is Merseyside, which had GDP per capita above the cut-off threshold. In the robustness checks, the results without Merseyside are presented.

Referendum (Brexit referendum), and opinion polls asked various questions regarding how citizens viewed and evaluated the EU during the campaign period. Comparing the support for the EU in well-funded regions and more developed regions can enable us to see the effect of place-based policies on political support toward the granting authority.

The dependent variables are derived from the British Election Study (BES). I mainly used Waves 7, 8, and 9 from the *Combined Waves 1-19 Internet Panel Studies* (Fieldhouse et al., 2020). These three waves just before and after the referendum included detailed questions about the respondents' opinions regarding the EU and Brexit. Wave 7 took place between April 14 and May 4, 2016. Wave 8 was between May 6 and June 22, just before the Brexit referendum on June 23. Wave 9 was between June 24 and July 4, 2016. Respectively, 30,895, 33,502, and 30,036 respondents took Waves 7, 8, and 9. Out of Wave 7 participants, 23,402 participated in Wave 9 as well, with a retention rate of 75.9%.

Additionally, Wave 2, which took place between May 22 and June 25, 2014, included a question on the respondents' approval of the EU. Wave 2 Whereas the first dispensation of the European Social Fund started in January 2014, the first disbursement for the European Regional Development Fund was April 2015, and a limited amount of the ESIF had been spent by May 2014. Therefore, Wave 2 in May of 2014 can serve as a quasi-pre-treatment period, as it is reasonable to assume that residents had less exposure to the EU-funded programs at that point. Residents may have been informed of what was to come, but most visible schemes, such as infrastructure projects, had not begun. Wave 2 had 33,219 respondents, and 15,956 of them also participated in Wave 9 in 2016, with a retention rate of 52.7%.

The main questions regarding the EU's evaluation are the following: "Do you approve or disapprove of the job that the EU is doing?". The question is asked in Waves 2, 7, and 9, and respondents chose from 5 pre-set levels of response. I also used the multi-level-answer question in Wave 7 and 8; "How much do you agree or disagree that the EU has made Britain more prosperous?".

As the exposure to the EU funding depends on the NUTS 2 regions a respondent lives

in, the respondents' locational information is critical for this study. For most respondents, BES recorded their local authorities, with which I locate the respondents on the map.⁵ While the BES respondents are coerced at the local authority level, the balance tests in the following section show no indication that these local authorities correspond to any systematic differences. The EU channeled an important part of the ESIF fund to local authorities, and no local authorities crossed the ESIF eligibility boundaries.

Various demographic and socioeconomic variables are available in the BES dataset, although some self-reported variables are not available for all of the respondents, and adding a full set of covariates reduces the sample size. In the robustness checks, the results are presented without covariates, with core covariates (age, sex, ethnicity, socioeconomic status, and education) and a full set of demographic covariates. Online Appendix C lists full demographic covariates.

As geographic covariates other than ESIF funding eligibility, local authority level data are drawn from the Office of National Statistics (ONS). I collected the statistics for the Gross Domestic Household Income (GDHI) per capita and the unemployment rate of the local authority level, as well as their growth rate. The population density and the linear distance to London are also used as controlling variables. Online Appendix J has a separate discussion with deindustrialization indicators (Colantone and Stanig, 2018).

Geographic Regression Discontinuity Design

Just using well-funded regions as treatment areas and more developed regions as control may raise the concern that some place-specific unobservable variables, such as political culture, could affect the support for the EU. As the ESIF funding eligibility is strictly based on the applicants' locations, the scheme perfectly fits the Regression Discontinuity Design in the spatial data (Keele and Titiunik 2014).

The Regression Discontinuity Design (RDD) exploits the discontinuity in the treatment assignment to solve omitted variable problems. Geographic Regression Discontinuity is used when treatment assignment is geographic. I use the distance from the border

⁵ I used the centroid of local authority areas when available. If not, I relied on their parliamentary constituency to locate the individual respondents.

between well-funded regions (*Transition Regions* or *Less Developed Regions*) and *More Developed Regions* as forcing variable, and being in the well-funded regions is the treatment. It is assumed that other relevant variables that affect the support for the EU are at least continuous, if not random, around the geographic border. However, the marginal distances would result in different ESIF funding availability levels and the residents' exposure to the EU-funded projects. Figure 1 shows the borders between well-funded regions and more developed regions in red, and the wards within 50 kilometers of that border as dots.⁶ Black dots are in *Transition Regions* or *Less Developed Regions*, and white dots are in *More Developed Regions*. I assessed whether there is a discontinuity in the support for the EU between the well-funded regions and More Developed Regions at the margins.

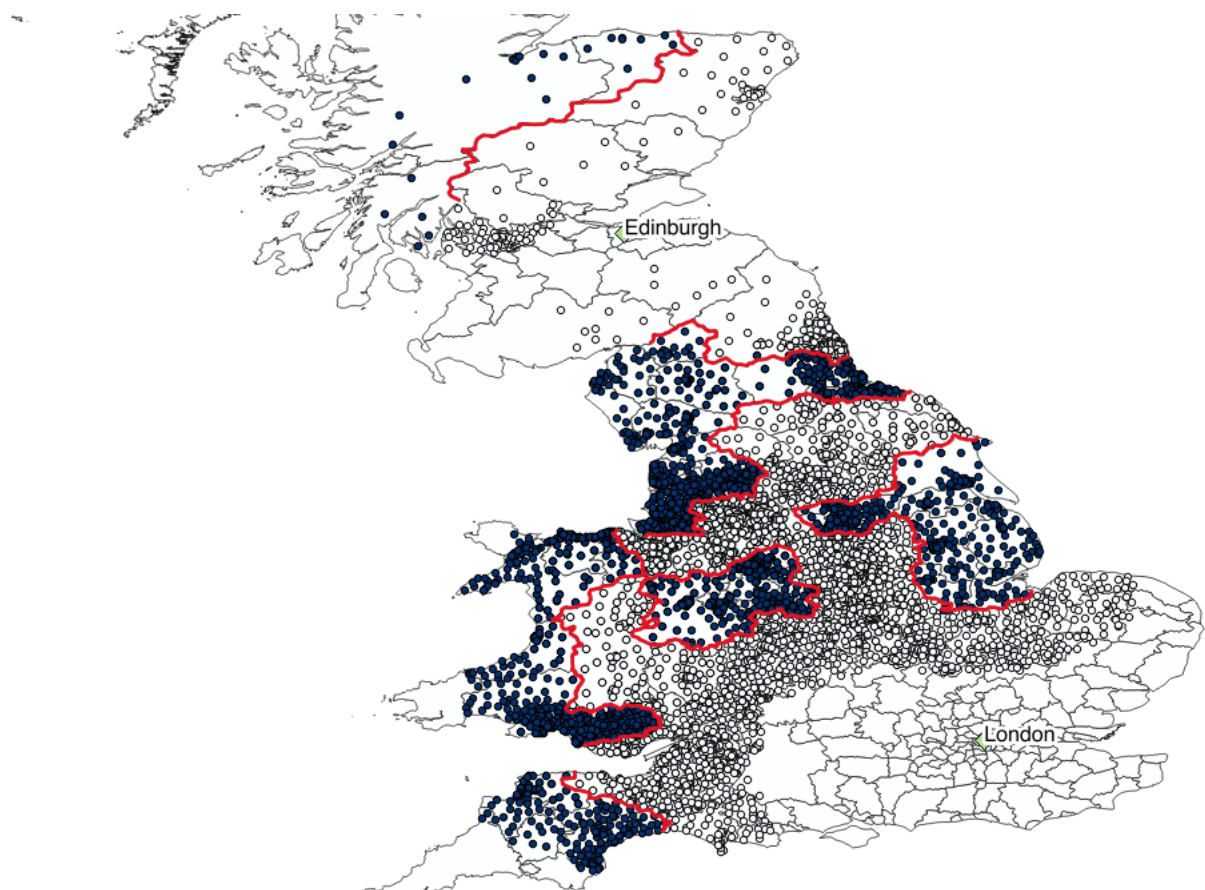


Figure 1: Borders between well-funded regions and more developed regions, with a 50km band: Well-funded regions in black

The framework of RDD is simple. Local linear regressions combine choosing a suitable

⁶ The density of wards is a proxy for the population density.

bandwidth with a linear control function and are the primary method in this paper. Local quadratic regression is used for bias-correction. The bandwidths for the main results are drawn from the *CCT bandwidth* developed by Calonico, Cattaneo, and Titiunik (2014), and the results are reported with robust bias-corrected confidence intervals. The results with arbitrary bandwidth (20/30/40/50km) are presented in Online Appendix B. The primary dependent variable of interest is the individual-level support for Brexit and the EU. I apply the following local linear regression to both sides of the cut-off line within the bandwidth;

$$P[SupportEU]_{i,c} = \alpha + \beta I(Well-funded_Region_c) + f(Distance_from_the_border_c) + \gamma_1 Closest_Border_c + \gamma_2 Demographic_Covariates_i + \gamma_3 Geographic_Covariates_c + \epsilon_{i,c}$$

s.t. $Distance_from_the_border_c \in (-\hat{h}, \hat{h})$

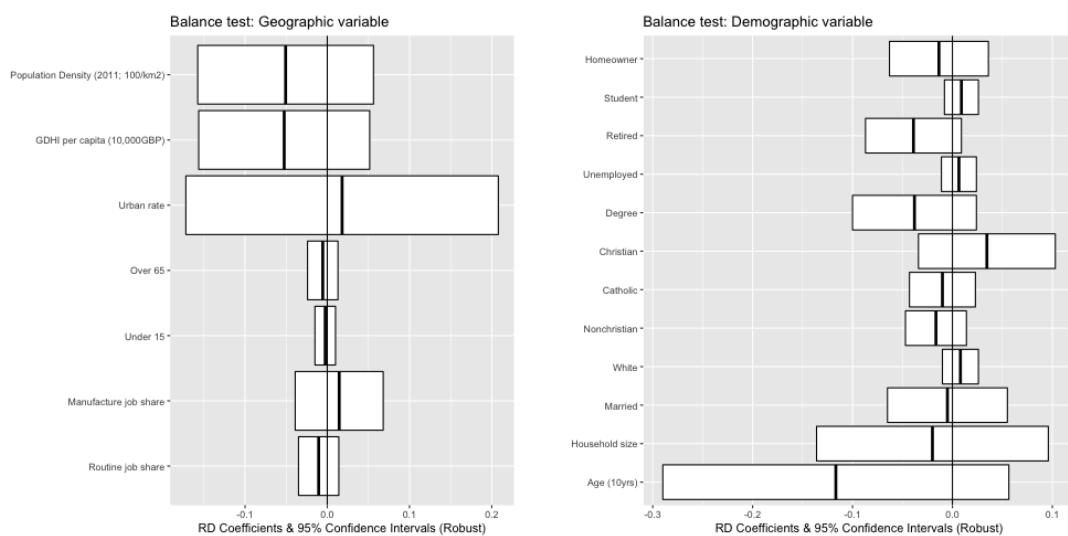
where $[SupportEU]_{i,c}$ is the propensity of an individual i in local area c to support or oppose the EU. This variable denotes the answer to the BES questions and changes depending on the answer structures. $I(Well-funded_Region_c)$ is the dummy variable, which takes 1 if the local area c is in *Transition Regions* or *Less Developed Regions*, 0 in *More Developed Regions*. \hat{h} is a neighborhood around the border between well-funded regions and *More Developed Regions*. $Distance_from_the_border_c$ is the linear distance to the closest border between two funding regions, and $f()$ is some continuous function for covariates and unobservables. All results will include the fixed effects of the border to which the local area is closest. Alternative results with different covariates and clustering are also presented.

