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# Euroscepticism and EU Cohesion Policy: The Impact of Micro-Level Policy Effectiveness on Voting Behavior*

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**Abstract**

This study investigates whether there is a link between the successful implementation of European cohesion policy and the voters' attitudes towards the EU. Using the French presidential elections in 2017 as a case study, we do not solely consider regional funds expenditures but also its induced effects in a region as further potential determinant of pro-European or eurosceptic voting behavior. In order to measure the effectiveness of EU structural funds and Cohesion Fund assignment, firm-level employment effects in French NUTS-2 regions stemming from project allocation during the multi-annual financial framework 2007-2013 are estimated. The obtained average treatment effects are, in a next step, used together with other regional characteristics to capture the citizens' perceived exposure to the EU in an empirical voting model for the French presidential election in 2017. The estimation results reveal a significant negative relationship between the effectiveness of EU funds allocation and the vote share of the eurosceptic candidate Marine Le Pen.

**JEL classification:** C21; D72; E61; R11; R58.

**Keywords:** Euroscepticism; EU cohesion policy; effectiveness; voting behavior; French presidential election.

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# 1 Introduction

In the first round of the French presidential election in 2017, the citizens had been able to choose among candidates with strongly opposing views on the European Union (EU). While Emmanuel Macron presented himself as clear pro-European and in favor of deeper economic and political integration, two of his opponents claimed a serious political interest in leaving the EU. However, Marine Le Pen and Jean-Luc Mélenchon presented completely different reasons for their respective opinions. Moreover, Mélenchon suggested he would consider a withdrawal from the EU only after failing in convincing the European institutions of the necessity to change their (austerity) policies[1], whereas Le Pen questioned the main principles of the European Union. The results of this *premier tour*, especially the vote shares for Macron on the one hand and the strongly eurosceptic Le Pen on the other hand, documents the French population's heterogeneous attitudes towards the EU.

There is a growing stream of literature with the aim of understanding citizens' voting behavior (for nationalist parties) and growing "hard" and "soft" Euroscepticism (Treib, 2014). Most recently, Becker, Fetzer & Novy (2017) and Crescenzi, Di Cataldo & Faggian (2017) investigated the determinants of the "Brexit" referendum result on the local and regional level, respectively, considering the local citizens' exposure to the EU measured in terms of trade with EU countries, foreign direct investment in- and outflows (Crescenzi, Di Cataldo & Faggian, 2017), immigration and the amount of structural funds received. Moreover, the studies account for the quality of the public political and financial system (Becker et al., 2017), the openness and previously measured attitude towards the EU (Crescenzi, Di Cataldo & Faggian, 2017), demographics and educational attainment of a region's population as well as regional economic characteristics. Becker et al. (2017) find that immigration and trade played a role for the outcome of the referendum, however, to a relatively low extent in quantitative terms. What mattered most are demographic aspects, the size of the manufacturing sector, wages and the regional gross domestic product (GDP).

These findings serve as a starting point for our analysis in which we refine the way in which European cohesion policy, as one of the EU's main policy instruments, enters the estimation equation. Becker et al. (2017), Crescenzi, Di Cataldo & Faggian (2017), Fidrmuc, Hulényi & Tunali (2016) and Crescenzi, Di Cataldo & Giua (2017) do not find any or an ambiguous influence of the EU's regional policy on vote shares for Leave in UK regions. However, we expect that taking into account only the amount of paid-out or committed funds (as all of these studies did) may not be sufficient to explain the citizens' perception of cohesion policy but that it is rather the policy's effectiveness which shapes voters' attitudes towards the EU.

The large literature dealing with the evaluation of the economic effects of EU structural funds (European Regional Development Fund, ERDF, and European Social Fund, ESF) and Cohesion Fund (CF; hereafter they are referred to as "regional funds") allocation can be divided into two main strands: The first one is rooted in regional economics and thus typically provides evidence on the NUTS-2 level of regional disaggregation (among the latest, e.g., Becker et al., 2017; Ferrara, McCann, Pellegrini, Stelder & Terribile, 2016; Percoco, 2017).[2] The other one focuses on specific projects or programs conducted but mainly applies case-study

[1] See www.theguardian.com/world/2017/apr/04/french-presidential-election-how-the-candidates-compare or www.politico.eu/article/france-elections-2017-presidential-candidates-eu-wishlists-macron-melenchon-le-pen-fillon.

[2] NUTS denotes the *Nomenclature des unités territoriales statistiques* (European Commission, 2011) that defines regions at different disaggregation levels. NUTS-3 regions in France correspond to French *départements*.

approaches (see e.g., Hartsenko & Sauga, 2012).[3] Due to differences in the methodological approaches and data, the literature has not reached a final conclusion on (the determinants of) the effectiveness of EU's regional policy yet. While some studies are not able to identify any significant effects (e.g., Barone, David & de Blasio, 2016), others highlight the conditional success of these policy measures (refer to Rodríguez-Pose & Fratesi, 2004, or others cited above).

What has only been done in a handful of studies until now is a careful microeconometric evaluation based on actual projects and beneficiary firms. Such an investigation allows to quantify the individual effects of regional policy instruments at the firm-level and to explore its (likely) heterogeneity across regions. This paper contributes to this recent stream of literature by applying a dataset capturing the French beneficiary firms and institutions of regional funds during the multi-annual financial framework (MFF) 2007-2013 together with a comprehensive sample of non-beneficiary firms and institutions which serve as a control group for the counterfactual scenario.[4]

In a first step, employment growth effects of regional funds in firms that actually implement the supported projects are estimated. We assume that EU project-induced job growth in a (NUTS-2) region is more likely to be perceived by the citizens as compared to other effects at the firm-level such as e.g., value added creation or changes in productivity, and effective programs may contribute to a positive perception of EU policies. Empirically, we rely on standard econometric methods from the program evaluation literature in order to identify causal treatment effects of EU's regional policies. Average treatment effects on the treated (ATTs) are estimated by applying a combination of propensity-score matching with a difference-in-difference approach.

Based on the findings from the first part of the empirical analysis, we further explore whether there is a link between the employment effects induced by EU's regional funds and the attitudes of NUTS-3 regions' citizens towards the EU. The latter is measured in terms of the vote shares for the pro-European presidential candidate Macron in the first round of French presidential election on 23th of April 2017 and, vice-versa, that for Le Pen who politically represents "hard" Euroscepticism (Treib, 2014). In addition to cohesion policy effectiveness, we consider the total amount of regional funds payments, the importance of tourism and trade for regional gross value added (GVA) creation and net migration in a NUTS-3 region relative to the national average in the econometric analysis. Further control variables on the NUTS-3 (or, if not available, NUTS-2) regional level include the highest educational attainment of citizens, their trust in the EU before the elections (Eurobarometer study), institutional quality, the size of the respective industry and construction sectors, regional income, unemployment rates and population density.

The estimation results reveal a significant negative relationship between EU regional funds expenditure in a NUTS-3 region and the vote share for Marine Le Pen. A one percentage point increase in the (statistically significant) average employment growth effect of EU cohesion policy on firms within a region induces a significant decrease of Marine Le Pen's vote share by approximately two percentage points. In qualitative terms, likewise, Emmanuel Macron's vote share is identified to be larger in French regions with effective EU

[3]Very recent exceptions are Beņkovskis, Tkačevs & Yashiro (2018); Fattorini, Ghodsi & Rungi (2018); Bachtrögler, Fratesi & Perucca (2017).

[4]Details on the used database which includes the beneficiaries of 2,055,375 EU regional projects carried out within 25 EU countries during the programming period from 2007 to 2013 are available in Bachtrögler, Hammer, Reuter & Schwendinger (2017).

policies, this effect, however, is sensitive to different model specifications.

The size of the trade and tourism industries as well as net migration do not appear to be related to the election outcomes. However, we find that higher income, education and regional institutional quality as well as lower unemployment rates and smaller manufacturing and construction sectors are associated with more favorable voting outcomes for Emmanuel Macron.

The remainder of the paper is structured as follows: Section 2 reviews the literature on firm-level regional policy evaluation and the causes of Euroscepticism. Section 3 describes our econometric methodology and Section 4 the data sources used. Section 5 discusses the estimation results, in Section 6 we offer some concluding remarks.

## 2 Literature review

This paper contributes to two streams of the economic literature: First, it is related to a strand studying the determinants of voting behavior putting a specific focus on voting for eurosceptic parties or the Leave option in the UK's "Brexit" referendum. Second, by providing microeconometric evidence on the effectiveness of the EU's regional policies, we add to the broad stream of EU cohesion policy evaluation which, so far, has mainly focused on either aggregate effects on the regional level or on small-scale case studies.

### 2.1 Determinants of eurosceptic voting behavior

The research question of this study, whether firm-level effects of regional policy and other elements representing the voters' perceived exposure of the EU are associated with their attitude towards the EU, is strongly related to recent research on the determinants of the "Brexit" vote in the United Kingdom in June 2016. Fidrmuc et al. (2016), Goodwin & Heath (2016) and Zoega & Arnorsson (2018) were among the first studies to investigate the determinants of the vote share for Leave in British NUTS-2 regions and find that it is smaller in richer regions (in terms of GDP per capita), in regions with a population having attained higher education and a larger share of inhabitants that are over 65 years old.

Lubbers & Scheepers (2010) analyze the determinants of Euroscepticism using the Eurobarometer survey and find that individual characteristics like human capital and social strata (i.e., occupation) matter next to economic (GDP, unemployment, inflation) and political characteristics (e.g., programs of political parties) of regions and countries. This finding is in line with the human capital hypothesis introduced by Eichenberg & Dalton (1993), which suggests that people with higher education (and more prestigious occupational positions) face better opportunities from European integration than those with lower degrees of educational attainment (see also Gabel & Palmer, 1995; McLaren, 2002).

Next to economic self-interest (Curtice, 2017, p.20), one's view on the EU has been shown to depend on the perception of European identity (Curtice, 2017) and individual personality. Regarding the latter, Garretsen, Stoker, Soudis, Martin & Rentfrow (2018) demonstrate that the voters' personality trait of openness is strongly linked to the "Brexit" referendum outcome, whereby more openness is associated with fewer eurosceptic votes within a region.[5] Also McLaren (2002) indicates that not only economic factors (costs and benefits) but perceived threats through European integration shape the citizens' attitudes towards the European Union. As the perception of potential advantages and disadvantages of being part of the EU is likely to be influenced by media, Lubbers & Scheepers (2010) have shown that the media coverage of European topics as well as the way in which they are reported indeed contribute to the citizens' perception of the EU. Moreover, there are various studies in which immigration has been shown to matter for voting behavior (mostly for nationalist parties) (see e.g., Lubbers & Scheepers, 2007; Barone, D'Ignazio, de Blasio & Naticchioni, 2016; Goodwin & Heath, 2016). Finally, Lubbers & Scheepers (2007) show that living in a less densely populated area is positively associated with more political Euroscepticism.

As it is a consistent finding in the literature that the (relative) income level of regions plays a crucial role for citizens' attitudes towards the EU, one may expect that the EU's regional policy which aims at reducing income disparities across European regions can contribute to dampen Euroscepticism (see e.g., Rodríguez-Pose, 2018). Two of the most recent research papers on the "Brexit" determinants have taken the amount of EU regional funds expenditure in British regions and more geographically disaggregated units into account. However, according to the empirical findings reported by Fidrmuc et al. (2016) and Crescenzi, Di Cataldo & Giua (2017), it seems to be the case that EU cohesion policy does not affect the result of the referendum in a specific way.

Becker et al. (2017) apply machine-learning techniques to find the most appropriate set of predictors for the outcome of the "Brexit" referendum. They argue that trade with and immigration from other EU member states is able to explain only very little of the outcome and that the amount of EU regional funds expenditures (in NUTS-3 regions) did not have any systematic impact on vote shares. Instead, in line with previous literature, the distribution of education levels, historically high importance of the manufacturing sector, income levels and unemployment rates are shown to be significantly correlated with the referendum results. Although British politics may have played an important role for the outcome of the referendum, the authors state that the "Brexit" vote can be interpreted as a vote against the EU. Crescenzi, Di Cataldo & Faggian (2017) consider foreign direct investment flows as additional element of regional exposure to the EU, which turns out to be relevant in contrast to the amount of EU structural funds paid out per inhabitant, immigration growth and trade. The authors find that vote shares for the Remain option have been higher in NUTS-2 regions with inhabitants with more cultural openness, which are younger as well as in regions with relatively fewer unemployed citizens.

