ELECTORAL INCENTIVES AND EFFORTS TO OBTAIN EU GRANTS

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ABSTRACT. Political accountability models predict that electoral concerns induce politicians to put effort into making policies that benefit citizens. We apply a difference-in-difference approach to investigate how term limits affect Portuguese majors' incentives to apply for EU grants. We focus on EU grants because getting them requires substantial effort. Moreover, by obtaining EU grants, mayors can do more for their citizens without raising taxes. We focus on Portugal because it provides a quasi-natural experimental setting to determine the causal effect of electoral incentives on effort. We find that term-limited mayors receive up to 50% less EU money than mayors eligible for reelection.

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1. Introduction

In political economics, we can distinguish between two main approaches to electoral competition (Persson and Tabellini, 2000). The first approach emphasizes selecting policies in an environment where voters have different policy preferences. Politicians choose policies to win elections (Downs, 1957) or try to win elections to implement specific policies (Wittman, 1973; Hibbs, 1977). The predictions of studies following this approach crucially hinge on candidates' power to commit themselves or to build a reputation (Alesina, 1988). The second approach takes politics as an implicit contract. Elections enable voters to punish bad behavior and reward good behavior [Barro (1973) and Ferejohn (1986)]. Electoral incentives induce politicians to put effort into making good policies and behave honestly (Besley and Case, 1995a). The agency approach to electoral competition emphasizes the selection and disciplining roles of elections.[1]

Almost thirty years ago, Besley and Case (1995a) were the first to use term limits to test the main predictions of political agency models. Term limits define who are and who are not eligible to stand for reelection. Consequently, they determine exogenously, that is, by law, the strength of electoral concerns. Several studies estimate the effects of term limits on public finance outcomes, like taxes and expenditures. Most of them find that electoral incentives affect economic policy choices. For example, Besley and Case (1995a) and Johnson and Crain (2004) report that politicians, facing term limits, choose higher expenditures. Regarding taxes, the evidence is mixed. Besley and Case (1995a) and Alt et al. (2011) find that electoral incentives induce U.S. governors to choose low taxes, while Johnson and Crain (2004) report the opposite result for a sample of 48 democracies. For Portuguese municipalities, Lopes da Fonseca (2020) finds that term-limited mayors choose lower taxes. Veiga and Veiga (2019) reports that revenues *and* expenditures are lower in Portuguese municipalities with term-limited mayors.

Generally, the empirical studies using term limits interpret their findings as supportive of the political agency approach. In the words of Besley and Case, Term-limited incumbents "reduce the effort expended to keep taxes and expenditures down"

[1] In both approaches, politicians care about voters' decisions in the next election. The political agency approach puts less emphasis on differences among voters and more on punishing and rewarding.

(see Besley and Case, 1995a, p. 781). However, most of the findings are also consistent with the predictions of models in the Downsian tradition. Alesina (1987) shows that in a setting with two ideological parties, elections may lead to policy convergence [see also Calvert (1985)]. Also, in Alesina's model, term-limited incumbents may choose more ideological policies. Strikingly, in Besley and Case (1995a), the lame-duck effect was mainly caused by Democratic Governors raising taxes in their last term. Likewise, in Lopes da Fonseca (2020), right-wing term-limited mayors tend to pursue more conservative policies. Possibly, term-limited incumbents did not reduce effort but had weaker incentives to please middle-of-the-road voters. Ideally, to test if electoral concerns incentivize politicians to exert effort, we need a political activity that (1) requires an incumbent's effort and (2) benefits all citizens.[2]

This paper investigates how term limits affect the incentives of Portuguese mayors to obtain grants funded by the European Union (EU). Through regional grants, the EU supports the development of regions. The two primary sources of EU funding are the Cohesion Fund and the European Regional Development Fund. We focus on EU grants because getting them requires substantial effort. To obtain grants, a municipality must monitor calls, seek collaboration, and prepare grant proposals. Receiving grants relaxes a municipality's budget constraint significantly. Over 1998-2021, it formed, on average, 8.8% of municipalities revenues in Portugal. By obtaining EU grants, a mayor can do more for her citizens without raising taxes. As a result, citizens' preferences regarding EU grants are relatively homogeneous. Hence, EU grants satisfy the two requirements for testing the central prediction of political agency models. Obtaining them requires substantial effort and benefits all citizens.