In this design, the spatial discontinuity could be considered as fuzzy due to spillovers of policy effects beyond borders, but the borders between *More Developed Regions* and well-funded regions do feature sharp changes. *More Developed Regions* are eligible for some ESIF funding as well, but as noted above, the programs are catered to those that benefit narrow sections of the population (e.g., research and innovation). It is certainly possible that workers in *More Developed Regions* adjacent to well-funded regions may commute to

the benefiting firms, thereby reap the benefit from the EU-funded projects, and they may encounter the EU placards while driving from non-funded areas. Nonetheless, the level of exposure to various funded projects, including local infrastructure, would be different across the border. The fact that the local authorities were major beneficiaries of the funding would lead to the discontinuity at the local authority borders. The prohibition of the beneficiary firms and projects to relocate elsewhere may also confine the spillover effect.

For this RD design to be viable, it is important to demonstrate no discontinuity in geographic or demographic indicators across the eligibility borders. Figures 2A and B exhibit that there is no discontinuity regarding the local authority area’s census results or demographic indicators of BES Wave 9 respondents. There are no systematic differences around the borders regarding population density, gross domestic household income per capita, and the share of residents over 65 or those working in the manufacturing sector. The BES respondents do not show any discontinuity in their characteristics, either. Online Appendix B has discussions on the McCrary Density Test for the BES survey in Wave 9. While in some specifications treated areas are slightly less populous, purging Scotland from the sample makes the distribution of respondents smooth. The robustness checks include the analysis with the reduced sample without Scotland and West Wales.

Figure 2: RD results of geographic indicators (2011 census) and demographic attributes (BES Wave 9), with border fixed effects



Given the literature and conventional wisdom surrounding populism and Brexit, the BES questions regarding the respondents' attitudes towards immigration, social change, gender roles, populism, patriotism, cultural traditionalism, and their perception of their finance and the general state of the economy are also analyzed. To those outcome variables, I applied the same RDD framework and present them as balance tests in the following section.

Main results (Geographic RD)

This section presents the RD results with the CCT bandwidth. All of the results include the “border” fixed effects so that geographically proximate units are compared across the borders between the well-funded regions and More Developed Regions. The 95% confidence intervals are reported in the robust and bias-corrected version, while the coefficients and standard errors rely on the conventional method (Calonico, Cattaneo, and Titiunik 2014). Local authority areas are the unit for cluster-robust variance estimation. For all of the models, the treatment is being in well-funded regions, and the rows in tables represent different dependent variables.

Overall, the results show that residents in well-funded regions are more likely to disapprove of the EU after the ESIF dispensation. Moreover, the support for national or local authorities does not show the corresponding discontinuity, and there was no regional gap regarding the attitude toward immigration or sovereignty. These findings are contrary to the conventional view that regional development policies and place-based policies would improve the political fortune of those who provide it. However, it is in line with the theory asserted here, that people may not necessarily support the funds' providers given the ambiguous economic benefits and mediocre track record of place-based policies.

Columns 1 and 2 in Table 2 show that the people in well-funded regions are less likely to approve the EU than less-funded neighbors by 0.16 to 0.19 points on a 5-point scale. The results are robust when adding demographic and geographic controls to the RD, and the robust and bias-corrected confidence intervals at the bottom of the table suggest a

Table 2: Main Results (Geographic RD: CCT bandwidth)

Treatment variable:	Being in well-funded regions							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable:								
Approve EU: Wave 9 (2016) (1 Strongly disapprove - 5 Strongly approve)	-0.166*** (0.026)	-0.187*** (0.031)						
Approve EU: Wave 2 (2014) (1 Strongly disapprove - 5 Strongly approve)			-0.013 (0.008)	0.017 (0.012)				
Approve EU: Wave 9 - Wave 2 (Simple deduction)					-0.255*** (0.031)	-0.212*** (0.042)		
EU has made Britain more prosperous: W7 (1 Strongly disagree - 5 Strongly agree)							-0.094*** (0.022)	-0.129*** (0.023)
Border Fixed Effects	X	X	X	X	X	X	X	X
Geographic Covariates		X		X		X		X
Full Demographic Covariates		X		X		X		X
Robust Confidence Interval (Upper bound)	-0.140	-0.117	0.036	0.051	-0.209	-0.133	-0.066	-0.103
Robust Confidence Interval (Lower bound)	-0.267	-0.288	-0.005	-0.018	-0.373	-0.351	-0.184	-0.206
Bandwidth (Estimate)	16.5km	19.0km	31.1km	21.1km	21.5km	20.7km	20.3km	19.5 km
Bandwidth (Bias Correction)	31.4km	28.1km	53.6km	32.7km	34.0km	32.8km	33.8km	48.8km
Effective N. Control	4447	2630	4527	1612	1892	1223	5060	2562
Effective N. Treatment	6340	1958	3425	1243	1464	989	3710	1927
<i>Note:</i>	*p<0.05; **p<0.01; ***p<0.001							

larger magnitude than conventional ones. Similar effects are shown in Columns 7 and 8 regarding a different question in Wave 7.

This gap did not exist before the introduction of the ESIF scheme to the areas. Columns 3 and 4 of Table 2 show no observed effect of being in well-funded regions in Wave 2 in May 2014. Among those who took both waves of surveys, Columns 5 and 6 show that people in well-funded regions became more displeased with the EU than those in less-funded regions between Waves 2 and 9.

If people are dissatisfied with the status quo in their regions, it is possible that they also blame national and local governments as much as the EU. Only Wave 7 asked if they approve of the local, national, and EU authorities at the same time. Columns 1-3 in Table 3 apply the same geographic RD framework to those questions. It appears that the areas that received a significant amount of the EU funding do not necessarily show lower support for the local or national government, as opposed to the EU. Similarly, Columns 9 and 10 in Table 3 demonstrate that people in well-funded areas are dissatisfied with the democracy at the EU level at Wave 9, but not at the national level.

It is worth clarifying what criteria they use to evaluate the EU. In Wave 7, the BES

Table 3: RD: Related questions

Treatment variable:	Being in well-funded regions									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Do you approve or disapprove of the job that each of the following are doing? (Wave 7: 5 levels)										
EU	-0.080***									
	(0.021)									
National Government		-0.029								
		(0.020)								
Local Authority			-0.007							
			(0.020)							
What matters most to you when deciding how to vote in the EU referendum? (Wave 7: Single option)										
Sovereignty				-0.000						
				(0.007)						
Immigration					0.004					
					(0.007)					
Economy						-0.009				
						(0.007)				
Spending							0.026***			
							(0.004)			
Bureaucracy								0.030**		
								(0.008)		
On the whole, how satisfied or dissatisfied are you with the way that democracy works in the following? (Wave 9: 4 levels)										
EU									-0.083***	
									(0.018)	
UK										0.010
										(0.018)
Border Fixed Effects	X	X	X	X	X	X	X	X	X	X
Robust CI (Upper)	-0.050	0.031	0.052	0.016	0.035	0.012	0.042	0.052	-0.059	0.090
Robust CI (Lower)	-0.159	-0.066	-0.048	-0.023	-0.006	-0.027	0.020	0.007	-0.148	-0.002
BW (Estimate)	20.5km	18.4km	17.7km	21.9km	22.3km	28.8km	25.7km	20.3km	18.5km	18.6km
BW(Bias Correction)	33.5km	37.4km	31.6km	36.1km	37.7km	54.5km	36.5 km	33.4km	32.6km	32.3km
Effective N. Control	5285	4824	4695	4371	4108	4482	5177	4045	4420	4608
Effective N. Treatment	3944	3799	3490	3066	3016	3169	3478	2954	3504	3668
Note:	*p<0.05; **p<0.01; ***p<0.001									

asked what people cared the most when deciding how to vote in the EU referendum. Columns 4-8 in Table 3 reports the geographic RD results for what topic the respondents chose. Interestingly, people in well-funded regions were more likely to select niche topics such as "Bureaucracy" and "Spending" by about three percentage points, respectively, than their counterparts in more developed regions do. More mainstream issues such as immigration, economy, and sovereignty did not show such regional gaps.

If bureaucracy and spending are critical factors, people may perceive that the EU unfairly treats them or imposes a high financial burden. Table 4 looks at various questions regarding the perceptions of the EU and Brexit. Those in well-funded regions are no more likely to expect a significant change in their financial situation, crime, or immigration when the UK leaves the EU than those in more developed areas. They are no less likely

Table 4: RD: Perception of the EU

Treatment variable:	Being in well-funded regions							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Do you think the following would be better if the UK leaves the European Union? (Wave 7: 5 levels)								
My personal financial situation	0.022 (0.013)							
The general economic situation in the UK		0.046* (0.020)						
Do you think the following would be higher if the UK leaves the European Union? (Wave 7: 5 levels)								
Immigration to the UK			0.009 (0.021)					
Unemployment				-0.076*** (0.016)				
The risk of terrorism					0.000 (0.013)			
How much do you agree or disagree that ... (Wave 8: 5 levels)								
Britain gets its fair share of EU spending						-0.031 (0.022)		
EU made Britain more prosperous							-0.093*** (0.023)	
EU created more red tape for business								0.287*** (0.031)
Border Fixed Effects	X	X	X	X	X	X	X	X
Robust CI (Upper bound)	0.053	0.119	0.069	-0.042	0.021	0.021	-0.038	0.404
Robust CI (Lower bound)	-0.017	0.009	-0.029	-0.130	-0.047	-0.094	-0.162	0.269
Bandwidth(Estimate)	25.6km	19.4km	15.5km	23.9km	24.5km	18.2km	19.7km	10.1km
Bandwidth (Bias Correction)	43.8km	31.5km	31.4km	38.3km	41.1km	30.3km	30.9km	27.8km
Effective N. Control	6265	4853	4363	5896	6449	4041	5352	2501
Effective N. Treatment	4202	3654	3074	4200	4358	3126	4132	2225

Note:

*p<0.05; **p<0.01; ***p<0.001

to believe that Britain gets a fair share of the EU budget, either. However, they appear to believe that the EU created significant red tapes, made the UK less prosperous, and leaving the EU may improve employment in the UK. Given these findings, it is unlikely that people are protesting out of parsimony or fiscal concerns.