This study sets up a voting model based on the previous literature in order investigate whether the same or similar determinants hold to be relevant when examining the share of eurosceptic votes (for Marine Le Pen) in the French presidential election in 2017. As indicated in the introduction, we hypothesize that using only the total amount of regional funds expenditures in a region is not sufficient to depict citizens' perception of EU cohesion policy. Therefore, we additionally include a measure of policy effectiveness that is expected to be "visible" for the voters, namely, whether the funded firms create more new jobs. Another reason for doing so is that French citizens appear to be more informed about EU co-financed projects in their regions and cities as compared to British voters. Based on a question asked in the Flash Eurobarometer 427, 71% of the French respondents assess the impact of EU projects on their region's development in a positive manner, which, still only constitutes the fourth smallest share among all EU countries (European Union, 2015*a*). In the UK only 66% of all surveyed citizens believe that EU structural funds exhibit positive effects on the

[5] Rentfrow, Gosling & Potter (2008) have previously analyzed the spatial dimension of psychological factors determining economic and social behavior.

economic development of the region of residence.

## 2.2 The evaluation of the EU's regional policy

In contrast to studies on the national and regional (NUTS-2 or NUTS-3) level, there is only a scarce literature which investigates the effects of the EU's regional policy on firm performance. Bondonio & Greenbaum (2006) study business investment incentives co-funded by Objective 2 structural funds in 1989-1993 and 1994-1999 in Northern and Central Italy. The authors' impact analysis isolates a positive employment growth effect on treated firms stemming from co-funding programs. Some years later, Bondonio & Greenbaum (2014) compare the firm-level effects induced by structural funds allocation with national public transfers to enterprises in one Italian region during the multi-annual financial framework 2000-2006. They do not find a difference in the impact of different funding sources but are able to show that larger economic incentives provided to firms induced larger positive employment effects.

De Zwaan & Merlevede (2013) analyze the impact of structural funds assignment in NUTS-2 regions on firm performance. The authors do not consider actual beneficiary firms but firms producing in regions that receive structural funds and find that the receipt of these EU transfers do not induce statistically significant differences in firm employment and productivity. Focusing on smaller samples, Hartsenko & Sauga (2012) claim that co-funding by structural funds increases net sales in Estonian firms, and Maroshegyi & Nagy (2010) conclude that structural funds payments have been important for Hungarian firms to stay financially liquid over the course of the economic and financial crisis.

Bernini & Pellegrini (2011) investigate firm-level effects of a domestic regional policy subsidy in Italy and indicate that it increases employment and fixed assets in treated firms while inducing negative productivity effects measured in terms of output per employee. In a similar vein, Bergström (2000) shows that there is a positive effect of capital subsidies for firms' employment but that productivity is not systematically affected. Presenting qualitatively similar results, Cusimano & Mazzola (2013) analyze financial incentives provided to firms in Italy by means of territorial integrated projects which aim at facilitating the receipt of EU structural funds. Firms that are treated by this program face significantly faster employment and sales growth but there does not appear to be any significant impact on productivity as measured via value added per employee.

Most recently, Beņkovskis et al. (2018) use a detailed dataset for Latvian beneficiaries and non-beneficiary firms and show that funded firms increase their number of employees, turnover and capital-to-labour ratio immediately, while positive effects on labor productivity and total factor productivity become effective two years after having received financial assistance. However, the productivity effects are not consistent across different estimation procedures used and not homogeneous across different types of firms. Both this study as well as Fattorini et al. (2018) indicate that initially less productive firms experience higher productivity gains induced by receiving co-funding from the ERDF. The latter study evaluates the impact of funds dedicated explicitly to business support and research, technology and development in the NUTS-2 regions of the 28 EU member states (during the MFF 2007-13) on total factor productivity of firms located in those regions. Thereby the authors assume that all firms within treated regions are able to take advantage from the funds. Finally, using a dataset of actual beneficiaries in seven EU member states, Bachtrögler, Fratesi & Perucca (2017) find that carrying out a project co-funded by the ERDF, the ESF or CF increases manufacturing firms' employment, value added and labour productivity growth. However, the authors show that the effects differ across countries and also within countries, depending on territorial characteristics and the regional income level.

This paper adds to this literature by providing regional treatment effects for EU structural funds projects carried out in France. Furthermore, by using the estimated employment effects of these projects as an empirical measure of policy effectiveness in a voting model, we additionally assess how current EU policy measures affect the attitudes of French citizens towards the EU and are able to demonstrate that the effectiveness of EU cohesion policy is significantly linked to voting decisions.

# 3 Methodology

The first part of this section is dedicated to the estimation of the effect of carrying out a project co-funded by regional funds on firms' employment growth, while the second part discusses the setup of the empirical voting model incorporating the obtained causal employment effects as potential determinant of the vote shares for Emmanuel Macron and Marine Le Pen, respectively, at the French presidential election.

## 3.1 Estimating employment effects of EU regional policies

For estimating average treatment effects on treated firms, we combine propensity score matching (PSM) (see, e.g., Cameron & Trivedi, 2005; Angrist & Pischke, 2009) with a standard difference-in-difference (DiD) approach. PSM allows to control for (time-varying) observable characteristics while DiD wipes out unobservable but time-invariant firm characteristics. In a first step, we specify an empirical model which allows to obtain propensity scores which are later on used for matching treated firms (i.e., recipients of regional funds during the programming period 2007-2013) with ones from the control group (i.e., firms that did not receive regional funds payments). As the effectiveness of EU regional policy in terms of beneficiary firms' performance may differ across regions (Bachtrögler, Fratesi & Perucca, 2017), we only consider control group firms which are located in the same NUTS-2 region for modeling the treated firms' unobservable counterfactual. Formally, the propensity score model reads as (see, e.g., Imbens & Wooldridge, 2009):

$$p(w_i) = Pr(T_i = 1|\mathbf{x}_i) = F(\mathbf{x}'_{i0}\beta) \tag{1}$$

where $p(w_i)$ is the propensity score (i.e., the probability of being a beneficiary of regional funds) for each firm $i$. $T_i$ denotes the treatment indicator which is equal to one for firms receiving regional funds payments during the MFF 2007-13 and zero otherwise. $F(.)$ is a cumulative distribution function (CDF) which maps the linear predictor $\mathbf{x}'_{i0}\beta$ such that $0 \leq p(w_i) \leq 1$. In this application we estimate probit models and thus $F(.) = \Phi(.)$, i.e., the standard normal distribution function. $\mathbf{x}'_{i0}$ denotes a vector of observable firm characteristics measured prior to the multi-annual financial framework 2007-2013 and $\beta$ is the corresponding vector of parameters to be estimated. Assuming conditional independence, we only need to control for the propensity score $p(w_i)$ in order to identify a causal average treatment effect on the treated (ATT). In our empirical specification and in order to assure balancing across the treatment and control group (i.e., similar propensity scores are based on similar realizations of $\mathbf{x}'_{i0}$), we include squared and interaction terms of the included covariates when estimating $p(w_i)$ (Angrist & Pischke, 2009). In Section 4 we detail on the specific observables entering $\mathbf{x}'_{i0}$. Furthermore, PSM requires the common support assumption to be fulfilled implying that we need to exclude funds-receiving firms from the estimation of Equation (1) which cannot be matched with firms from the control group due to too large differences in the respective propensity scores.

Based on the obtained propensity scores, we estimate the causal average employment effect stemming from EU regional funds allocation. In general, the ATT is given by $\tau[p(w_i)] = E[Y_i(1) - Y_i(0)|T = 1, p(w_i)]$ where $\tau[p(w_i)]$ denotes the ATT and $Y_i(1)$ and $Y_i(0)$ refer to the potential outcomes under alternative regional funding states. For treated firms we only observe $Y_i(1)$ directly but need to estimate the missing counterfactual $Y_i(0)$. For each treated firm the counterfactual is based on Epanechnikov kernel matching such that each control firm enters the calculation of the counterfactual based on a weight assigned according to the inverse of the distance in the respective propensity scores. Furthermore, we combine the PSM with a DiD approach by studying the differences in employment growth rates across treated and untreated firms. Formally, we thus aim at estimating a sample analogue to the following population estimand:

$$\tau(w) = E[g(1) - g(0)|T = 1, p(w)] \tag{2}$$

where $g(1)$ and $g(0)$ denote the respective employment growth rates across the treatment period under the two different treatment states. In the sample these two are approximated by the log-differences in employment, i.e., the number of employees, in firms which receive regional funds and from the control group, respectively. Since the propensity score on which we additionally need to condition on is an estimate, we report bootstrapped standard errors based on 500 replications in order to infer on the statistical significance of the obtained employment growth effects of EU regional funds allocation.

As our target is to differentiate the firm-level effects across regions within France, we run the DiD estimation and match firms within NUTS-2 regions considering NUTS-3 regional fixed effects. Thus, we end up with ATTs for 21 NUTS-2 regions that correspond to 96 NUTS-3 regions.[6] After bootstrapping the standard errors, we construct a dummy variable taking on the value of one if the ATT is significant at the 95% level and zero otherwise. That dummy variable as well as the coefficient of the ATT and the interaction thereof will be further used for the analysis of voting behavior in the French presidential elections in 2017.

### 3.2 Estimating the determinants of the French presidential election outcome

The main focus of this paper is to explore the determinants of the voting behavior in the first round of French presidential elections in 2017, in which the voters could choose between candidates with a moderate attitude towards the EU (e.g., François Fillon), Macron as a clear pro-European who stands for further European integration and Le Pen as an exponent of "hard Euroscepticism" (Treib, 2014).[7] In addition, we empirically asses whether the effectiveness of EU's regional policy is also able to explain variation in voter turnout across the French NUTS-2 regions.

[6] We skip the French overseas departments Guyane, Guadeloupe, Mayotte, La Réunion and Martinique due to a lack of data. Furthermore, the estimation of a causal employment effect is not possible for the NUTS-2 region of Alsace as there are only three treated firms that could be matched with ORBIS and for which all firm characteristics needed for the DiD estimation and the matching are available.

[7] As a consistency check, we also run a regression on the second round-results and additionally consider the vote shares for Mélenchon (see Section 5.4).

The choice of indicators of French citizens' exposure to the EU as well as the control variables is based on previous literature on the determinants of Euroscepticism and, especially, the Leave vote in the "Brexit" referendum discussed in Section 2.1. Regarding the potential impact of EU regional policy, we refine the mechanism through which structural funds assistance in regions might affect French inhabitants by including the average firm-level effect on employment growth for each NUTS-2 region ($ATT$ in Equations 3 and 4), the dummy variable denoting its statistical significance ($SIGN$) and the corresponding interaction term. Here, we assume that employment growth is more likely to be perceived by citizens as compared to other firm performance outcomes, such as e.g., productivity or investments. Additionally, we include the structural funds and the Cohesion fund expenditure per inhabitant in a NUTS-3 region (*Regfundsexp*) as former related studies did. For both policy effectiveness and payments per capita, a negative relationship with Le Pen's vote share might be expected.

For modeling a region's exposure to the EU, we furthermore take i) the GVA share generated by the wholesale and retail trade industries, transport, accommodation and food service activities, i.e., industries G, H and I according to the NACE Rev.2 classification (*GVAtradtour*), in a NUTS-3 region and ii) the net migration rate in a NUTS-3 region relative to the national average (*Netmigr*) into account. Unfortunately, immigration and emigration data are not available separately on a regional level for France. Following e.g., Barone, David & de Blasio (2016), one could expect that regions with a higher net migration rate than the country's average (i.e., regions with a relatively large number of immigrants or relatively small number of emigrants) may be more likely to be eurosceptic. With regard to the impact of trade and tourism, on the one hand, citizens may see a large emphasis on these industries as a sign for undesirable dependence on demand stemming from other EU member states (Curtice, 2017). On the other hand, the participation in the EU single market and the Schengen area might involve additional economic benefits in the regions, which could result in more EU-friendly attitudes held by its citizens. As a consequence, the respective sign of the coefficient in a regression explaining Marine Le Pen's share of vote remains ambiguous ex-ante.

In this paper, we mainly estimate an equation for Macron's and Le Pen's vote shares, for which opposite signs for all explanatory variables included are expected. This assumption is consistent with the argument that Macron and Le Pen represented extreme opposite positions regarding the future role of France within the EU. The two separate estimation equations read as following:

$$\begin{aligned} \mathrm{MACRON}_j =& \alpha_0 + \beta_1 * \mathrm{Regfundsexp}_j + \beta_2 * \mathrm{GVAtradtour}_j + \beta_3 * \mathrm{Netmigr}_j + \\ & \gamma_1 * \mathrm{ATT}_j + \gamma_2 * \mathrm{SIGN}_j + \gamma_3 * \mathrm{ATT}_j * \mathrm{SIGN}_j + X_j\delta + \epsilon_j \end{aligned} \tag{3}$$

$$\begin{aligned} \mathrm{LEPEN}_j =& \alpha_1 + \zeta_1 * \mathrm{Regfundsexp}_j + \zeta_2 * \mathrm{GVAtradtour}_j + \zeta_3 * \mathrm{Netmigr}_j + \\ & \kappa_1 * \mathrm{ATT}_j + \kappa_2 * \mathrm{SIGN}_j + \kappa_3 * \mathrm{ATT}_j * \mathrm{SIGN}_j + X_j\theta + \eta_j \end{aligned} \tag{4}$$

where $\mathrm{MACRON}_j$ and $\mathrm{LEPEN}_j$ denote the vote shares received by Macron and Le Pen in a French NUTS-3 region $j$, respectively. $\epsilon_j$ and $\eta_j$ denote error terms which are identically distributed but clustered at the NUTS-3 regional level. The parameters of most interest in this paper are denoted by $\gamma_1$ to $\gamma_3$ and $\kappa_1$ to $\kappa_3$, respectively.