Our analysis focuses on *Portugal* because it introduced mayoral term limits, which became binding in the 2013 municipal elections. This institutional change provides a quasi-natural experimental setting, which constitutes an ideal testing ground to analyze the effects of electoral incentives to apply for EU grants. It allows us to use a difference-in-differences approach across different groups of mayors before and after the reform. Most existing empirical studies on the impact of electoral concerns

[2]Political agency models also show that electoral concerns incentivize incumbents to behave honestly. Most citizens benefit from honest politicians. Ferraz and Finan (2011) show that mayors facing electoral incentives are less corrupt [see also Bobonis et al. (2016)]. The focus of our paper is on incentives to exert effort rather than on incentives to behave honestly.

on public finance compare the policies of term-limited politicians with those of non-term-limited politicians. Our DiD approach allows for a causal interpretation of the estimated effects.

We begin our analysis by building a rudimentary model of grant applications to help our thinking of mayors' drivers to apply for EU grants. In our model, introducing a term limit affects mayors' time horizons. The closer a mayor is to her final possible term, the weaker her incentives to put effort into preparing grant applications. The model also predicts an announcement effect. In Portugal, term limits became binding in the 2013 local elections but were announced before 2009. This means that mayors in their 2005-2009 terms could already anticipate that they could only be re-elected once or, at most, twice (those serving their first term in office). According to the model, this weakened their incentives to apply for EU grants. Finally, our model points to a competition effect. The more mayors face a term limit, the more funds available to the other municipalities. As in the 2013 elections, a large share of mayors faced a term limit, we expect the effect of a term limit to be large in these elections.

Next, we employ a dynamic Two-Way Fixed Effects (TWFE) model to generate event-study plots. Our sample covers six municipal elections, three terms before term limits become binding, and three terms (or cohorts) after term limits become binding. The event-study plots reveal that, on average, mayors not eligible for re-election obtain 50% less EU funding in the second part of their terms than mayors eligible for reelection. EU funding remains lower even after term-limits mayors left office. Thus, the plots indicate lagged effects. Our results are surprisingly stable over separate cohorts. As on average, EU grants form 8.8% of a municipality's revenues, up to 50% less funding means that, on average, a municipality's budget may be 4.4% lower when its mayor is not eligible for reelection.

The plots do not provide support for anticipation effects. The estimates for the pre-treatment years, the entire period, and each individual cohort suggest that control and treated municipalities are similar. Finally, our estimates do not support the hypothesis that the degree of competition is relevant to the effect of term limits on EU funding.

Recent studies show that estimates of TWFE models may be biased if the policy's effect is heterogeneous between groups or over time.[3] We present several alternative

[3]For surveys of this recent literature see de Chaisemartin and D'Haultfœuille (2023) and Roth et al. (2023).

estimators that are more robust to heterogeneous effects. Generally, the alternative estimators are in line with our previous findings. They provide strong evidence of (lagged) term-limit effects on EU funding, no evidence for announcement effects, and no evidence for a competition effect.

Our paper contributes to the literature on how electoral incentives induce politicians to act in voters' interests. Much of the empirical literature focuses on fiscal policy decisions. Several studies report that elections matter for fiscal policy. List and Sturm (2006) shows that environmental policy in the U.S. differs between states with term-limited governors and governors who could run for re-election. As in Besley and Case (1995b), electoral concerns encourage politicians to align fiscal policies with voters' preferences. Ferraz and Finan (2011) show that term-limited mayors are more corrupt than mayors who can stand for reelection. Our paper addresses the question of whether elections give incentives to politicians to exert effort. In this respect, this paper is closely related to De Janvry et al. (2012), which determines the impact of electoral concerns on the outcomes of a program to reduce school dropout rates. They found that these programs were less successful in municipalities governed by term-limited mayors than in municipalities governed by mayors who could be reelected. Thus, electoral concerns provide incentives for delivering public services.

Our paper also offers a modest contribution to the theoretical literature on political accountability [Barro (1973) and Ferejohn (1986)]. Political accountability models typically assume that voters coordinate on a rule that stipulates the condition under which the incumbent is reelected and when she is sent home. In practice, it is unclear how this coordination arises. We show that social image concerns may induce voting behavior that disciplines officeholders.

The paper proceeds as follows. Sections 2 and 3 present background information on EU grants and Portuguese municipalities, respectively. Section 4 develops the theoretical model and the testable hypotheses. The data and empirical methodology are described in Section 5, while Section 6 presents and discusses the empirical results. The final Section concludes.