Immigration and identity were unarguably the decisive topic in the EU referendum and the reason for many voters to support the *Leave* position. However, Table 5 demonstrates that the well-funded regions do not show any disparities in their preferences for immigration policies or their attitudes toward immigrants. The questions regarding ethnic minorities or British pride did not show regional discontinuity either. There is no indication that those residents are anti-immigrant, socially conservative, or nationalistic.

The main findings suggest that people turned against the entity offered significant resources for place-based policies in their local areas. This behavior may seem irrational, but a closer look reveals that emotional reasons are not the primary factor. People in

Table 5: RD: Attitudes toward Immigration

Treatment variable:	Being in well-funded regions							
Dependent Variable:								
Immigrants from other EU countries pay more in taxes than they get in benefits (W7: 1-5 scale)	0.040 (0.069)							
Immigrants are a burden on the welfare state (W7: 1-5 scale)	0.010 (0.030)							
Feeling thermometer: Polish people (W7: 1-100 scale)	1.734 (1.258)							
Feeling thermometer: Romanian people (W7: 1-100 scale)	-0.189 (0.969)							
Attempts to give equal opportunities to ethnic minorities have gone too far (W8: 1-5 scale)	0.005 (0.018)							
EU citizens in Britain should claim child-benefits for their children living elsewhere (W8: Binary)	0.011 (0.008)							
Britain should allow more workers from other EU countries to come and live in (W8: 0-10 scale)	-0.074 (0.052)							
Identify myself with Britishness very strongly (W9: 1-7 scale)	0.009 (0.030)							
Border Fixed Effects	X	X	X	X	X	X	X	X
Robust CI (Upper bound)	0.162	0.045	5.309	2.715	0.042	0.034	0.105	0.091
Robust CI (Lower bound)	-0.163	-0.109	-0.700	-2.067	-0.046	-0.009	-0.173	-0.091
Bandwidth (Estimate)	11.2 km	14.3km	19.1km	25.2km	20.1km	19.4km	17.4km	21.8km
Bandwidth (Bias Correction)	24.9km	25.3km	40.4km	48.9km	37.0km	34.0km	27.5km	35.2km
Effective N. Control	2793	4140	1222	1596	5547	5533	5021	5848
Effective N. Treatment	2255	2971	928	1102	4112	4245	3717	4254

Note:

*p<0.05; **p<0.01; ***p<0.001

well-funded regions are no more likely to blame the EU for crime or immigration, and they are more interested in the EU’s spending and bureaucracy than sovereignty.

Robustness checks

All the tables for robustness checks are available in Online Appendix. While most RD models in the main section use border fixed effects, Table A1 shows that adding different sets of covariates or dropping border fixed effects do not change the main findings. While adding the full sets of covariates results in the loss of samples and the coefficients fluctuate, the results stay negative and significant for all the specifications.

I used local authority areas as the unit of clustering for variance estimation. Models in Table A2 use different geographic levels for clustering. The results without any clustering return large standard errors, but the approval of the EU in well-funded regions is negative and significant at the 95% confidence interval for all the models.

As shown earlier, the treated regions had heterogeneity in their exposure to the EU funds, but dropping outliers did not change the results. Cornwall and West Wales received a higher amount of the ESIF funding as *Less Developed Regions*, Highlands and Islands had prior exposure to the EU funding as *Convergence Areas*. Merseyside made it to the *Transition Regions* status even though their GDP per capita seems to be above the threshold. As robustness checks, Table A3 presents the RD results for the EU approval in Wave 9, using different definitions of “well-funded regions”. I dropped the respondents in those three areas, and the result did not change significantly.

The results with arbitrary bandwidth (20km, 30km, 40km, 50km) instead of CCT, different order of polynomial for point estimation (2, 3) and bias correction (3, 4), as well as the results using different kernel (Uniform and Epanechnikov) are presented in the Table A4. They are all consistent with the main findings.

In addition to the RD, a simple difference-in-difference analysis with different definitions of well-funded areas is given in Table A5. Table A6 presents a two-stage least square analysis, using the well-funded region as the instrument variable and per-capita funding as the treatment variable. The results are consistent with the main findings in both

analyses, and more estimated per capita funding leads to less support. More detailed descriptions for Tables A5 and A6 are given in Online Appendix F and G. They indicate that the findings are not unique to geographic RD.

Discussions on mechanisms and subset analysis

The main findings are contrary to conventional wisdom, but earlier sections outlined five possible mechanisms to explain negative effects - dislike for inefficient pork-barrel politics, welfare chauvinism, misinformation, misattribution, information bias. While it is impossible to directly assess how the respondents perceived the EU-funded projects themselves with the BES data, it is possible to narrow down the potential mechanisms by evaluating which socioeconomic/skill/age groups reacted more strongly. Besides, most BES respondents reported the newspapers they read and what information source they used when deciding how to vote in the referendum, which provides a further clue. It can also test the expectation that place-based policies have heterogenous political effects.

It is essential to remind the earlier findings that people's feelings about immigration or sovereignty did not show the corresponding regional disparities. Those in well-funded areas are not satisfied with the EU's economic management and the state of democracy, and they are interested in spending and bureaucracy of the EU. These findings exclude explanations based on nationalism, anti-elitism, or identity politics.

I analyze what socioeconomic groups are driving the observed effect with the five different mechanisms in mind. First, I subsetted the sample with the educational attainment and socioeconomic status (*NRS social grade*) and then applied the geographic regression discontinuity framework to those subgroups.

Columns 1 - 4 in Table 6 report the results subsetted by educational attainment. Among the highly educated group, people in well-funded regions are more likely to disapprove of the EU than those in the less well-funded areas. The magnitude of the effect is about 0.29 points on a five-point scale, which is twice as much as the aggregate outcome shown earlier in Table 2. Columns 2 to 4 demonstrate that the coefficients get smaller as the respondents become less educated. Columns 5 - 8 in Table 6 present the

RD analysis subsetted by socioeconomic status. A similar tendency is observed here, as those with high-socioeconomic status tend to react more strongly against the EU. Subset analyses with labor market status and age groups are presented in Table A7 in Online Appendix H, but they show no specific trend associated with the regional discontinuity.

The results in this analysis lend support to the anti-pork-barrel attitude or the welfare chauvinism. Misattribution or misinformation bias appears less likely to concentrate among highly-educated, high-SES people. The caricatural description of the anti-EU voters - older people without a university degree, does not represent the groups reacting negatively to the EU-funded projects.

Subsequently, I analyze if the information source about the EU and local area can

Table 6: Subset RD: Education and SES

Treatment variable: Being in well funded regions								
Dependent variable: Approve EU (Wave 9: 5 levels)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Highest educational attainment of the respondent:								
Tertiary Education	-0.286***							
	(0.045)							
Upper Secondary (A-level)		-0.145						
		(0.084)						
Lower Secondary (GCSE)			-0.081**					
			(0.025)					
Compulsory/Primary				-0.017				
				(0.046)				
Socioeconomic status of the respondent (Wave 9):								
High(A/B)					-0.247***			
					(0.054)			
Intermediate(C1)						-0.126*		
						(0.052)		
Lower Middle(C2)							-0.065	
							(0.038)	
Inactive(E)								-0.161*
								(0.074)
Border Fixed Effects	X	X	X	X	X	X	X	X
Robust CI (Upper)	-0.255	0.017	-0.010	0.093	-0.149	-0.050	0.012	0.022
Robust CI (Lower)	-0.462	-0.407	-0.135	-0.151	-0.413	-0.319	-0.175	-0.362
Bandwidth (Estimate)	13.7km	14.1km	25.7km	19.5km	16.4km	17.9km	22.3km	18.8km
Bandwidth (Bias Correction)	40.0km	25.9km	49.9km	34.0km	31.1km	30.4km	41.7km	31.5km
Effective N. Control	1434	744	1416	651	1405	1231	1012	629
Effective N. Treatment	981	578	990	532	1009	922	778	476

Note:

*p<0.05; **p<0.01; ***p<0.001

make a difference. There are two possible ways that newspapers or media can affect the readers' view of EU-funded projects. The first possibility is in line with the information bias hypothesis that readers are influenced by the pro-EU or anti-EU stance of the news source they read. The local EU-funded projects serve as a reminder of the virtue or problems of the EU. The Reuters Institute for the Study of Journalism at Oxford University analyzed the reporting of major newspapers in the UK about the EU and reported a significant divergence in their stances and coverage.⁷ I categorized the newspapers by their Brexit stance, according to the report of the Reuters Institute.

Another possibility is that more information about the details will make people more skeptical in evaluating projects, which is in line with anti-pork-barrel attitudes. It is generally thought that those local development programs receive more coverage in local or regional newspapers (Surubanu 2017), and the readers of those papers may be more exposed to potential inefficiencies or problems related to the local development projects. Similar arguments can apply to the radio (Strömberg 2004) as opposed to TV.

I conducted the same spatial regression discontinuity analysis shown earlier, but this time with the respondents' subset reading particular newspapers. Columns 1 to 5 in Table 7 show the RDD results. Those respondents who read local or regional newspapers⁸ and live in the well-funded areas tend to disapprove of the EU. On the other hand, no discontinuity was observed among the readers of nation-wide newspapers, irrespective of their editorial stances on Brexit. The readers of the Daily Mail, a hard-line Brexit supporting paper, did not react differently to the local funding compared to the Guardian readers, who read more pro-EU editorials. It appears that the geographic discontinuity is not the result of the media-delivered image of the EU enhanced by the local presence of EU objects. This discredits the information bias theory.

It appears that those who are informed about the place-based policies are likely to disapprove of the EU, and they are not necessarily swayed by the opinions of papers they read. While it is not possible from the data to know which local papers the respondents

⁷ The Reuters Institute for the Study of Journalism, May 2014 <http://www.ox.ac.uk/news/2016-05-23-uk-newspapers-positions-brexite> last accessed December 9, 2019

⁸ Regional newspapers outside England include The Scotsman, The Herald (Glasgow), The Western Mail (Wales). Local newspapers in England are not specified in the BES dataset.

are reading, local papers' editorials are unlikely to be systematically affected by the area's ESIF funding status.