The vector of control variables $X_j$ includes the following variables measured at the NUTS-3 level: i) Population density (expected negative relationship with Le Pen's share of vote), ii) GDP per capita and iii) GDP per capita growth depicting the economic performance during the Great Recession (for both variables, expected negative link to eurosceptic votes for Le Pen) and iv) the share of the population aged above 64 (the effect may be positive or negative).

Further controls which are only available at the NUTS-2 regional level are i) institutional quality measured by the European Quality of Government Index (EQI) (**?**) as this variable may explain part of the extent of regional policy effectiveness (Rodríguez-Pose & Garcilazo, 2015), ii) the share of respondents to an Eurobarometer study that tend to trust in the EU (European Union, 2015*b*), iii) the average annual regional employment growth rate for the years from 2007 to 2014 which may be correlated with our measure of program effectiveness[8], iv) the share of population with primary education (ISCED levels 0-2; expected positive correlation with eurosceptic votes), v) the share of employees working in the sectors industry and construction, vi) the quality of the health system (inhabitants per hospital bed, expected negative relationship), and vii) the unemployment rate (expected positive association with eurosceptic votes). The corresponding vectors of parameters associated with the control variables are denoted by $\delta$ and $\theta$, respectively. Finally, in some specifications we alternatively include NUTS-2 regional fixed effects instead of the above mentioned variables on this regional level.

From Equations 3 and 4, we can derive the marginal effect of a one percentage point increase in cohesion policy effectiveness, in terms of employment growth, on Macron's and Le Pen's vote shares by calculating:

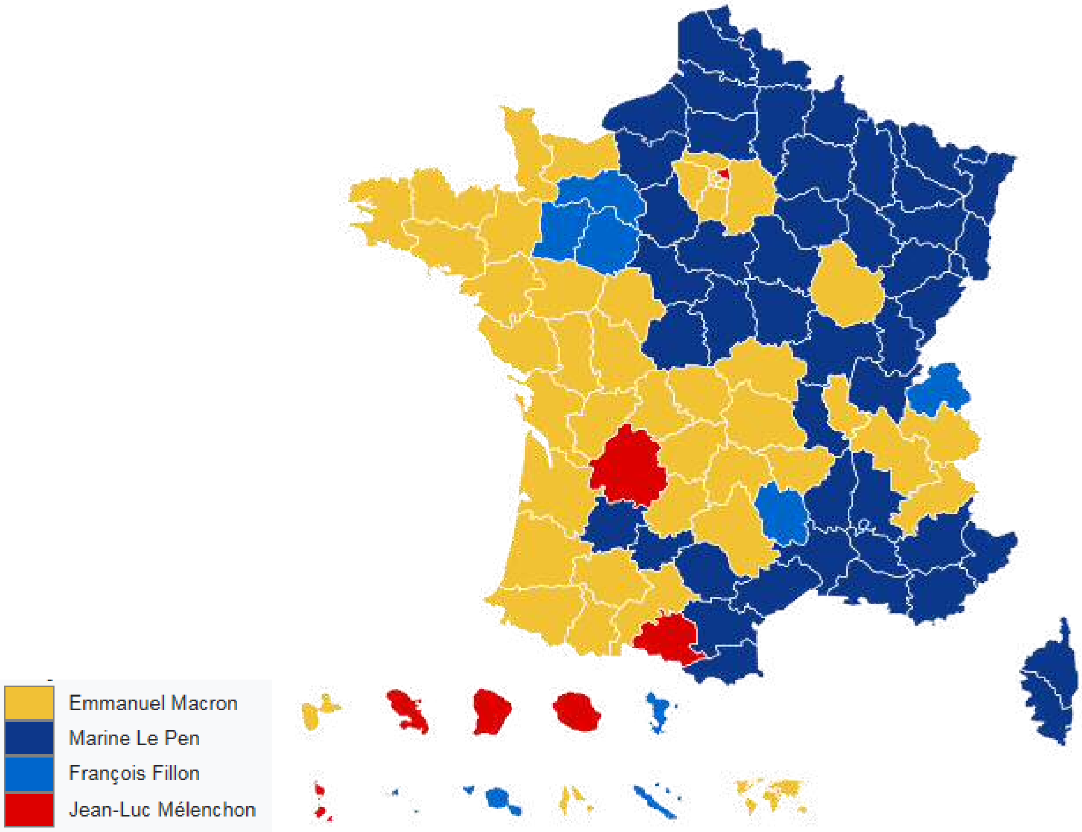
$$\text{Marginal effect}_{\text{CP Eff.}} = \frac{\partial \text{MACRON}}{\partial \text{ATT}} = \hat{\gamma_1} + \hat{\gamma_3} * \text{SIGN}_j \tag{5}$$

$$\text{Marginal effect}_{\text{CP Eff.}} = \frac{\partial \text{LEPEN}}{\partial \text{ATT}} = \hat{\kappa_1} + \hat{\kappa_3} * \text{SIGN}_j \tag{6}$$

When presenting the main results, we rely on cross-sectional data and apply simple ordinary least squares (OLS) and thus consider, if not specified differently in the data section, the averages of each variable from 2007 to 2015 (prior to the election). As we use the estimated ATT from Equation 2, standard errors (clustered by NUTS-3 region) of the second-stage regressions are bootstrapped with 20,000 replications. Robustness checks include a Poisson regression using the number of votes as dependent variable, the estimation of vote shares using a fractional response model (Papke & Wooldridge, 1996) and a seemingly unrelated regression (SUR) framework. Additionally, we run regressions taking into account Marine Le Pen's vote shares in 2012 and exploit the time variation in the voting data for analyzing the potential impact of EU's regional policy effectiveness.

[8] A matrix with the correlation coefficients of all variables is provided in the appendix. Interestingly, the correlation between regional average employment growth and the cohesion policy-induced effect on firm-level employment growth is quite small ($\rho = 0.109$)

Figure 1: Candidate with most votes by *département*






# 4 Data

## 4.1 The outcome of the 2017 French presidential election

The voting results of the first (and second) round of the presidential elections in 2017 (and also 2012) are reported for the NUTS-3 regional level (French *départements*) on the website of the French ministry of internal affairs. Given the diverse set of positions regarding the French EU agenda represented by the candidates in this round, we assume that the voters of Macron held widely pro-European views while the supporters of Le Pen most likely took an eurosceptic position. Figure 1 visualizes the geographical divide with regard to the candidates that won the election in each French *département*. Moreover, Table 1 presents the variation of minimum and maximum vote shares for Emmanuel Macron and Marine Le Pen across the NUTS-3 regions. Especially the difference of thirty percentage points between regional vote shares for the eurosceptic Front National candidate (Le Pen) motivates research about the determinants of French citizens' voting decisions.

Table 1: Vote shares per candidate and French NUTS-3 regions, first-round presidential election 2017

| Candidate | Total share | Min. share | Max. share |
|---|---|---|---|
| Emmanuel MACRON | 24.01% | 17.73% (FR825) | 34.83% (FR101) |
| Marine LE PEN | 21.30% | 4.99% (FR101) | 35.67% (FR221) |
| François FILLON | 20.01% | 12.75% (FR621) | 29.14% (FR105) |
| Jean-Luc MÉLENCHON | 19.58% | 13.78% (FR832) | 34.02% (FR106) |

*Notes:* Valid votes: 31,381,603. Further candidates: Benoît HAMON (6.36%), Nicolas DUPONT-AIGNAN(4.70%), Jean LASSALLE (1.21%), Philippe POUTOU (1.09%), François ASSELINEAU (0.92%), Nathalie ARTHAUD (0.64%), Jacques CHEMINADE (0.18%).

### 4.2 Data on cohesion policy beneficiaries

For the estimation of the effectiveness of EU cohesion policy at the micro-level, information on actual beneficiaries of EU regional policy instruments during the programming period 2007-2013 (i.e., firms that actually carried out projects co-funded by the ERDF, the ESF or the CF) is needed in order to identify the treated firms in France. For this purpose, a new dataset has been compiled which uses different sources. First, beneficiary lists including the funded projects that are part of the EU member states' operational programmes are (mostly) publicly available on the websites of the respective managing authorities. They have been computerized and carefully checked for plausibility. The information regarding a funded firm's name, in a next step, allows to match this data with information on firm characteristics stemming from the ORBIS database (commercially) provided by Bureau van Dijk.[9] Comparable information for non-funded firms which serve as the control group is also collected from ORBIS.

For France, the final sample for which all required data is available consists of 1,383 treated entities and 123,167 firms in the control group.[10] The outcome variable of interest is employment growth from its pre-treatment value (2006 or, if not available in ORBIS, 2005 or 2004) to its post-treatment value (2014, if not available, 2015 or 2016). In order to be able to compare estimates across firms and ATTs across regions, we calculate average annual employment growth rates by dividing each firm's growth rate by the number of years between the utilized pre- and post-treatment observations. In addition we are interested in estimating a "lagged ATT". For this purpose, we entirely ignore the employment data from 2014 and calculate average annual employment growth rates by only considering 2015 or 2016 as post-treatment outcome of interest. This allows to account for an additional lag in the effects induced by EU structural funds payments.

The variables used for the estimation of the propensity scores and retrieved from the ORBIS database are the following: (Log) pre-treatment number of employees, (log) initial firm age measured as difference between the recorded date of incorporation and 2007, (log) initial fixed assets per employee, (log) pre-treatment current ratio (current assets divided by current liabilities) and two-digits industry dummy variables based on the NACE Rev.2 classification. Furthermore, matched control firms are restricted to be located in the same NUTS-2 region as their funded counterparts and, additionally, NUTS-3 region fixed effects are included in the propensity score matching procedure.

[9] See Bachtrögler, Hammer, Reuter & Schwendinger (2017) for detailed information on the dataset.

[10] As firm age enters the probit model for estimating the propensity scores as logarithm, i.e., firms which have been founded in 2007 (and thereafter) are excluded from the sample.

Two thirds of all firms in the sample are active either in the manufacturing, construction or wholesale and retail trade sectors (NACE Rev.2 industries C, F and G). An additional share of 15% of all observations (firms) considered operate in accommodation and food services industries or provide professional, scientific and technical activities (NACE Rev.2 industries I and M).[11] Geographically, almost one quarter of all treated firms is located in *Île de France*. Another 12% of all observations is located in either the NUTS-2 region of *Rhône-Alpes* or *Provence-Alpes-Côte d'Azur*, respectively.

Table 2 reports summary statistics for the group of EU fund-receiving firms and the control group, respectively. The reported average realizations across these two different groups clearly motivate the need for applying a matching procedure for eliminating differences in observable characteristics. In the whole sample, firms which are funded by EU regional policy instruments exhibited much faster employment growth over the observed time span, employed on average about seven times as many workers, and in 2007 they were about five years older as compared to the control group average. Moreover, physical capital available per worker was higher prior to the programming period while the current ratio of the average control firm slightly exceeded the one of an average treated firm.

Table 2: Descriptive statistics: Firm-level data

| Variable | Obs. | Mean | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| **Treatment group** | | | | | |
| Employment growth | 1,383 | 0.174 | 0.698 | -5.384 | 4.766 |
| Average annual employment growth | 1,383 | 0.021 | 0.086 | -0.673 | 0.596 |
| Number of employees | 1,383 | 231.037 | 2,342.82 | 1.000 | 83,006.000 |
| Age (until 2007) | 1,383 | 20.612 | 14.987 | 1.000 | 107.000 |
| Fixed assets per employee | 1,383 | 162.030 | 1,057.418 | 0.002 | 24,290.600 |
| Current ratio | 1,383 | 1.653 | 2.110 | 0.028 | 53.667 |
| **Control group without outliers** | | | | | |
| Employment growth | 123,163 | 0.010 | 0.663 | -6.094 | 8.147 |
| Average annual employment growth | 123,163 | 0.001 | 0.082 | -0.737 | 1.018 |
| Number of employees | 123,163 | 32.349 | 341.533 | 1.000 | 74,506.000 |
| Age (until 2007) | 123,163 | 15.498 | 12.378 | 1.000 | 125.000 |
| Fixed assets per employee | 123,163 | 148.226 | 4,776.599 | 0.001 | 825,289.000 |
| Current ratio | 123,163 | 1.660 | 4.051 | 0.001 | 487.455 |

Notes: Sources: Bachtrögler, Hammer, Reuter & Schwendinger (2017), ORBIS database. All variables apart from employment growth are measured prior to treatment. Note that the distribution of most variables is highly skewed, e.g., the median value of employment in treated firms amounts to about 25. One outlier observation with regard to the pre-treatment value of fixed assets per employee is excluded (non-treated firm with a value of 1,375,649.000 in Île de France) and three observations (also in the control group) with a current ratio above 600 (maximum value of 92,043.630), located in Île de France and Rhône-Alpes are excluded.