Wave 7 asked what information source the respondents use to gather information about the EU. Columns 6 to 8 in Table 7 show the RD results for this question. Those who gathered information via radio and talking showed a significant regional discontinuity, while the TV users show a smaller gap. As most TV channels operate nation-wide while many radio stations are locally run, it can indicate that those who gather information via local sources react more negatively to local place-based policies.

To test the welfare-chauvinism hypothesis, I subset the respondents according to their response to two welfare-related questions in Wave 7. Table 8 shows that the negative

Table 7: Subset RD: Information source (Geographic RD: CCT bandwidth)

Treatment variable:		Being in well funded regions							
Dependent variable:		Approve EU (5 levels)							
		Wave 9				Wave 7			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Subset: newspaper subscription (Wave 9)									
Local and Regional Newspapers		-0.158*							
		(0.067)							
The Daily Mail (Pro-Brexit, Anti-EU)			0.011						
			(0.038)						
The Guardian (Anti-Brexit, Pro-EU)				0.138					
				(0.106)					
Pro-Leave papers (The Daily Mail / The Sun / Daily Telegraph / Daily Express)					0.020				
					(0.035)				
Pro-Remain papers (Daily Mirror / Guardian / Financial Times)						-0.112			
						(0.071)			
Subset: information source about the EU (Wave 7)									
Talking							-0.209***		
							(0.039)		
Radio								-0.225***	
								(0.038)	
TV									-0.052*
									(0.024)
Border Fixed Effects		X	X	X	X	X	X	X	X
Robust CI (Upper bound)		-0.002	0.124	0.467	0.133	0.045	-0.157	-0.346	0.012
Robust CI (Lower bound)		-0.342	-0.064	-0.106	-0.035	-0.319	-0.354	-0.142	-0.119
Bandwidth (Estimate)		26.1km	24.4km	29.7km	14.9km	17.9km	18.5km	20.7km	21.6km
Bandwidth (Bias Correction)		48.8km	47.6km	52.5km	30.9km	32.9km	32.5km	32.6km	34.5km
Effective N. Control		481	917	483	1369	657	2195	1708	3568
Effective N. Treatment		356	627	308	934	488	1628	1198	2635

Note:

*p<0.05; **p<0.01; ***p<0.001

attitude toward the EU is concentrated among those sympathetic to the welfare programs and recipients. It may not disprove welfare chauvinism in this particular context of the EU funds, but at least one could say there is no apparent link between hostility to welfare recipients and adverse reaction to the place-based policies.

Table 8: Subset RD: Perception of welfare

Treatment variable:	Being in well-funded regions					
Dependent variable:	Approve EU (Wave 7: 5 levels)					
<i>Too many people these days like to rely on government handouts (W7)</i>						
Agree/Strongly agree	-0.007 (0.021)					
Neither agree or disagree		-0.264*** (0.043)				
Disagree/Strongly disagree			-0.196*** (0.055)			
<i>When someone is unemployed, it's usually through no fault of their own (W7)</i>						
Agree/Strongly agree				-0.230*** (0.030)		
Neither agree or disagree					-0.122*** (0.035)	
Disagree/Strongly disagree						0.060 (0.043)
Border Fixed Effects	X	X	X	X	X	X
Robust Confidence Interval (Upper bound)	0.028	-0.215	-0.048	-0.196	-0.071	0.164
Robust Confidence Interval (Lower bound)	-0.085	-0.430	-0.336	-0.354	-0.237	-0.060
Bandwidth (Estimate)	21.7km	16.6km	19.8km	20.4km	14.5km	28.9km
Bandwidth (Bias Correction)	34.1km	30.9km	34.5km	32.7km	30.3km	47.9km
Effective N. Control	3248	862	1023	2057	1641	1257
Effective N. Treatment	2248	663	837	1523	1174	922

Note:

*p<0.05; **p<0.01; ***p<0.001

Thus, while it is challenging to establish an anti-pork-barrel attitude firmly, this section convincingly denies the three other potential mechanisms; miss-attribution, misinformation, and information bias, while casting doubt on the welfare chauvinism argument. Thus it is reasonable to conclude that those highly educated, high SES people, who read local newspapers and somewhat sympathetic to welfare recipients, are likely to evaluate the EU negatively given the management of projects they saw in their area.

Even though the negative return on place-based policies is contrary to the conventional wisdom on pork-barrel politics and clientelism in general, it is imperative to note that

the literature on those topics mainly discusses the impact of those policies on the poor. While low-income voters may have reacted positively toward cash transfers and public sector employment, it is not clear how relatively better-off people respond to such policy measures, knowing the potential inefficiencies. As place-based policies are often visible and less targeted, the reaction of the rich would also affect how the areas would politically respond to the policy measures. Rather than whether the government spends money for them, how they spend and managed may become a more prominent criterion, as the amount spent does not necessarily correlate with the improvement in individual utility in the case of place-based policies.

Geocoded Projects and Matching Analysis

The earlier geographic regression discontinuity analysis can deal with the selection issues and omitted variable problems, but an intent-to-treat analysis; not using the projects themselves. Even though the chance of gaining EU funding is open to any entity in the well-funded regions, not all of the supposedly well-funded regions may witness big EU-funded projects. To deal with treatment, I conducted a complimentary matching analysis using the recipients' locations.

I geocoded all the local managing authorities of ESIF-funded projects in England by their post-codes, using the data from the Department of Communities and Local Government.⁹ The datasets listed all of the managing authorities such as local commissions, local authorities, and chambers of commerce, but not the end beneficiaries. Therefore, even if the funding was to support the capital investment by small and medium-sized enterprises, the data does not have individual firms' locations; they have the intermediaries' addresses. Nonetheless, it is assumed that most of the end-beneficiaries are located near the managing authorities, since the EU has strict rules about the end beneficiaries' location as described in the previous sections.¹⁰ The central government departments in London or the Big Lottery Fund in Coventry manage most of the job training projects

⁹ Scotland and Wales publish separate datasets with a different format. Only England is featured in this section.

¹⁰ In some projects, private consulting firms get funding for the projects in specific areas, but the data only has the location of their headquarters, which inevitably resulted in some mismatches.

funded by ESF in England, and those programs had large targeted areas, so they are excluded. Focusing primarily on locally managed ERDF projects has another merit, in that none of them had started by Wave 2, unlike labor market projects.

The dataset recorded 1305 projects categorized into 89 different policy objectives, and I classified them into the following six large groupings; 1. Infrastructure and Transport; 2. SME support / Business development / Industrial parks; 3. Climate change measures, Biodiversity, Renewable energy; 4. Community-led local development; 5. Information and Communication, ICT; 6. Research and Innovation, Technology transfer.¹¹ Community-led local development projects are often targeted at deprived quarters in the cities. Many “SME support” projects combine several measures, such as developing a business park and grants for new business investments. Some of the climate change measures appear to include infrastructure upgrades, as well.

I sorted all the projects in England in the 2014-2020 EU budget cycle published by July 2020, then checked for each local authority area in England, what type of EU-funded projects are in place, if any. Table 9 shows the decomposition of the projects according to project type. I also categorized them into four different recipient types; A. Local and Regional Councils; B. Private firms and Chambers of Commerce; C. Nonprofit organizations and Trusts; D. Universities.

Table 9: Count of EU-funded projects in England (ESIF) by July 2020

Infrastructure&Transport	SME/Business development /Industrial parks	Climate change, Biodiversity, Renewable	Community-led local development	ICT	Research&Innovation
149	515	92	45	70	212

With the geocoded project data and the same BES dataset, I test if having certain kinds of EU-funded projects in the area affect people’s views on the EU. The Genetic Matching (Diamond and Sekhon 2013) algorithm is used to find two people, who are similar in demographic characteristics. Those who live in the local authority areas with specific project types are in treatment groups, and those without such projects are in

¹¹ A few projects with several different objectives are double-counted for different categories. Some miscellaneous projects, such as government accounting, were not categorized.

control groups. Genetic matching finds the matched sets with the lowest p-value of any covariate differences between the treated and controlled samples. As in the RD sections, dependent variables are the approval of the EU in Waves 2 and 9. The respondents are matched with full demographic and socioeconomic variables (30) used earlier. Online Appendix I shows the list of matched variables and the result of conventional nearest-neighbor matching.

The results in Table 10 suggest that a person with identical characteristics shows lower support for the EU if the area benefited from Infrastructure projects or business support programs funded by the EU in Wave 9. As in the RD, such a gap is not observed for Wave 2, and climate change measures also result in aggravating the EU approval between Waves 2 and 9. While coefficients are negative across different types of projects, the effect is weaker and not significant for the areas with community-led local development and research and innovation projects.

Table 11 shows the genetic matching results according to recipient type. People react negatively to those projects in which local authorities are the beneficiaries, but people do not seem to respond when universities or nonprofit organizations received funding. As

Table 10: Matching result: Project type

Dependent variable:	Approve EU (5 levels)					
	W9	W2	$\Delta W2:W9$	W9	W2	$\Delta W2:W9$
Infrastructure and Transport	-0.05682* (0.02821)	0.006471 (0.012531)	-0.11889* (0.05252)			
SME support / Business development / Industrial parks				-0.06053** (0.02287)	0.012706 (0.010306)	-0.09854* (0.04312)
Number of Matched Observations	6334	3398	2656	9844	5350	4098
Climate change measures, Biodiversity, Renewable energy	-0.02016 (0.03093)	0.020747 (0.013743)	-0.14448* (0.05758)			
Community-led local development				-0.06136 (0.04566)	0.01982 (0.02029)	-0.14398 (0.08585)
Number of Matched Observations	5356	2890	2282	2410	1310	1012
Information and Communication, ICT	-0.06587 (0.03363)	0.02178 (0.01525)	-0.09519 (0.06367)			
Research and Innovation, Technology transfer				-0.04444 (0.02657)	0.003058 (0.012116)	-0.07724 (0.05106)
Number of Matched Observations	4522	2386	1826	7244	3922	2950

Note:

*p<0.05; **p<0.01; ***p<0.001

the residents did not turn against local authorities in the earlier results, this may be due to council-run projects' public nature and visibility.

In Online Appendix I, the results using nearest-neighbor matching instead of genetic matching are reported, as well as the results that count projects in a 20 km buffer area outside the local authorities (Tables A8/A9). All of the negative and significant results in this section are robust and consistent in those different specifications.

Table 11: Matching result: Recipient type

Dependent variable:	Approve EU (W9)				Δ Approve EU (W9-W2)			
Recipient type:								
Local and Regional Council	-0.07525**				-0.17316***			
	(0.02371)				(0.04469)			
Private Firms / Chamber of Commerce		-0.04825				-0.08267		
		(0.02742)				(0.05280)		
Nonprofit Organizations and Trusts			-0.01344				0.03209	
			(0.039242)				(0.07341)	
Universities				-0.001645				-0.07296
				(0.029054)				(0.05585)
N. of Matched Observations	9008	6754	3420	6078	3694	2780	1494	2520

Note:

*p<0.05; **p<0.01; ***p<0.001

These results largely corroborate the earlier findings in the RDD: the EU-funded projects indeed reduce the support for the EU. As the Research & Innovation projects in the universities were available in the *More developed regions* funding category, the matching results strengthen the view that conventional regional development policies are causing the political shift.

The projects with wide beneficiaries, such as Infrastructure projects and climate change measures, were the worst performer in political returns. In contrast, selective policies such as community-led local development in deprived areas, returned weaker results. This suggests that place-based policies that are visible and large in scale, which attract local attention and scrutiny, can negatively affect the evaluation. This is in line with the anti-pork barrel attitude presented in the earlier sections.

Suppose well-educated residents are critical of the policies they do not benefit from, as in the welfare chauvinism argument. In that case, the community-led local development policies should be associated with the largest negative effect, and business support projects could potentially have a positive return. However, the results indicate that redistributive

aspects are not relevant. It is reasonable to interpret that voters are more critical of deliveries and management of the projects or spending money in an inefficient way, rather than having any projects at all.

Conclusion

This paper deals with the lack of political support from the supposed beneficiaries of place-based policies, about which few attempts has been made to rigorously identify and theorize. The mechanism is not pinpointed precisely, but the findings suggest that well-informed, well-off people hate inefficient or ill-suited pork-barrel projects in their local areas. Discovering potential heterogeneity regarding receptions of place-based policies is a critical step. More meticulous data of project performance indicators and residents' surveys will uncover this mystery further.

The findings cast doubt on the traditional understanding of pork-barrel politics. It appears that the EU failed to generate political support, especially among the high-skilled and highly-educated voters. Compared to cash transfer or welfare programs, whose effectiveness to improve political support is well established, place-based policies may be less potent. As economics literature points out, place-based policies have not been successful in eliminating regional economic disparities, and if the contribution to “pork” is more likely to be noticed by well-informed, well-off voters in the area, the usual formula of buying votes of relatively worse-off voters may cease to function.

The results of this paper also have substantial policy implications. As the political backlash against economic globalization became familiar, many policymakers used place-based policies to compensate regions adversely affected by technological changes, industrial declines, economic globalization, and environmental regulations. It is essential to review whether such compensatory measures have the intended effect at all, and this paper questions the efficacy of such policies to placate the discontent.

Many policy fields, such as protectionism, are known to be economically inefficient yet believed to be politically effective, but such assumptions rarely undergo rigorous scrutiny. However, the political impact of distributional policies needs to take into account

the eventual economic impact and heterogenous political reactions among the supposed beneficiaries. Understanding who benefits and who loses from political favor could be essential steps to analyzing the question of democratic accountability.

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Online Appendix

Table of Contents

- P2. Online Appendix A: Detailed information about the ESIF and the national-level regional development programs
- P5. Online Appendix B: McCrary density test
- P6. Online Appendix C: Robustness checks; different covariates and clustering
- P8. Online Appendix D: Robustness checks; different definitions of well-funded regions
- P10. Online Appendix E: Robustness checks; arbitrary bandwidth, different order of the local polynomial, and kernel
- P11. Online Appendix F: Difference-in-differences results with different definitions of well-funded regions
- P12. Online Appendix G: Two-stage least square analysis with per-capita EU funding
- P13. Online Appendix H: Subset analysis with age and labor market status
- P14. Online Appendix I: Nearest-neighbor matching and matching with 20km buffer
- P16. Online Appendix J: Discussion on the findings of Colantone and Stanig (2018)
- P18. Online Appendix K: RD graphs
- P19. Online Appendix L: Examples of ESIF-funded projects
- P20. Online Appendix M: Geographic distribution of ERDF recipients in England

Online Appendix A: Detailed information about the ESIF in the UK and the government-led regional development programs

European Regional Development Fund (ERDF) and European Social Fund (ESF) are the primary tools the EU uses to foster regional development in relatively advanced member states, which together are referred to as European Structural and Investment Funds (ESIF).¹

ERDF covers most of the conventional regional development policies, such as the financial support for small and medium-sized enterprises, investment in infrastructure, transport, broadband, energy, business services, and information and communication technologies. Large firms are also eligible for the funding as long as the investment concerned is related to research and innovation, energy, environment, ICT, and cooperations with local small and medium-sized enterprises. Any regional development policies, except for constructions of nuclear power stations, airports, manufacturing of tobacco, and undertaking of firms in difficulty can be applicable to the ERDF.

ESF financially support local employers, public authorities, and other training institutions to assist with employment and social inclusion, as well as vocational training and retraining. The eligible projects for ESF include 1) Promoting employment and mobility, 2) Promoting social inclusion, combating poverty and any discrimination, 3) Education, training, vocational training, life long learning, and 4) Institutional capacity for public authorities and stakeholders and efficient public administration.

In both ERDF and ESF, the aid may take the form of grants, prizes, repayable assistance, other financial instruments, or a combination of them. While the EU assesses the applications and finances for more than 50% of each approved project's expenditure, the national governments, local governments, and relevant private actors are obliged to co-finance the project to ensure their commitment.

In the UK, the Department for Business, Innovation, and Skills coordinated the UK-wide policies of ESIF. In England, the Ministry of Housing, Communities, and Local

¹ "Regulation (EU) No1303/2013 of the European Parliament and of the Council." *Official Journal of European Union* <https://ec.europa.eu/digital-single-market/en/news/regulation-eu-no-13032013-european-parliament-and-council> Accessed 24 August 2019

Government was responsible for ERDF, and the Department for Work and Pensions is for ESF. ESIF stresses the importance of Community-led local development and encourages local actors, rather than the national governments, to come up with proposals. In England, the projects were evaluated and managed through the Local Enterprise Partnership (LEP) areas, while the Scottish and Welsh Governments and the Northern Ireland Executive were in charge of the delivery of ERDF and ESF in their own nations. Thus there are four layers of government involved in the ESI at the local, regional, national, and EU levels, but the EU is the predominant funder, and often has the final say on the project approval.

Prior to the Brexit referendum in June 2016, the UK government scaled back the regional development policies under the broad framework of austerity programs. They abolished the Regional Development Agencies, and put an end to earmarking, except for school and public health grants in 2012, in exchange for an increase in autonomous tax revenues.² Even though the UK government changed its approach and unveiled two programs to foster regional development after the Brexit referendum, they are smaller in scale compared to the ESI schemes. The *Transforming City Fund*, similar to ERDF, allocated 1.28 billion Pounds for the five years from 2018/19 to 2022/23. The *Housing and Infrastructure Funds*, had 2.3 billion pounds for the four years between 2017/18 and 2020/21³. Those national schemes were primarily targeted at England, and cover different policy areas⁴, but it is clear that ERDF and ESF were vital sources for local development projects for local areas, especially in relatively struggling regions with limited autonomous tax revenues.

It is difficult to know the entire amount the UK government committed to de facto regional policies, in addition to those funds presented in the main section, as there is no ministry to oversee regional development explicitly. In the national budget for the fiscal year 2019-20, the total amount allocated for *Business, Energy and Industrial Strategy*

² Ferry, Martin, and John Bachtler. 2013. "Reassessing the concept of policy termination: the case of regional policy in England." *Policy Studies* 34(3): 255-273.

³ Her Majesty's Treasury. 2018. "Copy of the Budget Report: October 2018" Ordered by the House of Commons to be printed, 29 October 2018

⁴ Scottish, Welsh, and Northern Irish devolved governments are in charge of regional development programs in their respective nations.

was 1.8 billion Pounds, and *Housing and Community* received 2.3 billion Pounds⁵, some of which was relevant to local development.

It was clear to the voters in the benefiting areas that voting for Brexit in June 2016 would risk the discontinuation of these benefits, and the exit from the EU jeopardized the funding arrangement. In July 2018, more than two years after the referendum, the UK government finally committed to funding projects which would have been funded according to the EU rules⁶, but until then, the status of the current ESI funding recipients was left uncertain. As of March 2020, there was no funding program secured for those who would have benefited from the ESI in the 2021-2027 budget cycle had the UK stayed in the EU.

It could be worth noting that the outcome variables in this paper measure one's approval or evaluation of the EU, and not local representatives.⁷ It is possible that relatively well-informed, well-educated groups with high-socioeconomic status regarded the entities that distribute those projects as wasteful or inefficient, but not their local representatives who managed to get the funding. While those regions were net beneficiaries of EU funds, the taxpayers contributed to regional development projects all across the EU, and the perception of the local EU-funded projects and the EU's competence may have affected the overall evaluation of the EU.

⁵ Her Majesty's Treasury. 2018. "Copy of the Budget Report: October 2018" Ordered by the House of Commons to be printed, 29 October 2018

⁶ Her Majesties Treasury "Funding from EU programs guaranteed until the end of 2020" <https://www.gov.uk/government/news/funding-from-eu-programmes-guaranteed-until-the-end-of-2020> accessed September 19, 2019

⁷ The Members of the European Parliaments (MEPs) are elected in a block-level proportional representation system, and MEPs do not have strong mandates regarding specific projects in the area they represent.

Online Appendix B: McCrary Density Test

Figures A1 and A2a show the McCrary Density Test results, in order to assure there was no manipulation of the running variable in the regression discontinuity design. Visually, there is no evidence that the eligibility border was manipulated. However, the treatment areas have slightly fewer survey respondents near the border than the control area. This could result from two rural treatment areas - West Wales and Scottish Highlands and Islands - having fewer respondents than the nearby control areas.

Figure A2b shows the McCrary Density Test without those who live near the border of these two rural regions. They do not show a discontinuity of unit numbers, and it appears that the distributions are smooth across the cut-point. In the robustness checks, the results are presented without those two regions, and they are consistent with the main findings. The balance test with border fixed effects in Figure 2 of the main paper did not show any discontinuity related to the urban-rural divide either.