## 4.3 Regional data for the voting model

Descriptive statistics for the regional characteristics entering the analysis of the French voting behavior are reported in Table 3. Accumulated expenditure data (until 2014) per NUTS-3 region is provided by the European Commission (DG REGIO). On average, it amounts to 82 Euros per inhabitant in France, ranging

[11] Note that we do not limit the sample by excluding firms in different sectors but control for different sectors when estimating propensity scores. We do so as the main research question in this study is whether increasing employment growth induced by EU regional policy affects a specific region's citizens' attitude towards the EU. Whether this takes place in different sectors, may be, on average, of minor importance to the voters.

from below 8 Euros per capita in two NUTS-3 regions in Île de France to 359 Euros per capita in Corse. As further variables indicating a region's exposure to the EU, the importance of the trade and tourism sector (NACE Rev.2 industries G-I) and regional net migration are considered. As emigration and immigration data is not available for France (on a regional level), the relationship of the regional to the national average should proxy the extent of net migration into a *depártement* as compared to others within France, which may determine a citizen's perceived exposure to foreign countries and therefore the EU.[12]

Table 3: Descriptive statistics: Regional characteristics for 96 NUTS-3 regions in the voting model

| **Variable** | **Average**[a] | **Source** | **Mean** | **Std.Dev.** | **Min** | **Max** |
|---|---|---|---|---|---|---|
| **NUTS-3 level** | | | | | | |
| Regional funds expenditure (mio.) per 1,000 inhabitants | 2007-14 (sum) | DG REGIO | 0.082 | 0.059 | 0.007 | 0.359 |
| GVA share NACE Rev.2 G-I (%) | 2007-15 | Eurostat | 17.810 | 3.054 | 12.500 | 31.605 |
| Relative crude net migration rate (%) (Deviation NUTS-3 from national average)[b] | 2007-15 | Eurostat (own calc.) | 0.000 | 2.073 | -4.386 | 5.034 |
| Population density: Inhabitants per km$^2$ | 2007-15 | Eurostat | 558.823 | 2456.684 | 14.856 | 21,130.45 |
| GDP per capita | 2007-15 | Eurostat | 27,184.640 | 10,012.81 | 19,037.50 | 90,312.50 |
| GDP per capita growth (%) | 2007-15 | Eurostat (own calc.) | 0.782 | 0.806 | -1.061 | 3.277 |
| Population share over 65 years (%) | 2007-15 | Eurostat, (own calc.) | 19.020 | 3.473 | 10.844 | 26.761 |
| **NUTS-2 level** | | | | | | |
| European Quality of Government Index (EQI)[d] | 2007-15 | EQI[c] World Bank | 0.475 | 0.223 | 0.073 | 0.999 |
| Eurobarometer: Trust in the EU (%) | 2015 | Eurobarometer[e] | 37.042 | 4.034 | 29.000 | 46.000 |
| Employment rate growth (%) | 2007-14[f] | Eurostat | 0.078 | 0.447 | -0.785 | 1.136 |
| Population share with ISCED levels 0-2[g] (%) | 2007-15 | Eurostat | 27.814 | 4.456 | 20.611 | 42.800 |
| Employment share in industry and construction sector (%) | 2007-15 | Eurostat | 22.927 | 4.454 | 14.570 | 33.489 |
| Inhabitants per hospital bed | 2007-15 | Eurostat | 149.987 | 12.871 | 115.583 | 174.108 |
| Unemployment rate (%) | 2007-15 | Eurostat | 8.839 | 1.349 | 6.956 | 12.878 |

[a]For the first difference regression (robustness check) we use average values from 2008 to 2011 and from 2012 to 2015 (2012-2014 for employment growth).

[b]In order to ensure a reliable comparison of the values at the NUTS-3 level, regional crude rates of net migration are first standardized so that their mean coincides with the crude net migration rate reported for metropolitan France (excluding French overseas departments).

[c]**?**

[d]As described in Charron & Lapuente (2018), the EQI 2010 and 2013 are based on an average country score of the World Governance Indicators (WGI) 'Control of corruption', 'Government effectiveness', 'Rule of law' and 'Voice and accountability'. As the WGI are available until 2015, we are able to create a time-variant institutional quality measure from 2007 to 2015. We add the distance of the NUTS-2 level EQI to the national average EQI that coincides with the WGI country score, which is available on an annual basis, in 2010 and 2013, respectively. EQI 2010 is used for the years from 2007 to 2013 and EQI 2013 for the years 2014 and 2015.

[e]European Union (2015*b*)

[f]As the firm-level effects on employment growth included in the voting model are estimated over the MFF 2007-2013 until 2014 (or later years if the 2014 value is not available), this is also the time span of interest regarding the aggregate employment growth rate of a NUTS-2 region.

[g]The population share refers to the inhabitants aged 25 to 64. The highest educational attainment referred to by ISCED levels from 0 to 2 is primary education (UNESCO, 2012).

[12]Unfortunately, the stock of migrants relative to a region's total inhabitants, as an alternative measure, is not available as a time series but on the NUTS-2 regional level in 2011. The average population share with foreign citizenship corresponded to 5% that year.

As regional differences in cohesion policy effects on firm performance may be due to the quality of institutions within a region (as a determinant of absorptive capacity, see e.g., Becker, Egger & von Ehrlich, 2013), we include the European Quality of Government Index introduced by **?**.[13] Moreover, to capture the regional inhabitants' attitude towards the EU independently from the running candidates, an indicator stemming from a Eurobarometer survey about the citizens' trust in the EU is included. That is, the share of respondents within a NUTS-2 region who "tend to trust" in the European Union as a whole. In order to account for overall employment growth within a NUTS-2 region, we add the average of this variable for 2007-2014 as further control variable. Those three covariates are expected to be associated with less Euroscepticism.

Additional control variables on the NUTS-3 regional level are population density, income and income growth as well as the share of the regional population aged over 65 years. Divergent GDP per capita growth rates should account for the asymmetric impact of the Great Recession on regional economic development. For the NUTS-2 region level, another set of economic characteristics is considered, namely, the employment share in the manufacturing and construction industries and the unemployment rate. Finally, the share of the population aged between 25 and 64 years with primary or no education (on average, 28%) and an indicator describing the quality of the health system (inhabitants per hospital bed) are included in the estimation. Based on previous findings in the literature, we expect that higher income and income growth, population density and education as well as fewer inhabitants per hospital bed are correlated with less Euroscepticism and fewer votes for Marine Le Pen.

# 5 Estimation results

## 5.1 Firm-level effectiveness of regional funds

The first part of the empirical analysis estimates the firm-level effects of projects co-funded by regional funds in French NUTS-2 regions. The results are presented in Table 4, which reports estimated average treatment effects on the treated (ATT) over the whole time span (from before the MFF 2007-2013 to afterwards, depending on data availability) and annualized (i.e., annual average) ATTs. The estimates are based on employment growth from 2006 (or earlier if the 2006 value is not available from ORBIS) to 2014 or later (if the 2014 value is unknown), as well as with an additional lag (lagged ATT). Recall that for estimating lagged ATTs, the post-treatment value considered for the calculation of employment growth is 2015 and 2016, respectively and not 2014. By using employment growth instead of employment, our approach combines propensity score matching with a DiD framework. With regard to the propensity score matching, covariate-balancing is achieved in all different specifications applied.

In the baseline results of the voting model presented in the next section, we use the non-lagged annual ATT as the co-funded projects carried out by the firms during the MFF 2007-2013 start from 2007 on and we therefore expect that a lag in policy effectiveness is already included for a large share of the projects also when taking into account employment growth (only) until 2014.

[13]Refer to Table 3 for details on the calculation of a panel version of the European Quality of Government Index.

Table 4: Results: Firm-level average treatment effects on the treated firms' employment growth

| **NUTS-2 region** | **Total obs. Treated obs.** | **ATT** | **Annual ATT** | **Total obs. Treated obs.** | **Lagged ATT** | **Annual lagged ATT** |
|---|---|---|---|---|---|---|
| Île de France | 26,779 | $0.285^{***}$ | $0.029^{**}$ | 22,773 | $0.282^{***}$ | $0.031^{***}$ |
| | 196 | (0.097) | (0.012) | 174 | (0.109) | (0.011) |
| Champagne-Ardenne | 1,325 | 0.042 | 0.004 | 1,123 | 0.188 | 0.020 |
| | 44 | (0.155) | (0.018) | 42 | (0.165) | (0.018) |
| Picardie | 1,050 | 0.122 | 0.015 | 520 | 0.316 | 0.035 |
| | 18 | (0.295) | (0.036) | 15 | (0.336) | (0.037) |
| Haute-Normandie | 1,162 | 0.317 | 0.038 | 1,042 | 0.386 | 0.043 |
| | 24 | (0.260) | (0.032) | 24 | (0.287) | (0.032) |
| Centre (FR) | 2,242 | 0.315 | $0.039^{*}$ | 1,853 | $0.597^{***}$ | $0.066^{***}$ |
| | 40 | (0.193) | (0.024) | 36 | (0.186) | (0.021) |
| Basse-Normandie | 1,223 | 0.405 | 0.048 | 1,041 | 0.077 | 0.006 |
| | 18 | (0.301) | (0.036) | 12 | (0.292) | (0.032) |
| Bourgogne | 1,772 | 0.220 | 0.028 | 1,500 | $0.345^{\dagger}$ | $0.038^{\dagger}$ |
| | 35 | (0.204) | (0.025) | 33 | (0.209) | (0.023) |
| Nord-Pas-de-Calais | 3,892 | $0.234^{\dagger}$ | $0.028^{\dagger}$ | 3,373 | $0.332^{**}$ | $0.037^{**}$ |
| | 81 | (0.145) | (0.018) | 73 | (0.162) | (0.018) |
| Lorraine | 1,389 | 0.061 | 0.008 | 1,206 | 0.125 | 0.014 |
| | 87 | (0.105) | (0.013) | 75 | (0.133) | (0.015) |
| Franche-Comté | 1,558 | 0.191 | 0.023 | 1,097 | $0.262^{\dagger}$ | $0.029^{\dagger}$ |
| | 40 | (0.153) | (0.019) | 40 | (0.180) | (0.020) |
| Pays de la Loire | 2,404 | 0.139 | 0.017 | 2,145 | 0.106 | 0.012 |
| | 36 | (0.193) | (0.024) | 30 | (0.194) | (0.021) |
| Bretagne | 1,318 | 0.204 | 0.025 | 1,117 | 0.395 | 0.044 |
| | 20 | (0.275) | (0.034) | 18 | (0.292) | (0.032) |
| Poitou-Charentes | 1,382 | −0.005 | 0.000 | 1,205 | 0.090 | 0.010 |
| | 52 | (0.151) | (0.019) | 48 | (0.154) | (0.017) |
| Aquitaine | 5,246 | 0.131 | 0.015 | 4,223 | 0.045 | 0.005 |
| | 57 | (0.156) | (0.019) | 53 | (0.163) | (0.018) |
| Midi-Pyrénées | 7,193 | $0.218^{***}$ | $0.027^{***}$ | 6,026 | $0.227^{***}$ | $0.025^{***}$ |
| | 255 | (0.073) | (0.009) | 223 | (0.082) | (0.009) |
| Limousin | 1,052 | $0.274^{*}$ | $0.033^{*}$ | 858 | 0.037 | 0.004 |
| | 52 | (0.150) | (0.018) | 46 | (0.162) | (0.018) |
| Rhône-Alpes | 11,546 | $0.167^{*}$ | $0.021^{*}$ | 9,687 | 0.060 | 0.007 |
| | 118 | (0.095) | (0.012) | 105 | (0.109) | (0.012) |
| Auvergne | 1,382 | $0.397^{**}$ | $0.049^{**}$ | 1,216 | $0.317^{\dagger}$ | $0.035^{\dagger}$ |
| | 34 | (0.183) | (0.023) | 31 | (0.201) | (0.022) |
| Languedoc-Roussillon | 5,599 | $0.431^{**}$ | $0.053^{**}$ | 4,673 | $0.293^{\dagger}$ | $0.032^{\dagger}$ |
| | 64 | (0.170) | (0.021) | 58 | (0.189) | (0.021) |
| P.A.-Côte d'Azur | 9,810 | $0.384^{**}$ | $0.047^{**}$ | 7,946 | $0.394^{**}$ | $0.043^{**}$ |
| | 50 | (0.152) | (0.019) | 49 | (0.171) | (0.019) |
| Corse | 929 | 0.193 | 0.023 | 752 | 0.012 | 0.000 |
| | 29 | (0.221) | (0.027) | 25 | (0.222) | (0.024) |

*Notes:* *** denotes statistical significance at the 1% level, ** at the 5% level, * at the 10% level, † at the 15% level. The treatment effects are estimated per NUTS-2 region with considering a NUTS-3 region fixed effect in the estimation of the propensity scores. For FR421 and FR422 (Bas-Rhin and Haut-Rhin in Alsace), no ATT could not be calculated due to too few observations. The lagged ATT considers the 2015 value, or if it is not available from ORBIS, the 2016 value as a post-treatment value for the calculation of the outcome variable (employment growth).