Figure A.1: McCrary test (IK)

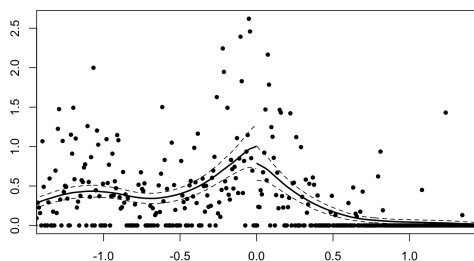
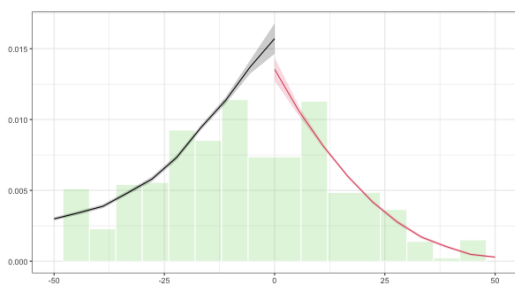
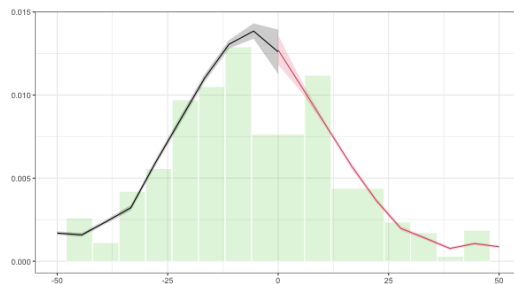


Figure A.2: McCrary test (CCT)



a. Full sample



b. Excluding West Wales and Highlands and Islands

Online Appendix C: Robustness checks with different covariates and clustering for RDD

Full demographic covariates for RDD include age, sex, ethnicity, social grade (6 categories), labor market status (full-time, part-time, inactive, retired, student, unemployed), Anglican Christian, non-christian, monthly church attendance, sexuality, marital status, homeownership, university degree, enrollment to any university, household size, being a parent, household income, past or current union membership, having a routine job, having preschool kids in the household, having school-age kids in the household, having sick elderly persons in the household, Facebook usage, and Twitter usage. Some of them include a substantial number of non-response.

Core demographic covariates include age, sex, ethnicity, social grade (6 categories), labor market status (Full-time, Part-time, inactive, retired, student, unemployed), Anglican Christian, non-christian, sexuality, marital status, and enrollment to any university.

Geographic covariates include the unemployment rate in 2016 (From Nomis Labor market statistics), its growth from 2008, the urban rate in 2011, population density in 2011, and the Gross Domestic Household Income (GDHI) per capita in 2011 (From 2011 census). The linear distance to London is also included.

Border fixed effects use one of the seven different continuous borders (Scottish Highland, Lincolnshire and South/East Yorkshire, Lancashire and Durham (Southern border), Staffordshire and Herefordshire, Northumberland, Devon, and Wales) to which the respondents is the closest. NUTS 2 regions are treatment unit, and individual respondents are located by their local authority areas.

Table A1 presents the results with different sets of covariates, and Table A2 uses different geographic units for clustering to estimate variance. The effects are consistently negative and significant.

Table A1: Robustness checks with different covariates

Treatment variable:	Being in well-funded regions							
Dependent Variable:								
Approve EU: Wave 9	-0.179 (0.031)	-0.166 (0.026)	-0.111 (0.025)	-0.174 (0.024)	-0.140 (0.024)	-0.180 (0.031)	-0.187 (0.031)	
Border Fixed Effects		X	X	X	X	X	X	
Geographic Covariates			X		X		X	
Core Demographic Covariates				X	X	X	X	
Full Demographic Covariates						X	X	
Robust CI (Upper bound)	-0.141	-0.140	-0.067	-0.145	-0.107	-0.130	-0.117	
Robust CI (Lower bound)	-0.284	-0.267	-0.193	-0.263	-0.220	-0.296	-0.288	
Bandwidth (Estimate)	12.5km	16.5km	18.3km	16.7km	17.5km	20.2km	19.0km	
Bandwidth (Bias Correction)	30.1km	31.4km	32.4km	31.7km	35.0km	31.0km	28.1km	
Effective N. Control	3743	4447	4581	4444	4578	2827	2630	
Effective N. Treatment	2804	3232	3681	3228	3437	2134	1958	

Table A2: Robustness Checks: Results with different units for clustering

Treatment variable:	Being in well-funded regions							
Dependent Variable:								
Approve EU: Wave 9	-0.138 (0.064)	-0.122 (0.058)	-0.180 (0.024)	-0.166 (0.021)	-0.180 (0.023)	-0.166 (0.019)	-0.152 (0.057)	-0.123 (0.051)
Variance clustered at;								
NUTS 2 region level			X	X				
Nearest border level					X	X		
Parliamentary Constituency level							X	X
Standard errors not clustered	X	X						
Border fixed effects		X		X		X		X
Robust CI (Upper bound)	-0.011	-0.014	-0.159	-0.142	-0.159	-0.153	-0.049	-0.037
Robust CI (Lower bound)	-0.337	-0.316	-0.267	-0.254	-0.260	-0.241	-0.333	-0.300
Bandwidth (Estimate)	19.2km	21.9km	12.8m	17.3km	12.0km	16.6km	18.4km	21.7km
Bandwidth (Bias Correction)	33.2km	36.4km	30.5km	31.8km	30.5km	33.5km	32.1km	35.4km
Effective N. Control	5080	5670	3917	4576	3336	4447	4764	5619
Effective N. Treatment	3865	4121	2804	3512	2801	3232	3865	4121

Online Appendix D: Robustness checks with different definitions of well-funded regions

As most of the UK regions had a GDP per capita below the EU average in 2011, most of the *More Developed Regions* were not far from the cut-off line of the 90%, and relatively comparable with the *Transition Regions*. Nine NUTS 2 regions in the UK had a GDP per capita between 90% and 92% in 2011 and marginally missed out on *Transition Regions* status, while another eleven regions had the a GDP per capita between 93% and 100%. Most of them are geographically adjacent to the *Transition Regions*.

In 2011, the 90% threshold of GDP per capita corresponded to 23,580 Euros. The UK regions of Dorset and Somerset had a GDP per capita of 23,600 Euros and were categorized as *More Developed Regions*. The neighboring region of Devon recorded 22,500 Euros and was categorized as a *Transition Region*. The small differences put them in very different positions regarding ESIF funding availabilities. The only exception within the UK was Merseyside, which had 23,700 Euros, 120 Euros above the cut-off threshold. The area was previously categorized as an exception, as a “phasing in” region. In the following empirical analysis, the results without Merseyside are presented.

As robustness checks, Table A3 presents the RD results for the EU approval, using different definitions of “well-funded regions”. As noted in the earlier section, Merseyside was selected as *Transition Region* even though the GDP per capita in 2011 was above the 90% threshold, while Cornwall, West Wales, and Scottish Highlands and Islands were treated as *Convergence regions* in the previous EU budget cycle. I dropped the respondents in those areas, and the result did not change significantly.

Table A3: Robustness Checks: Results excluding Merseyside, Cornwall, West Wales, and Scottish Highlands

Dependent Variable:	Approve EU: Wave 9 (1 Strongly disapprove - 5 Strongly approve)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment Variable:							
Being in Well-funded region	-0.173 (0.030)	-0.169 (0.033)	-0.158 (0.034)	-0.180 (0.031)	-0.149 (0.031)	-0.154 (0.032)	-0.141 (0.039)
Sample Excluding:							
- Merseyside (Political assignment)		X			X		X
- West Wales and Cornwall (<i>Less Developed Regions</i>)			X		X	X	X
- Highlands and Islands (Former <i>Convergence area</i>)				X		X	X
Robust Confidence Interval (Upper bound)	-0.134	-0.117	-0.046	-0.143	-0.078	-0.109	-0.069
Robust Confidence Interval (Lower bound)	-0.272	-0.272	-0.387	-0.286	-0.241	-0.261	-0.263
Bandwidth (Estimate)	13.7km	15.6km	18.0km	12.5km	19.3km	13.5km	15.0km
Bandwidth (Bias Correction)	31.2km	32.0km	37.3km	29.7km	32.0km	30.3km	27.5km
Effective N. Control	4058	4445	4306	3738	5032	3908	4326
Effective N. Treatment	2854	2734	2989	2804	2855	2352	2017

Note:

*p<0.05; **p<0.01; ***p<0.001

Online Appendix E: Robustness checks with arbitrary bandwidth, different order of the local polynomial, and kernel

The results with arbitrary bandwidth (20km, 30km, 40km, 50km) instead of CCT, different order of polynomial for point estimation (2, 3) and bias correction (3, 4), as well as the results using different kernel (Uniform and Epanechnikov) are presented in the Table A4. They are all consistent with the main findings.

Table A4: Robustness Checks: Results with Arbitrary Bandwidth and kernel (Geographic RD)

Treatment variable:		Being in well-funded regions						
Bandwidth	20km	30km	40km	50km	CCT	CCT	CCT	CCT
Polynomial order of:								
Point estimator	1	1	1	1	2	3	1	1
Bias correction	2	2	2	2	3	4	2	2
Kernel		Triangular				Uniform		Epanechnikov
Dependent Variable:								
Approve EU: Wave 9	-0.138 (0.022)	-0.092 (0.017)	-0.081 (0.015)	-0.067 (0.014)	-0.170 (0.028)	-0.246 (0.042)	-0.096 (0.039)	-0.159 (0.025)
Border Fixed Effects	X	X	X	X	X	X	X	X
Robust CI (Upper bound)	-0.161	-0.129	-0.093	-0.092	-0.122	-0.130	-0.072	-0.131
Robust CI (Lower bound)	-0.327	-0.251	-0.195	-0.179	-0.254	-0.296	-0.238	-0.252
Bandwidth (Estimate)	20km	30km	40km	50km	34.2km	38.5km	9.4km	16.9km
Bandwidth (Bias Correction)	20km	30km	40km	50km	54.2km	59.3km	27.6km	31.8km
Effective N. Control	5243	7082	8224	9312	7919	8185	2240	4447
Effective N. Treatment	3984	5118	5353	5683	5239	5353	2071	3439

Online Appendix F: Difference-in-differences results with different definitions of well-funded regions

Table below presents initial difference-in-differences results in England, using the approval of the EU in Wave 2 and Wave 9 as a dependent variable. Scotland and Wales had their own devolved regional development policies and are excluded from the initial results. Being in the *Transition Regions* had negative effects on the respondents' evaluation of the EU in Wave 9, the effects ranging from -0.21 to -0.28 points on the 5-point scale. The effects are missing in Wave 2, suggesting that the negative effects appeared after most of the EU-funded projects started. Removing Merseyside or adding Cornwall - the only English region in the *Less Developed Regions* category - do not make meaningful changes in all the different specifications. As there was no data before January 2014, this section does not have the pre-trend analysis.

Table A5: Difference-in-differences in England with different definitions of “well-funded regions”

Dependent variable:	Do you approve or disapprove of the job that the EU is doing? (Wave 2 and 9) (1 Strongly disapprove - 5 Strongly approve)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Being in <i>Transition Regions</i> * Post-treatment (Wave 9)	-0.21332*** (0.04931)	-0.24239*** (0.05740)	-0.2802*** (0.05412)						
Being in <i>Transition Regions</i> * Post-treatment (Except Merseyside)				-0.21791*** (0.0537)	-0.23665*** (0.05873)	-0.2842*** (0.05511)			
Being in <i>Transition Regions</i> or <i>Less Developed Regions</i> * Post-treatment (Including Cornwall)							-0.21480*** (0.04928)	-0.24443*** (0.05739)	-0.2543*** (0.05763)
Being in <i>Transition Regions</i>	0.02817 (0.04251)	0.08841 (0.04762)	0.07054 (0.04256)						
Being in <i>Transition Regions</i> (Except Merseyside)				0.02771 (0.04350)	0.08385 (0.04884)	0.06934 (0.04329)			
Being in <i>Transition Regions</i> or <i>Less Developed Regions</i> (Cornwall)							0.02878 (0.04249)	0.08919 (0.04763)	0.08536 (0.05060)
Full Demographic Covariates	N	Y	Y	N	Y	Y	N	Y	Y
Full Geographic Covariates	N	N	Y	N	N	Y	N	N	Y
Adjusted R squared	0.03928	0.08014	0.07666	0.03972	0.08381	0.07804	0.03933	0.08042	0.0833
Number of observation	17535	9919	8160	16924	9566	7876	17569	9935	9610

Note:

*p<0.05; **p<0.01; ***p<0.001

Online Appendix G: Two-stage least square analysis with per-capita EU funding

The differences in the eligibility status should have resulted in the greater scope and amount of the EU funding, but the connection between the funding amount itself and the support for the EU is not established. I conducted a two-stage least square analysis to confirm the observed effect via more funding, using the well-funded region as the instrument variable and per-capita funding as the treatment variable. Per-capita funding data is only available at the NUTS-2 level for the seven-year period between 2014 and 2020, not at the local authority level or annually, so this is only a rough proxy of the scale of the EU funding budget the region actually received by Wave 9. Table A6 reports that being in well-funded region did result in higher per capita EU funding for regional policies, and higher per-capita EU funding is associated with lower approval of the EU.

Table A6: 2SLS results: Eligibility status and per-capita funding

Dependent variable:	First stage		Second stage	
	Per capita EU Funding in 2014-2020 (EUR) in their local area		Approval of the EU (Wave 9) (5 levels)	
Treatment Variable:				
Being in well-funded region	245.739*** (2.484)	254.4697*** (3.4840)		
Estimated <i>Per capita EU Funding</i> (in 100 Euro)			-0.05089** (0.006442)	-0.02483** (0.007984)
Full Demographic Covariates		X		X
Full Geographic Covariates		X		X
Nation Fixed Effects	X	X	X	X
Adjusted R squared	0.2589	0.2785	0.002187	0.1031
N. Observation	28015	14872	28015	14872

Note:

*p<0.05; **p<0.01; ***p<0.001

Online Appendix H: Subset analysis with age and labor market status

People who voted to leave the EU in the referendum were on average older, so this group may have reacted more strongly against the projects compared to the younger group with university degrees, who tend to be more supportive of the EU projects.

Subset analysis with labor market status and age groups are presented in Table A7, but they show no specific trend associated with the regional discontinuity. Students and people under 34 in well-funded areas did not show negative results, but those aged 35-49 and in full-time jobs show more negative attitudes toward the EU than those over 65 or the pensioners did.

Table A7: Subset Results (Geographic RD: CCT bandwidth)

Treatment variable:		Being in well funded regions							
Dependent variable:		Do you approve or disapprove of the job that the EU is doing? (Wave 9: 5 levels)							
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age group of the respondent:									
Over 65		-0.191*** (0.032)							
50-64			-0.067* (0.027)						
35-49				-0.472*** (0.047)					
Under 34					0.128 (0.087)				
Labor market status of the respondent:									
Full-time job						-0.180*** (0.040)			
Student							0.040 (0.298)		
Inactive								-0.144* (0.070)	
Retired									-0.057** (0.020)
Border Fixed Effects		Y	Y	Y	Y	Y	Y	Y	Y
Robust Confidence Interval (Upper bound)		-0.140	-0.004	-0.421	0.347	-0.109	0.779	0.062	-0.014
Robust Confidence Interval (Lower bound)		-0.292	-0.147	-0.646	-0.123	-0.327	-0.867	-0.282	-0.122
Bandwidth (Estimate)		14.8km	19.8km	16.9km	22.5km	21.9km	21.5km	19.3km	20.4km
Bandwidth (Bias Correction)		30.6km	34.3km	33.2km	36.1km	36.2km	33.5km	32.9km	34.4km
Effective N. Control		1180	1781	1018	872	2077	140	412	1757
Effective N. Treatment		893	1387	724	642	1394	116	339	1440

Note:

*p<0.05; **p<0.01; ***p<0.001

Online Appendix I: Matching results; Nearest-neighbor matching and matching with 20km buffer

For matching, the full demographic covariates include age, sex, ethnicity, social grade (6 categories), labor market status (full-time, part-time, inactive, retired, student, unemployed), Anglican Christian, non-Christian, monthly church attendance, sexuality, marital status, homeownership, university degree, enrollment to any university, household size, being a parent, household income, past or current union membership, having a routine job, having preschool kids in the household, having school-age kids in the household, having sick elderly in the household, Facebook usage, and Twitter usage. Some of these categories had a substantial number of non-response replies.

The main section used the Genetic matching algorithm, but the following section reports the results using nearest-neighbor matching instead of genetic matching, as well as the results that count projects in a 20 km buffer area outside the local authorities. The results are consistent with the main specifications.

Table A8: Nearest neighbor matching result: Project type in local area and the evaluation of the EU

Panel A: Wave 9 with nearest-neighbor matching							
Dependent variable:	Do you approve or disapprove of the job that the EU is doing? (Wave 9: 5 levels)						
Infrastructure and Transport	-0.06408*						
	(0.02800)						
SME support / Business development / Industrial parks		-0.05850*					
		(0.02280)					
Climate change measures, Biodiversity, Renewable energy			-0.02650				
			(0.03091)				
Community-led local development				-0.03151			
				(0.04581)			
Information and Communication, ICT					-0.04951		
					(0.03369)		
Research and Innovation, Technology transfer						-0.02788	
						(0.02667)	
Number of Matched Observations	6334	9844	5356	2410	4522	7244	

Panel B: Wave 9 with 20 km buffer and nearest-neighbor matching							
Dependent variable:	Do you approve or disapprove of the job that the EU is doing? (Wave 2: 5 levels)						
Infrastructure and Transport	-0.12105***						
	(0.02339)						
SME support / Business development / Industrial parks		-0.31715***					
		(0.02865)					
Climate change measures, Biodiversity, Renewable energy			-0.04686*				
			(0.01900)				
Community-led local development				-0.02755			
				(0.02516)			
Information and Communication, ICT					-0.04983*		
					(0.02321)		
Research and Innovation, Technology transfer						-0.15109***	
						(0.02543)	
Number of Matched Observations	9250	6014	14212	8130	9470	7808	

Note: *p<0.05; **p<0.01; ***p<0.001

Table A9: Nearest-neighbor Matching result: Recipient type in local area and the evaluation of the EU

Dependent variable:	Approve EU (W9)							
	Without 20km buffer				With 20km buffer			
Recipient type:								
Local and Regional Council	-0.06970***				-0.30608***			
	(0.02367)				(0.02809)			
Private Firms / Chamber of Commerce		-0.04855				-0.09279***		
		(0.02744)				(0.02369)		
Nonprofit Organizations and Trusts			-0.01812				-0.03518	
			(0.03891)				(0.01934)	
Universities				-0.03191				-0.03191
				(0.02926)				(0.02926)
N. of Matched Observations	9008	6754	3420	6078	6310	9072	13700	6078

Note: *p<0.05; **p<0.01; ***p<0.001

Online Appendix J: Discussion on the findings of Colantone and Stanig (2018)

Colantone and Stanig (2018) demonstrated that the local job loss due to the globalized competition was causing the local residents to vote for Brexit. However, it would be useful to disentangle locations of place-based policies and deindustrialization. While Colantone and Stanig used the shift-share instrument to identify the causal mechanism, for the purpose of this paper, it just needs to be established that local job loss or deindustrialization is not the confounding factors with respect to the EU funding scheme.

I use the actual job losses in the local or nearby areas in order to control for the effect of deindustrialization. For this purpose, the following figures are added as the geographical covariates; the manufacturing employment growth and routine job growth in 2014-2016, as well as in 2008-2014 following the 2008 recession. I checked the increase in unemployment in these periods as well. All the data are at the local authority level. In addition, I collected the articles, including the keywords “factory closure”, “plant closure”, “factory close”, and “plant close” from the homepages of BBC and their regional branches, dating back to 1999. Then I selected the case of factory closures with more than 100 local job losses, including transfer to other regions. All the 279 factory closures on the maps at the plant level are located, then categorized into pre-Brexit and post-Brexit closures by the announcement date. I checked if the BES respondents’ local authorities had major factory closures before the Brexit, which I used as the main covariates in this section. The map of factories is presented below as Figure A6.

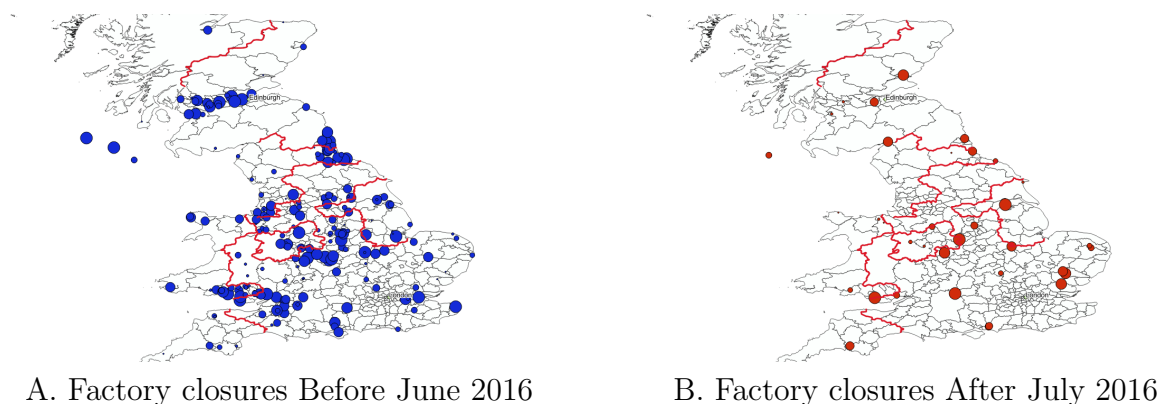


Figure A.3: Factory closures with more than 100 job losses since 1999

The detailed labor market data was not available for some local authorities, so the sample is slightly different from the main analysis. The following Table A10 presents the analysis with deindustrialization indicators. While including such covariates did increase the standard errors, the magnitude of coefficients did not move significantly from the main results, and the effects are negative and significant for all the models.