From the propensity score matching estimation and based on bootstrapped standard errors, we find that, on average, treated firms in five (eight) of the 21 French NUTS-2 regions experience a positive and statistically significant employment growth effect at least at the standard confidence level of 95% (90%). To give an example, in Île de France, annual average employment growth of treated firms over the programming period 2007-2013 is by 2.9 percentage points larger due to funding from EU structural funds. Taking into consideration the lagged effect until 2015, the (significant) annualised ATT increases further by 0.2 percentage points.

A similar pattern can also be found for the NUTS-2 regions of Centre and Nord-Pas-de-Calais, where the treatment effect turns significant at the 5%-level when considering the time lag of the effect. The policy effects are also statistically significant in *Midi-Pyrénées* and *Provence-Alpes-Côte d'Azur*, while the estimated treatment effects in some other regions are only significant at the 15%-level when lagging the post-treatment employment outcomes.[14]

In the majority of regions, however, the projects co-funded by the EU's structural funds do not appear to have had a statistically significant impact on employment growth for beneficiary firms. In all cases, the estimated ATTs take on positive values but we are not able to rule out a zero effect.[15] As indicated in Table 4, in some regions the number of treated firms is relatively small which reduces the statistical power associated with the estimated treatment effects stemming from the applied propensity score matching and DiD framework. In general, however, one may conclude that EU structural funds payments do not seem to induce adverse employment effects in the French NUTS-2 regions but its statistical effectiveness varies substantially across regions. In the next step we are aiming to exploit the variation in the obtained EU structural funds effects in order to explain voting behavior in the 2017 French presidential election.

### 5.2 The basic model for explaining eurosceptic voting

In the following, we concentrate on the proposed voting model explaining variation in the vote at the French presidential election across French NUTS-3 regions. Thereby, we put special emphasis on the main hypothesis of this study, namely, that not only the amount of cohesion policy expenditures in a NUTS-3 region but, conditional on these, also actual policy effectiveness affects the voting behavior of French citizens. Policy effectiveness enters the voting model via the estimated ATTs stemming from the firm-level analysis of the employment growth effects of EU structural funds payments. As indicated in the introduction, we expect that (this kind of) policy effect may be perceived by voters.

Table 5 reports the estimated marginal effects of the selected variables, identified in the previous literature, on Macron's vote share (reported at the left-hand side) and on Le Pen's election success (at the right-hand side), without considering the effectiveness of EU regional policies. Thus, these results offer a benchmark and are comparable to the ones provided by other papers for the case of the "Brexit" referendum (e.g., Becker et al., 2017). In the first specifications each we include all available NUTS-2 and NUTS-3 regional characteristics. Specifications (2) alternatively include NUTS-2 fixed effects and, as a consequence, only study the impacts of regional characteristics available at the more disaggregated NUTS-3 level. The third specifications for each of the two candidates include the vote shares of Le Pen in Macron's equation, and vice versa, as they are strongly negatively correlated with $\rho = -0.927$ (see Table A1 in the Appendix).

According to our estimates, there is no clear relationship between the size of the trade and tourism sectors as well as the regional net migration rate (relative to national net migration) and the voting behavior in French regions. By contrast, the estimation results indicate that a one percent increase of regional funds expenditure per 1,000 inhabitants in the respective NUTS-3 region statistically significantly decreases the vote share for Marine Le Pen by about one to two percentage points. The corresponding effect for the vote

[14] In *Limousin* and *Rhône-Alpes*, the standard ATT is only statistically significant at the 90%-level, which may explain its loss of significance when being lagged.

[15] Refer to Figure 2 for a depiction of significant and non-significant ATTs by NUTS-2 region in a map of France.

share for Emmanuel Macron points in the opposite direction but is smaller in magnitude and not statistically significant in Specification (3). The finding that regional policy matters, which is robust across all models estimated in this paper, is in contrast to the outcomes of studies examining the determinants of the "Brexit" vote (Becker et al., 2017; Crescenzi, Di Cataldo & Giua, 2017) and points to cross-country heterogeneity in voting motives.

Table 5: Marginal effects on vote shares in the first round of the 2017 French presidential elections: Baseline specification

| | Macron's Share | | | Le Pen's Share | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (1) | (2) | (3) |
| Regional funds expenditure | 0.008** | 0.008* | −0.002 | −0.017*** | −0.022*** | −0.012** |
| per 1,000 inh. (log) | (0.004) | (0.004) | (0.003) | (0.005) | (0.007) | (0.006) |
| GVA share trade&tourism | −0.002** | −0.001 | −0.001 | 0.001 | 0.001 | −0.001 |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Relative net migr. | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.002 |
| rate | (0.001) | (0.002) | (0.001) | (0.002) | (0.003) | (0.002) |
| Inhabitants per km$^2$ (log) | 0.000 | −0.002 | −0.002 | 0.000 | 0.002 | −0.001 |
| | (0.004) | (0.004) | (0.003) | (0.009) | (0.009) | (0.007) |
| GDP per capita (log) | 0.067*** | 0.086*** | 0.034* | −0.108*** | −0.119*** | −0.011 |
| | (0.015) | (0.016) | (0.018) | (0.025) | (0.027) | (0.024) |
| GDP per capita growth | 0.000 | −0.002 | −0.002 | −0.004 | 0.000 | −0.003 |
| | (0.003) | (0.003) | (0.002) | (0.006) | (0.006) | (0.004) |
| Pop. share over 65 | 0.000 | 0.000 | 0.000 | −0.003* | −0.002† | −0.002† |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Europ. Quality of Government | 0.017*** | – | – | −0.024*** | – | – |
| Index (log) | (0.004) | – | – | (0.008) | – | – |
| Eurobarometer Resp. share who | 0.001 | – | – | −0.003** | – | – |
| trust in EU | (0.001) | – | – | (0.001) | – | – |
| Employment growth | 0.004 | – | – | −0.008 | – | – |
| | (0.005) | – | – | (0.010) | – | – |
| Pop. share with | 0.000 | – | – | 0.001 | – | – |
| ISCED <= 2 | (0.001) | – | – | (0.001) | – | – |
| Empl. share in industry | −0.002** | – | – | 0.004*** | – | – |
| &construction | (0.001) | – | – | (0.001) | – | – |
| Inhabitants per hosp.bed | 0.028 | – | – | −0.099** | – | – |
| | (0.032) | – | – | (0.042) | – | – |
| Unemployment rate | −0.010*** | – | – | 0.018*** | – | – |
| | (0.002) | – | – | (0.004) | – | – |
| Vote share of Le Pen/ | | | −0.437*** | | | −1.252*** |
| Macron | | | (0.054) | | | (0.171) |
| NUTS-2 FE | No | Yes | Yes | No | Yes | Yes |
| Adjusted $R^2$ | 0.733 | 0.827 | 0.921 | 0.775 | 0.833 | 0.923 |
| Observations | 96 | 96 | 96 | 96 | 96 | 96 |

Notes: Marginal effects after OLS estimation (corresponding to the coefficients obtained). Standard errors (in parentheses) are clustered at the NUTS-3 level. *** denotes statistical significance at the 1% level, ** at the 5% level, * at the 10% level, , † at the 15% level.

Furthermore, in line with previous literature, the regional voting outcomes for Macron and Le Pen are driven by differences in regional income, unemployment rates, education and the regional share of employees working in manufacturing and construction sectors. For the latter, only NUTS-2 data is available, that is why these effects are omitted when including NUTS-2 fixed effects in Specifications (2) and (3) in Table 5, respectively.

Considering the size of the marginal effects, GDP per capita in a NUTS-3 region is the main driver of the vote shares for both candidates. A one percent larger GDP per capita, for example, leads to to a rise in Macron's vote share by at at least three percentage points and a drop of Le Pen's vote share by an even larger magnitude in Specifications (1) and (2).

In the spirit of e.g., Curtice (2017), the voting model presented in Table 5 includes not only economic (and demographic) variables but also one indicating the trust of a NUTS-2 region's citizens in the EU. The latter is measured as the share of respondents at an Eurobarometer survey in 2015 which "tend to trust in the EU". Interestingly, throughout the results shown in this study, this indicator affects Le Pen's but not Macron's vote share. As expected, regions in which more citizens tend to trust in the EU have voted to a lesser extent for the eurosceptic candidate.

One variable included in our voting model, which has not gained much attention in the papers dealing with the "Brexit" referendum, is institutional quality, measured by the time-varying European Quality of Government Index (Charron, Dijkstra & Lapuente, 2014)[16]. The estimation results in this paper show that higher institutional quality is linked to significantly more Europe-friendly votes for Emmanuel Macron and less for Marine Le Pen.

Finally, another robust empirical finding is that the indicator representing the quality of the health system, inhabitants per hospital bed, has a statistically significant impact on Marine Le Pen's vote share. If one assumes that more inhabitants per hospital bed in a region signifies a lower quality of the health systems, it might come as a surprise that this variable turns out to be negatively associated with voting for Le Pen, who has criticised the current public system (in the framework of the EU) during her campaign. However, the variable may also reflect differences in the efficiency of the regional health system, i.e., that some regions might need less hospital beds (and public funds) in order to accurately treat their citizens. That is why we are cautious with the interpretation of the corresponding significant coefficient estimate.

### 5.3 The impact of cohesion policy effectiveness on eurosceptic voting

In Table 6, we introduce the annual average employment effect from EU cohesion policy funding as a measure of its effectiveness in French regions. For each NUTS-3 region, the estimated average employment growth effect of cohesion policy (ATT) stemming from the NUTS-2 estimates enters the equation individually and also interacted with a dummy indicating the statistical significance of the ATT based on the 95% confidence interval, whereby an entry of one implies statistical significance and zero not. The significance dummy is also included as an individual explanatory variable in the voting model. This modelling approach allows to explicitly disentangle the role of statistically significant versus zero effects of EU cohesion policy.

The results for the NUTS-2- and NUTS-3-level control variables from Table 5 are hardly affected by the inclusion of our effectiveness measure. The citizens in richer regions with better institutional quality and more trust in the EU, a smaller manufacturing and construction sector as well as a lower unemployment rate tend to vote to a larger extent for Macron and to a lesser degree for Le Pen. Furthermore, in line with some findings from the previous literature (e.g., Goodwin & Heath, 2016; Zoega & Arnorsson, 2018), a negative

[16] Refer to Table 3.

relationship between the age of the population within a region and the vote shares for Marine Le Pen is identified. This finding is in contrast to Becker et al. (2017) who find that more "Leave" votes were counted in the "Brexit" referendum in regional districts with relatively old inhabitants, pointing again to specific particularities being relevant for the voting decisions in different countries.

Table 6: Marginal effects on vote shares in the first round of the 2017 French presidential elections: Augmented specification

| | Macron's Share | Le Pen's Share |
|---|---|---|
| Regional funds expenditure | 0.010** | −0.012*** |
| per 1,000 inh. (log) | (0.004) | (0.007) |
| ATT NUTS-2 | 0.000 | −0.005† |
| | (0.002) | (0.003) |
| Significant ATT NUTS-2 | −0.040† | 0.073* |
| | (0.027) | (0.037) |
| Significant x ATT NUTS-2 | 0.009 | −0.015* |
| | (0.006) | (0.008) |
| GVA share trade&tourism | −0.002* | 0.001 |
| | (0.001) | (0.001) |
| Relative crude net migration rate | 0.000 | 0.000 |
| | (0.001) | (0.002) |
| Inhabitants per km$^2$ (log) | 0.002 | −0.002 |
| | (0.005) | (0.009) |
| GDP per capita (log) | 0.061*** | −0.100*** |
| | (0.017) | (0.030) |
| GDP per capita growth | 0.001 | −0.005 |
| | (0.004) | (0.007) |
| Pop. share over 65 | 0.000 | −0.003* |
| | (0.001) | (0.002) |
| Europ. Quality of Government | 0.012* | −0.013 |
| Index (log) | (0.006) | (0.011) |
| Eurobarometer Resp. share who | 0.001 | −0.004* |
| trust in EU | (0.001) | (0.002) |
| Employment growth | −0.003 | 0.004 |
| | (0.007) | (0.012) |
| Pop. share with ISCED <= 2 | −0.001 | 0.003* |
| | (0.001) | (0.002) |
| Empl. share in industry | −0.002** | 0.004*** |
| &constr. | (0.001) | (0.001) |
| Inhabitants per hosp.bed | 0.032 | −0.140** |
| | (0.037) | (0.061) |
| Unemployment rate | −0.011*** | 0.020*** |
| | (0.003) | (0.005) |
| Adjusted $R^2$ | 0.737 | 0.784 |
| Observations | 94 | 94 |

Notes: Significance dummy defined according to the 95%-level of confidence. Marginal effects after OLS estimation. Standard errors (in parentheses) are clustered at the NUTS-3 level and bootstrapped (20,000 replications). *** denotes significance at the 1% level, ** at the 5% level, * at the 10% level, † at the 15% level.

Equations 5 and 6 and the results from Table 6 indicate that the total effect of EU regional policy's effectiveness on voting behavior depends on the marginal effect of the policy-induced employment effect (ATT), the dummy variable denoting its statistical significance as well as the interaction thereof. The sole impact of the estimated ATT as such turns out to be close to zero for Macron's and negative for Le Pen's vote shares. These coefficients are, however, not very informative without considering the corresponding interaction with the dummy variable denoting statistical significance at the 5%-level. In fact, the interaction terms are well in line with our expectation taking on positive (negative) estimated parameter values for Macron's (Le Pen's) vote shares, although they are not statistically significant in Macron's case. Furthermore, the magnitudes of these parameters are larger as compared to the coefficients associated with the quantitative size of the ATT.

Applying Equations 5 and 6, Table 7 and Figure 2 report the resulting marginal effects by differentiating between the statistical significance of the EU structural funds across regions. Ineffective (i.e., non-significant) EU structural funds effects do not statistically significantly increase Macron's vote shares, while Marine Le Pen seems to already have suffered in her election outcomes even in the absence of a statistical significant employment growth effect induced by regional policy programmes. The latter finding is related to the statistically significant ATT main effect which implies a vote share reduction of about 0.5 percentage points. In regions with statistically significant EU policy-induced employment growth effects, the coefficients representing the impacts on voting behavior are magnified. As Table 7 indicates, in such regions the effect for Le Pen amounts to approximately minus two percentage points, while the corresponding overall effect indicates that Emmanuel Macron's vote shares increase by about 0.8 percentage points. However, based on our main specification this overall effect is statistically not significantly different from zero.

Table 7: Marginal effects of cohesion cohesion policy effectiveness on the shares of vote: Partial derivative w.r.t. ATT

| | Marginal Effect | Standard Error | Marginal Effect | Standard Error |
|---|---|---|---|---|
| | Macron's vote share | | Le Pen's vote share | |
| SIGN = 0 | 0.000 | 0.002 | $-0.005^{\dagger}$ | 0.003 |
| SIGN = 1 | 0.008 | 0.006 | $-0.020^{**}$ | 0.009 |

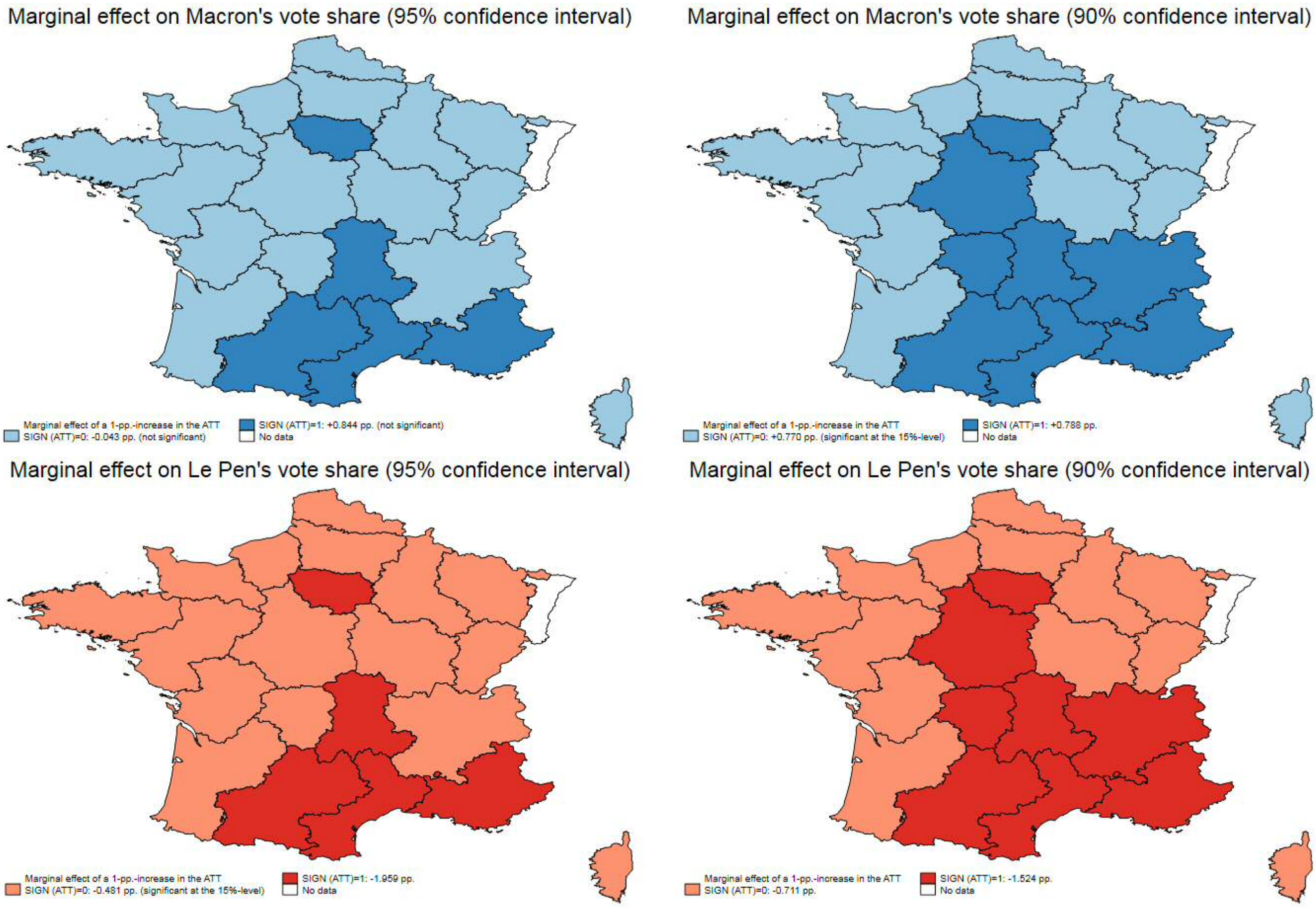
Notes: Total marginal effect of cohesion policy effectiveness evaluated at means of the other variables. Partial derivative with respect to ATT (see Equations 5 and 6). *** denotes significance at the 1% level, ** at the 5% level, * at the 10% level, † at the 15% level.

For the sake of brevity, the subsequent Tables we will combine all relevant results into one Table each. The estimation results for the control variables are presented as in the above Tables while we directly calculate the overall marginal effects for the policy effectiveness measure and report them for significant versus non-significant ATTs at the bottom of each Table.

After applying the voting model for explaining the variation in the vote shares for Macron and Le Pen, it may also be of interest to test for the importance of the variables included when it comes to voter turnout at the first and the second round of 2017 presidential election in French NUTS-3 regions. On average, voter turnout amounted to around 76% in the second round, and to slightly more, 80%, in the first round of the presidential election. Table 8 shows that EU exposure, i.e., cohesion policy, trade and tourism and migration, only had a little impact. A one percentage point increase in the share of the trade and tourism sectors in gross value added is associated with a turnout decrease in both rounds by 0.2 percentage points. However, the turnout was higher in NUTS-3 regions that are less densely populated, richer in terms of GDP per capita, and in which the share of the population aged between 25 and 64 with no secondary education is lower.

With regard to the variables of main interest, the bottom of Table 8 suggests that policy effectiveness barely affected voter turnout in the first round of the 2017 French presidential elections. Larger but statistically insignificant employment effects stemming from EU cohesion policy are associated with a mild increase

Figure 2: Total marginal effect of cohesion policy effectiveness: NUTS-2 regions with non-/significant cohesion policy effects (5%- and 10%-level)




Notes: For FR421 and FR422 (Bas-Rhin and Haut-Rhin in Alsace), no ATT could be calculated due to too few observations. See Table 4 for detailed information on the regions with a significant ATT with respect to different confidence intervals. The marginal effects of ATTs that are significant at the 5%-level are presented in Table 6 and 7. Estimation results considering a dummy indicating significance of the ATT at the 10%-level are shown in Table 11 in the Appendix.

in voter turnout. This positive turnout effect is magnified in regions in which the ATTs turn out to be statistically significant but, similar to the results for Macron, this overall effect is not statistically significant.

Table 8: Turnout as dependent variable: Marginal Effects

| | Turnout 1st round | Turnout 2nd round |
|---|---|---|
| Regional funds expenditure | $-0.003$ | $-0.006$ |
| per 1,000 inh. (log) | (0.005) | (0.005) |
| GVA share trade&tourism | $-0.002^{***}$ | $-0.002^{***}$ |
| | (0.001) | (0.001) |
| Relative crude net migration | 0.000 | $-0.001$ |
| rate | (0.002) | (0.002) |
| Inhabitants per km$^2$ (log) | $-0.012^{**}$ | $-0.014^{***}$ |
| | (0.005) | (0.005) |
| GDP per capita (log) | $0.044^{**}$ | $0.045^{**}$ |
| | (0.022) | (0.021) |
| GDP per capita growth | 0.000 | 0.000 |
| | (0.000) | (0.000) |
| Pop. share over 65 | 0.000 | 0.001 |
| | (0.001) | (0.001) |
| Europ. Quality of Gov. | 0.000 | 0.009 |
| Index (log) | (0.007) | (0.006) |
| Eurobarometer Resp. share who | 0.000 | 0.000 |
| trust in EU | (0.001) | (0.001) |
| Employment growth | 0.000 | 0.000 |
| | (0.000) | (0.000) |
| Pop. share with | $-0.005^{**}$ | $-0.004^{**}$ |
| ISCED <= 2 | (0.002) | (0.002) |
| Empl. share in industry | $-0.001$ | 0.000 |
| &constr. | (0.001) | (0.001) |
| Inhabitants per hosp.bed | $0.101^{***}$ | $0.052^{\dagger}$ |
| | (0.035) | (0.035) |
| Unemployment rate | 0.005 | $0.006^{\dagger}$ |
| | (0.004) | (0.004) |
| **Total marginal effect of cohesion policy effectiveness** | | |
| SIGN = 0 | $0.004^{\dagger}$ | 0.001 |
| | (0.002) | (0.002) |
| SIGN = 1 | 0.010 | 0.007 |
| | (0.007) | (0.007) |
| Adjusted $R^2$ | 0.559 | 0.614 |
| Observations | 94 | 94 |

Notes: Marginal effects after OLS estimation, evaluated at means of the other variables. Marginal effect of ATT over the dummy indicating its significance (at means of other variables). Standard errors (in parentheses) are clustered at the NUTS-3 level and bootstrapped (20,000 replications). *** denotes significance at the 1% level, ** at the 5% level, * at the 10% level, † at the 15% level.

## 5.4 Robustness Checks

This section offers a variety of robustness checks. First, in Table 9 we apply alternative estimators for studying the voting behavior of the French electorate. In particular, we apply the fractional response model proposed by Papke & Wooldridge (1996) which explicitly accounts for the fractional nature of relative vote share data, implying that these are naturally bounded by the zero-one interval. Second, we investigate the total number of votes casted for Macron and Le Pen instead of vote shares as an alternative outcome variable of interest. As these are integer numbers, the natural estimator applicable is the (pseudo) maximum-likelihood estimator based on the Poisson distribution. In these first two robustness checks, we furthermore apply alternative measures for migration and institutional quality. In particular, we do not consider the net migration rate relative to the national one but the NUTS-3 regions' net migration per inhabitant, and take the average European Quality of Government Index (EQI) from 2007 to 2013 into account. The latter only considers the EQI 2010 and not also the EQI 2013 version up from 2014 for the calculation of the time-variant institutional quality measure (as it does in the baseline results), such that a potential bias of the estimated parameter due to a discontinuity in the measurement can be avoided.