Table A10: Check with local factory closures and manufacturing job loss.

Dependent Variable:	Approve EU: Wave 9 (1 Strongly disapprove - 5 Strongly approve)			
	(1)	(2)	(3)	(4)
Treatment Variable:				
Being in Well-funded region	-0.164 (0.071)	-0.149 (0.074)	-0.169 (0.073)	-0.146 (0.073)
Factory closures before BES	X	X		X
Factory closures between W1 and W7	X	X		X
Manufacturing job loss 2008-2014			X	X
Manufacturing job loss 2014-2016			X	X
Routine job loss 2008-2014			X	X
Routine job loss 2014-2016			X	X
Δ Unemployment 2008-2014		X	X	X
Δ Unemployment 2014-2016		X	X	X
Full Geographic Covariates	X	X	X	X
Full Demographic Covariates	X	X	X	X
Border Fixed Effects	X	X	X	X
Robust Confidence Interval (Upper bound)	-0.010	-0.007	-0.005	-0.007
Robust Confidence Interval (Lower bound)	-0.398	-0.413	-0.410	-0.410
Bandwidth (Estimate)	23.0km	22.1km	22.3km	22.3km
Bandwidth (Bias Correction)	35.0km	33.4km	33.6km	33.8km
Effective N. Control	3060	2948	2948	2948
Effective N. Treatment	2326	2085	2137	2137

Online Appendix K: RD graphs

The main analysis uses CCT bandwidth with Border fixed effects and clustered standard errors. The following RD graphs use all the sample without fixed effects.

RD Graphs on Evaluation of EU (Wave9): Education and SES

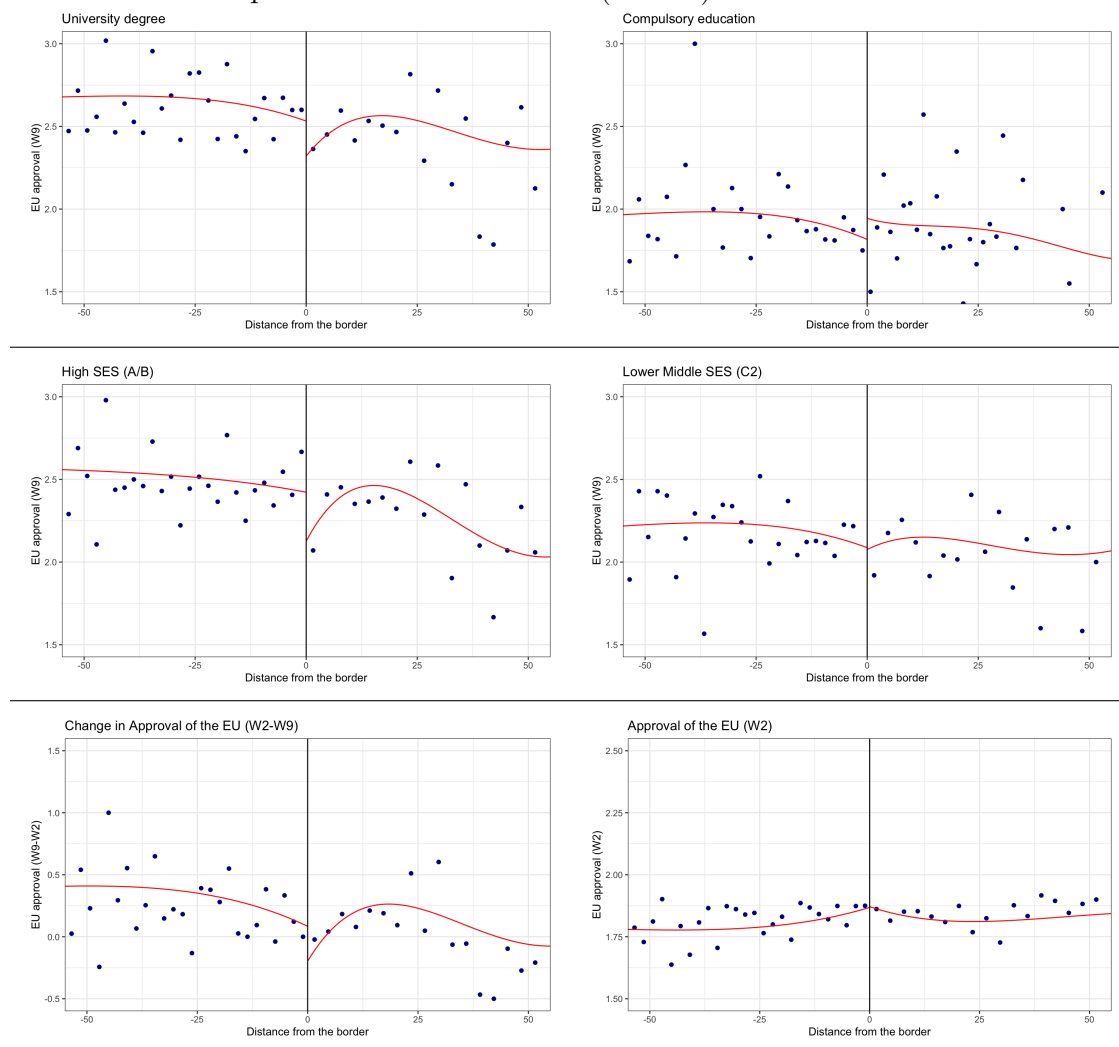


Figure A.4: RDD graphs

Online Appendix L: Examples of ESIF-funded projects

As noted, there are many different types of the project, and it is difficult to summarize. Nonetheless, the following visual images and represents some of the typical projects funded by the ESIF and its billboards.

Recipient of funds	Name of Project	Fund	Investment £m
Hitachi Europe Ltd	Smart Energy Islands	ERDF	8637179
Cumbria Chamber of Commerce & Industry Ltd	Cumbria Growth hub	ERDF	2326133
Leeds City Council	Stourton Park & Ride Smart Energy Grid	ERDF	3185419.75
Canal & River Trust	Titford Pools & Canal Improvement Project	ERDF	1015000
Teeside University	Digital Skills for Growth	ESF	521510
Strategic Employer Engagement in Devon	Strategic Employer Engagement in Devon	ESF	578961

Figure A.5: Example of typical ESIF funding recipients and projects

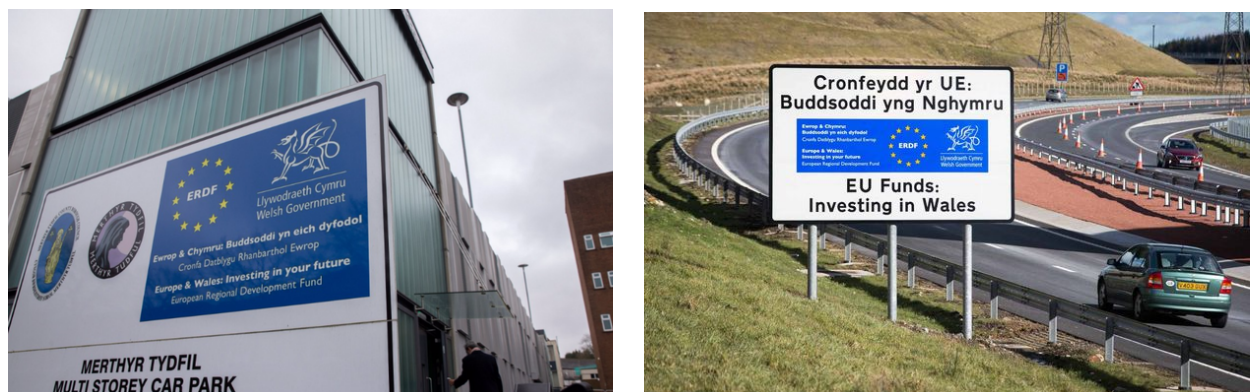


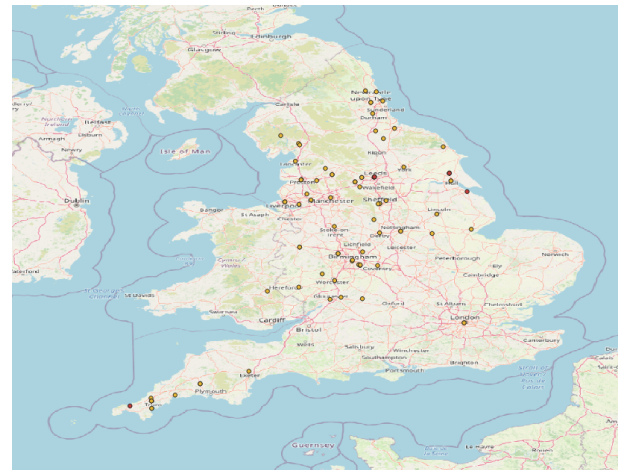
Figure A.6: Example of the EU Funded Projects and Billboards (From Wales online: <https://www.walesonline.co.uk/news/politics/how-much-money-wales-gets-12765100>)

Online Appendix M: Geographic distribution of ERDF recipients in England

As discussed in the main sections, I have the addresses of managing authorities and not the end recipients. Nonetheless, comparing the locations of beneficiaries of infrastructure or climate change projects and those of research and innovation projects reveal that More Developed Regions (e.g., South East) received a significantly smaller number of conventional place-based policies funded by the EU.



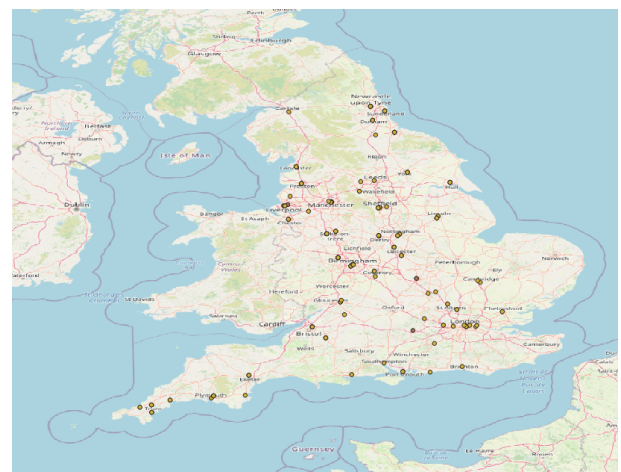
A. Recipients of EU-funded infrastructure and development projects



B. Recipients of EU-funded climate change, energy, renewables projects



C. Recipients of EU-funded research and innovation projects



D. Recipients of EU-funded projects for universities

Figure A.7: Geographic distribution of the Recipients of ERDF Funding in England