Table 9: Robustness checks (I): Generalized linear model (GLM) and Poisson estimation, alternative measures for migration and institutional quality.

| | Macron's Share | | Le Pen's Share | |
|---|---|---|---|---|
| | GLM | Poisson Votes per capita | GLM | Poisson Votes per capita |
| Regional funds expenditure | $0.011^{***}$ | $0.006^{**}$ | $-0.025^{***}$ | $-0.013^{***}$ |
| per 1,000 inh. (log) | (0.004) | (0.003) | (0.006) | (0.004) |
| GVA share trade&tourism | $-0.002^{*}$ | $-0.002^{**}$ | 0.001 | 0.001 |
| | (0.001) | (0.001) | (0.002) | (0.001) |
| Net migration per inhabitant | 0.001 | 0.003 | 0.004 | 0.005 |
| (log) | (0.004) | (0.004) | (0.007) | (0.005) |
| Inhabitants per km$^2$ (log) | 0.003 | $-0.004$ | $-0.001$ | $-0.006$ |
| | (0.005) | (0.003) | (0.010) | (0.006) |
| GDP per capita (log) | $0.057^{***}$ | $0.038^{***}$ | $-0.097^{***}$ | $-0.070^{***}$ |
| | (0.018) | (0.014) | (0.030) | (0.019) |
| GDP per capita growth | 0.001 | $-0.001$ | $-0.004$ | $-0.001$ |
| | (0.004) | (0.003) | (0.007) | (0.004) |
| Pop. share over 65 | 0.000 | $0.001^{*}$ | $-0.003^{*}$ | $-0.001$ |
| | (0.001) | (0.001) | (0.002) | (0.001) |
| Europ. Quality of Gov. | 0.006 | 0.003 | $-0.007$ | $-0.004$ |
| Index 2007-13 (log) | (0.006) | (0.004) | (0.009) | (0.005) |
| Eurobarometer Resp. share who | 0.002 | 0.001 | $-0.004^{*}$ | $-0.003^{**}$ |
| trust in EU | (0.001) | (0.001) | (0.002) | (0.001) |
| Employment growth | $-0.008$ | $-0.001$ | 0.008 | 0.006 |
| | (0.007) | (0.005) | (0.011) | (0.007) |
| Pop. share with | $-0.002^{\dagger}$ | $-0.002^{***}$ | $0.004^{**}$ | 0.000 |
| ISCED <= 2 | (0.001) | (0.001) | (0.002) | (0.001) |
| Empl. share in industry | $-0.002^{**}$ | $-0.001^{*}$ | $0.005^{***}$ | $0.003^{***}$ |
| &constr. | (0.001) | (0.001) | (0.001) | (0.001) |
| Inhabitants per hosp.bed | 0.036 | $0.050^{**}$ | $-0.151^{**}$ | $-0.054^{\dagger}$ |
| | (0.037) | (0.025) | (0.061) | (0.034) |
| Unemployment rate | $-0.012^{***}$ | $-0.004^{**}$ | $0.020^{***}$ | $0.013^{***}$ |
| | (0.003) | (0.002) | (0.005) | (0.003) |
| **Total marginal effect of cohesion policy effectiveness** | | | | |
| SIGN = 0 | 0.000 | 0.001 | $-0.005^{*}$ | $-0.002$ |
| | (0.002) | (0.002) | (0.003) | (0.002) |
| SIGN = 1 | $0.011^{*}$ | $0.010^{**}$ | $-0.023^{***}$ | $-0.007^{\dagger}$ |
| | (0.006) | (0.005) | (0.008) | (0.004) |
| BIC/Pseudo $R^2$ | -345.266 | 0.004 | -345.231 | 0.012 |
| Observations | 94 | 94 | 94 | 94 |

Notes: Marginal effects after GLM and Poisson estimation, evaluated at means of the other variables. Marginal effect of ATT over the dummy indicating its significance (at means of other variables). Standard errors (in parentheses) are clustered at the NUTS-3 level and bootstrapped (20,000 replications). *** denotes significance at the 1% level, ** at the 5% level, * at the 10% level, † at the 15% level.

Table 10: Robustness Checks (II): Results of the second round of presidential elections as dependent variable. Seemingly Unrelated Regression (SUR) estimation.

| | Le Pen's Share 2nd round | Macron's share | Le Pen's share |
|---|---|---|---|
| | | SUR (1st round) | |
| Regional funds expenditure | $-0.031^{***}$ | $0.010^{**}$ | $-0.023^{***}$ |
| per 1,000 inh. (log) | (0.010) | (0.004) | (0.007) |
| GVA share trade&tourism | 0.002 | $-0.002^{*}$ | 0.001 |
| | (0.002) | (0.001) | (0.001) |
| Relative net migr. | 0.001 | 0.000 | 0.000 |
| rate | (0.004) | (0.002) | (0.002) |
| Inhabitants per km$^2$ (log) | $-0.007$ | 0.002 | $-0.002$ |
| | (0.013) | (0.005) | (0.009) |
| GDP per capita (log) | $-0.128^{***}$ | $0.061^{***}$ | $-0.100^{***}$ |
| | (0.044) | (0.017) | (0.030) |
| GDP per capita growth | $-0.006$ | 0.001 | $-0.005$ |
| | (0.010) | (0.004) | (0.007) |
| Pop. share over 65 | $-0.002$ | 0.000 | $-0.003^{*}$ |
| | (0.002) | (0.001) | (0.002) |
| Europ. Quality of Gov. | $-0.020$ | $0.012^{*}$ | $-0.013$ |
| Index (log) | (0.015) | (0.006) | (0.011) |
| Eurobarometer Resp.share who | $-0.004$ | 0.001 | $-0.004^{*}$ |
| trust in EU | (0.003) | (0.001) | (0.002) |
| Employment growth | 0.012 | $-0.003$ | 0.004 |
| | (0.016) | (0.007) | (0.012) |
| Pop. share with | $0.005^{**}$ | $-0.001$ | $0.003^{*}$ |
| ISCED <= 2 | (0.002) | (0.001) | (0.002) |
| Empl. share in industry | $0.006^{***}$ | $-0.002^{**}$ | $0.004^{***}$ |
| &constr. | (0.002) | (0.001) | (0.001) |
| Inhabitants per hosp.bed | $-0.178^{**}$ | 0.032 | $-0.140^{**}$ |
| | (0.087) | (0.038) | (0.061) |
| Unemployment rate | $0.026^{***}$ | $-0.011^{***}$ | $0.020^{***}$ |
| | (0.007) | (0.003) | (0.005) |
| **Total marginal effect of cohesion policy effectiveness** | | | |
| SIGN = 0 | $-0.004$ | 0.000 | $-0.005^{\dagger}$ |
| | (0.004) | (0.002) | (0.003) |
| SIGN = 1 | $-0.031^{**}$ | $0.008^{\dagger}$ | $-0.020^{**}$ |
| | (0.012) | (0.006) | (0.008) |
| Adjusted/Pseudo $R^2$ | 0.791 | 0.785 | 0.824 |
| Observations | 188 | 94 | 94 |

Notes: Marginal effects after OLS estimation. Standard errors (in parentheses) are clustered at the NUTS-3 level and bootstrapped (20,000 replications). *** denotes significance at the 1% level, ** at the 5% level, * at the 10% level, † at the 15% level.

The alternative estimators applied (together with alternative variable definitions) point to the robustness of the main results reported in Table 6. The first column in Table 9, for Macron's and Le Pen's vote share as dependent variable each, shows fractional response estimator-based results (GLM). In the second column each, the nature of voting data as count data is taken seriously and Poisson regressions with the number of votes for each candidate per inhabitant in the particular NUTS-3 region as left-hand-side variable are run. In contrast to the baseline results, Table 9 also reports significantly positive effects for the votes devoted to Emmanuel Macron in regions in which EU structural funds exhibited statistically significant employment effects. The estimation results for Marine Le Pen are statistcially weaker when applying the Poisson estimator but are qualitatively in line with the previous findings.[17]

[17]Results are also robust to including the share of foreign citizens among all inhabitants of a NUTS-3 region in the year 2011. Unfortunately, Eurostat does not not release this information for more recent years. The corresponding estimation results are

As a further robustness check, third, we consider the presidential election's second-round results as a dependent variable (first column of Table 10). As the voting motives, especially with respect to Euroscepticism, are likely to be different than in the first round in which there were also candidates with a less clear European agenda, these results are not considered for the main results section. The vote shares for Macron and Le Pen sum up to 100% in the runoff election that is why estimation results are only reported for Marine Le Pen. The overall marginal effect from a statistically significant cohesion policy effectiveness (SIGN=1) is even higher in this case, indicating a 3.1 percentage point decrease in Le Pen's vote share due to a one percentage point rise of the significant ATT in a French NUTS-3 region.

Fourth, as the estimation models for explaining Macron's share of vote on the one hand and Le Pen's on the other hand but also, especially, the two dependent variables as such are closely linked to each other (refer to the correlation matrix in Table A1), we use a seemingly unrelated regression (SUR) approach in order to account for potential correlation in both error terms from Equations (3) and (4) (Davidson & MacKinnon, 2009). Using feasible generalized least squares estimation, the main results presented in Table 6 are confirmed (see columns two and three in Table 10). Accordingly, the results for Macron's vote shares again turn out only slightly statistically significant while we do find negative effects for Le Pen's voting outcomes in regions which exhibit statistically significant employment growth effects stemming from the EU's cohesion programmes. Due to the high correlation of the residuals from the two seemingly (un-)related regressions, the null hypothesis of the Breusch-Pagan test of independence is rejected at the 5%-level of statistical significance indicating the possibility for efficiency gains when explicitly accounting for this correlation.

Fifth, it could be argued that not only Le Pen but also Mélenechon proclaimed serious doubts about the European Union in his election campaign for the first round of the presidential elections and therefore represents eurosceptic voters. In Table 11 we provide a robustness check in which we use the sum of vote shares for the two eurosceptic candidates as a dependent variable. While the significant impact of regional funds expenditure in a NUTS-3 region vanishes, the marginal effect of policy effectiveness on eurosceptic voting shares gets even stronger.

Sixth, in Table 11 we vary the threshold level for identifying significant EU structural funds effects. In particular, we alternatively define the dummy variable based on the statistical significance of the ATT at the 10%-level. While the coefficients for education and institutional quality (instead of the citizens' trust in the EU) get statistically significant for both dependent variables, the overall marginal effect of cohesion policy effectiveness on Macron's vote shares again also turns out statistically significant while the results for Marine Le Pen are hardly affected.

Finally, in Table 12 we account for the issue of few observations (cross-section of 94 French NUTS-3 regions) and present estimation results which additionally incorporate the regional vote shares of Marine Le Pen at the first round of the 2012 presidential elections in France. For this purpose we construct two cross-sections for each region and measure our covariates as four-year averages prior to both elections, namely from 2008 to 2011 and 2012 to 2015, respectively. Note that we do not consider a time-variant measure for regional employment growth from 2007-2014 as it mirrors the regional development of which the firm-level policy

available from the authors upon request.

effects are part of.

Table 11: Robustness Checks (III): All eurosceptic candidates. Alternative signficance level for ATTs.

| | Le Pen+Mélenchon<br>Sum of shares | Macron's Share | Le Pen's Share |
|---|---|---|---|
| | | Signifance at 10%-level | |
| Regional funds expenditure | $-0.008$ | $0.007^{*}$ | $-0.019^{***}$ |
| per 1,000 inh. (log) | (0.007) | (0.004) | (0.006) |
| GVA share trade&tourism | $0.003^{\dagger}$ | $-0.001$ | 0.001 |
| | (0.002) | (0.001) | (0.001) |
| Relative crude net migration rate | $-0.001$ | 0.001 | 0.000 |
| | (0.003) | (0.001) | (0.002) |
| Inhabitants per km$^2$ (log) | 0.013 | 0.001 | 0.000 |
| | (0.010) | (0.004) | (0.009) |
| GDP per capita (log) | $-0.157^{***}$ | $0.070^{***}$ | $-0.111^{***}$ |
| | (0.034) | (0.015) | (0.029) |
| GDP per capita growth | 0.006 | 0.000 | 0.000 |
| | (0.007) | (0.000) | (0.000) |
| Pop. share over 65 | $-0.003^{\dagger}$ | 0.000 | $-0.002$ |
| | (0.002) | (0.001) | (0.002) |
| Europ. Quality of Government | 0.000 | $0.014^{***}$ | $0.021^{**}$ |
| Index (log) | (0.010) | (0.005) | (0.009) |
| Eurobarometer Resp. share who | $-0.006^{***}$ | 0.001 | $-0.002$ |
| trust in EU | (0.002) | (0.001) | (0.002) |
| Employment growth | $-0.001$ | 0.000 | 0.000 |
| | (0.013) | (0.000) | (0.000) |
| Pop. share with ISCED <= 2 | 0.000 | $-0.002^{**}$ | $0.003^{*}$ |
| | (0.002) | (0.001) | (0.002) |
| Empl. share in industry | $0.003^{**}$ | $-0.002^{**}$ | $0.004^{***}$ |
| &constr. | (0.002) | (0.001) | (0.001) |
| Inhabitants per hosp.bed | $-0.121^{**}$ | 0.021 | $-0.133^{**}$ |
| | (0.058) | (0.034) | (0.055) |
| Unemployment rate | $0.023^{***}$ | $-0.010^{***}$ | $0.019^{***}$ |
| | (0.006) | (0.002) | (0.005) |
| **Total marginal effect of cohesion policy effectiveness** | | | |
| SIGN = 0 | $-0.005^{*}$ | 0.003 | $0.007^{**}$ |
| | (0.003) | (0.002) | (0.003) |
| SIGN = 1 | $-0.021^{*}$ | $0.008^{**}$ | $-0.015^{***}$ |
| | (0.011) | (0.003) | (0.005) |
| Adjusted $R^2$ | 0.686 | 0.770 | 0.794 |
| Observations | 94 | 94 | 94 |

Notes: Significance dummy (ATT) defined according to the 90%-level of significance. Marginal effects after OLS estimation. Standard errors (in parentheses) are clustered at the NUTS-3 level and bootstrapped (20,000 replications). *** denotes significance at the 1% level, ** at the 5% level, * at the 10% level, † at the 15% level.

The first column in Table 12 shows the outcome of a pooled linear regression taking into account the two periods, in which the variables representing cohesion policy effectiveness are time-invariant. The resulting overall marginal effect on Le Pen's vote share in the 2012 and 2017 elections is not statistically significant. In order to avoid the issue of measuring the ATT and its significance in only one of the time periods, in the following we consider the change in Le Pen's share from 2012 to 2017 as dependent variable (together with the controls as used in the baseline results in Table 6; column two in Table 12) and, additionally, difference all control variables that are available for the NUTS-3 regional level (the last column in Table 12). Note that we do not take first differences of the other covariates available at the NUTS-2 level as, by policy design, we cannot do so for the estimated ATTs which serve as policy effectiveness measures.

Table 12: Robustness checks (IV): Taking into account the presidential election results for Marine Le Pen in 2017 and 2012.

| | Le Pen's Share | Change in Le Pen's Share | |
|---|---|---|---|
| | Pooled OLS | First diff. dep. var. | First diff. all NUTS-3 var. |
| Regional funds expenditure per 1,000 inh. (log) | $-0.017^{***}$ | $-0.003^{\dagger}$ | $-1.437^{**}$ |
| | (0.004) | (0.002) | (0.604) |
| GVA share trade&tourism | $0.001^{\dagger}$ | 0.000 | −0.002 |
| | (0.001) | (0.000) | (0.002) |
| Relative crude net migration rate (log) | 0.001 | −0.001 | −0.001 |
| | (0.001) | (0.001) | (0.001) |
| Inhabitants per km$^2$ (log) | −0.001 | 0.000 | $-0.989^{**}$ |
| | (0.005) | (0.004) | (0.463) |
| GDP per capita (log) | $-0.086^{***}$ | $-0.033^{***}$ | $-0.094^{*}$ |
| | (0.017) | (0.011) | (0.050) |
| GDP per capita growth | $0.371^{*}$ | $-0.003^{\dagger}$ | $0.266^{***}$ |
| | (0.217) | (0.002) | (0.096) |
| Pop. share over 65 | $-0.002^{*}$ | 0.000 | $0.015^{**}$ |
| | (0.001) | (0.001) | (0.006) |
| Europ. Quality of Gov. Index (log) | $-0.025^{***}$ | −0.004 | −0.002 |
| | (0.005) | (0.004) | (0.003) |
| Eurobarometer Resp. share who trust in EU | $-0.003^{***}$ | $-0.001^{**}$ | −0.001 |
| | (0.001) | (0.001) | (0.001) |
| Employment growth (not time-variant) | −0.007 | −0.004 | −0.001 |
| | (0.006) | (0.004) | (0.005) |
| Pop. share with ISCED <= 2 | −0.001 | 0.000 | $0.001^{*}$ |
| | (0.001) | (0.001) | (0.001) |
| Empl. share in industry &constr. | $0.003^{***}$ | 0.000 | $0.001^{*}$ |
| | (0.001) | (0.000) | (0.001) |
| Inhabitants per hosp.bed | $-0.084^{**}$ | −0.005 | −0.026 |
| | (0.036) | (0.021) | (0.019) |
| Unemployment rate | $0.019^{***}$ | $0.006^{***}$ | $0.005^{***}$ |
| | (0.002) | (0.002) | (0.002) |
| **Total marginal effect of cohesion policy effectiveness** | | | |
| SIGN = 0 | −0.003 | −0.001 | −0.002 |
| | (0.002) | (0.001) | (0.001) |
| SIGN = 1 | −0.003 | $-0.007^{*}$ | $-0.010^{***}$ |
| | (0.002) | (0.004) | (0.003) |
| Adjusted/overall $R^2$ | 0.746 | 0.726 | 0.668 |
| Observations | 94 | 94 | 94 |

Notes: Marginal effects after OLS estimation, evaluated at means of the other variables. Robust standard errors (in parentheses) are bootstrapped (20,000 replications) in the estimations for the first two columns and clustered at the NUTS-3 regional level for the estimations with the change in Le Pen's share as dependent variable. *** denotes significance at the 1% level, ** at the 5% level, * at the 10% level, † at the 15% level.

On average, the vote share for Le Pen has increased by 3.7 percentage points in the French presidential election 2017 as compared to the one in 2012.[18] Apart from the pooled linear regression, the estimations confirm the negative marginal effect of cohesion policy effectiveness on Le Pen's vote share (over time). In other words, the (positive) change in the vote shares for Marine Le Pen is smaller in regions in which EU structural funds payments successfully induced additional employment growth. In addition, we find that larger regional funds expenditures in a NUTS-3 region seem to dampen eurosceptic voting behavior. Furthermore, it turns out as a robust result that an increase in GDP per capita over time reduces votes for Le Pen, and that rising unemployment is linked to more votes for the eurosceptic presidential candidate.

[18] Marine Le Pen's votes decreased by 1.2 percentage points in Île de France (minimum of the change) and increased by 9.3 percentage points in Picardie (maximum change).

## 6 Conclusion

This paper tries to shed light on the determinants of eurosceptic versus pro-European voting taking the first-round results of the French presidential elections in 2017 as a case study. The choice of variables considered in the analysis is based on recent empirical studies on the "Brexit" referendum which has revealed a strong divergence in European citizens' attitudes towards the EU as well (e.g., Becker et al., 2017; Crescenzi, Di Cataldo & Faggian, 2017). This paper argues that regional funds expenditures in a region may not be sufficient to model the citizens' perception of cohesion policy, the EU's main redistributive policy instrument, in a proper way. Therefore, we contribute to the literature by estimating firm-level treatment effects of EU cohesion policy using a novel database providing information on beneficiary and control group firms for the the multi-annual financial framework from 2007 to 2013. The outcome variable analyzed is the firms' employment growth, which turns out to be significantly higher for treated firms in about one fourth of all French NUTS-3 regions.

In the next step, the estimated treatment effects are used for testing whether more effective regional policies and other factors which determine the exposure of citizens to the EU are able to explain regional variation in the voting behavior of French citizens. To be more precise, we are mainly interested in analyzing the vote shares of the eurosceptic Marine Le Pen and the pro-European Emmanuel Macron in each NUTS-3 region in 2017. In general, we find evidence for a positive relationship between higher regional income and lower unemployment rates with more votes for the pro-European candidate Emanuel Macron. Moreover, smaller parts of the population having attained only primary education as well as a less important manufacturing and construction sector are associated with more pro-European and less eurosceptic votes in a particular region.

These findings are in line with previous literature, however, the results for France presented in this paper point to a significant impact of EU cohesion policy, which has not been found for the case of the United Kingdom's "Brexit" referendum (Becker et al., 2017). In particular, EU's structural funds expenditures and its effectiveness in terms of fostering employment growth in treated firms turn out to be crucial in this respect. Our estimation results reveal a stable and negative relationship between structural funds effectiveness and the vote shares casted for Marine Le Pen. The findings for the impact of effective policy-making in a region on the voting outcomes of Emmanuel Macron are more mixed in the sense that in some specifications the positive impact turns out statistically insignificant. Taking all the findings together, higher EU cohesion policy-induced employment growth seems to be visible for the French electorate and to harm the election performance of the eurosceptic Marine Le Pen.

The finding that greater cohesion policy effectiveness may be a potential lever for convincing French citizens of the advantages of European integration has important policy implications. Research on the perception of the effects of cohesion policy may help to make this result more useful for policy makers and lead to further relevant research questions. The large literature on the heterogeneous effects of the EU's cohesion policy programmes identifies conditions which foster the effectiveness of such measures and thus might constitute a helpful guideline for potential EU cohesion policy reforms to be carried out for the post-2020 programming period. In this regard, the already proposed initiative by the European Commission aiming at improving the visibility of co-funded projects at the local level may contribute to increasing EU citizens' awareness of the benefits stemming from EU policies and membership.

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# Appendix

Table A1: Correlation matrix

| | MACRON | LEPEN | Regfunds | SIGN | ATT | GVA_G-I | NetMigr | Popdens | GDPpc | GDPpcgr | EQI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MACRON | 1.000 | | | | | | | | | | |
| LEPEN | −0.927 | 1.000 | | | | | | | | | |
| Regfunds | −0.155 | 0.152 | 1.000 | | | | | | | | |
| SIGN | −0.150 | 0.049 | 0.135 | 1.000 | | | | | | | |
| ATT | −0.137 | 0.089 | −0.002 | 0.5723 | 1.000 | | | | | | |
| GVA_G-I | −0.125 | 0.022 | −0.172 | 0.116 | 0.025 | 1.000 | | | | | |
| NetMigr | 0.124 | −0.174 | 0.183 | 0.383 | 0.212 | 0.240 | 1.000 | | | | |
| Popdens | 0.204 | −0.160 | −0.437 | −0.195 | −0.120 | 0.198 | −0.292 | 1.000 | | | |
| GDPpc | 0.397 | −0.391 | −0.246 | −0.260 | −0.204 | 0.247 | −0.277 | 0.666 | 1.000 | | |
| GDPpcgr | 0.234 | −0.274 | −0.232 | −0.163 | −0.162 | 0.166 | −0.272 | 0.414 | 0.571 | 1.000 | |
| EQI | 0.598 | −0.538 | −0.087 | −0.212 | −0.076 | −0.186 | 0.388 | −0.081 | −0.026 | −0.108 | 1.000 |
| Trust | 0.395 | −0.493 | −0.277 | 0.293 | −0.173 | 0.140 | 0.087 | 0.263 | 0.147 | 0.169 | 0.094 |
| EMPLRgr | 0.044 | −0.174 | −0.082 | 0.141 | 0.109 | 0.342 | 0.298 | 0.190 | 0.119 | 0.134 | −0.153 |
| Pop65 | −0.095 | 0.035 | 0.225 | 0.406 | 0.329 | −0.042 | 0.468 | −0.741 | −0.640 | −0.357 | 0.214 |
| ISCED02 | −0.678 | 0.716 | 0.160 | −0.048 | 0.195 | −0.010 | −0.342 | −0.110 | −0.105 | 0.020 | −0.665 |
| Manuf | −0.178 | 0.323 | 0.177 | −0.417 | −0.300 | −0.400 | −0.236 | −0.120 | −0.103 | −0.243 | 0.033 |
| Hospbeds | 0.163 | −0.178 | −0.318 | −0.526 | −0.513 | −0.063 | −0.330 | 0.381 | 0.353 | 0.335 | 0.063 |
| UNEMPLR | −0.670 | 0.657 | 0.181 | 0.128 | −0.068 | 0.161 | −0.285 | 0.020 | −0.105 | 0.030 | −0.698 |

Notes: Average treatment effect on the treated (ATT) on employment growth.

Correlation matrix

| | Trust | EMPLRgr | Pop65 | ISCED02 | Manuf | Hospbeds | UNEMPLR |
|---|---|---|---|---|---|---|---|
| Trust | 1.000 | | | | | | |
| EMPLRgr | 0.219 | 1.000 | | | | | |
| Pop65 | −0.149 | 0.070 | 1.000 | | | | |
| ISCED02 | −0.624 | −0.124 | −0.075 | 1.000 | | | |
| Manuf | −0.311 | −0.462 | −0.169 | 0.215 | 1.000 | | |
| Hospbeds | 0.139 | −0.267 | −0.544 | −0.075 | 0.307 | 1.000 | |
| UNEMPLR | −0.173 | −0.004 | −0.123 | 0.717 | −0.049 | −0.089 | 1.000 |

Notes: Average treatment effect on the treated (ATT) on employment growth.