2. Background: EU grants

The EU provides financial support through a wide variety of programs. The European Regional Development Fund (ERDF) and the Cohesion Fund (CF) are Portuguese municipalities' most relevant funding sources. The main objective of these programs is to reduce regional inequalities and foster sustainable development. Within the scope of the ERDF or the CF, the EU launches operational programs that start with calls to apply. Municipal project applications must satisfy selection criteria specific to a call. Usually, an EU committee or a national/regional managing authority assesses applications, oversees project selection, and ensures that the spending aligns with EU and national priorities.

Three features of EU funding procedures are essential for estimating the effect of term limits on mayors' efforts to acquire EU funds. First, acquiring EU grants requires effort, but effort does not guarantee the acquisition of grants.[4] Our data shows how much EU money municipalities receive. We are aware that this is an imperfect measure of effort. Our measure does not include mayors' efforts that eventually did not lead to the acquisition of EU grants.

Second, EU funding procedures take time. There are two main lags between a mayor's effort in obtaining EU funding and the actual transfer of EU money: the proposal lag, which is the time between a mayor's effort and the EU's funding decision, and the implementation and transfer lag, which encompasses the time between the EU's funding decision and the actual transfer of funds to the municipality, including the project implementation phase. Due to these lags, there is no one-to-one relationship between receiving EU money and the mayor in office. We account for time lags in event-study estimations by including two years after treatment ends. An additional complexity due to these delays is that mayors' efforts may influence the transfers of EU funds beyond their terms, affecting subsequent administrations. We report suggestive evidence that weaker incentives for term-limited mayors to acquire grants reduce revenues from EU funds beyond their final terms.

[4] During the 2014-2020 programming cycle (Portugal 2020), the approval rate for all accepted applications stood at 66%, with EU funds accounting for an average of 60% of the total cost (AD&C, 2023).

The third feature of EU funding is that the EU offers fixed budgets for specific periods.[5] The implication is that competition for funding may vary across years. Our theoretical model assumes competition in getting grants among municipalities. However, how competitive calls for funding are is an empirical question.

3. Background: Portuguese Municipalities

On the mainland of Portugal, municipalities are the second-highest level of government, just below the central government. There are 278 municipalities.[6] The mayor is prominent in the municipal executive. She is elected for four years. Municipal elections took place in December until 2001 and in October or late September in the subsequent elections (2005, 2009, 2013, 2017, and 2021).[7]

Before the 2013 local elections, there were no constraints on the number of consecutive terms a mayor could serve. Due to this, many mayors were reelected, resulting in prolonged tenures in office. Notably, by 2013, 31 mayors had held their positions for over two decades. In 2005, Law 46/2005 was enacted to enhance mayoral turnover, imposing a limit of three successive terms. However, as a transitory measure permitted all mayors to seek re-election in 2009, the law only came into effect during the 2013 elections. In the 2013 elections, 160 of the 308 mayors were ineligible for re-election in their respective municipalities. The number of term-limited mayors was smaller in the following two local elections, with 41 not eligible for re-election in 2017 and 50 in 2021.

Table A.1 presents data on municipalities' revenues. More than half of their revenues come from the national government or the EU. On average, European grants form 8.8% of a municipality's revenues. National grants to municipalities are predominantly formula-determined. How much formula-determined budget a municipality receives depends on its population, geographic characteristics, and income.

[5]EU programming cycles for funds refer to the multiannual frameworks that outline the EU's budgetary and policy priorities, including allocating funds to various programs and projects. These cycles typically span seven years and are designed to provide a structured and strategic approach to EU funding, ensuring that investments align with long-term objectives.

[6]There are 308 municipalities in Portugal, 278 on the mainland, and 30 on the archipelagos of Madeira (11) and Azores (19). Municipalities in the islands can obtain grants from their regional governments and are entitled to ultra-periphery grants by the EU, which are unavailable to mainland municipalities. Therefore, to assure full comparability across municipalities, only the 278 located on Portugal's mainland are included in the sample used in the empirical analysis.

[7]The first municipal elections after the restoration of democracy in 1974 took place in December 1976. Subsequent elections were held every three years until December 1985, and every four years thereafter.

By definition, the allocation of formula grants to municipalities does not depend on mayors' efforts. Consequently, formula grants form an excellent candidate for placebo falsification.

4. A Simple Model

Political accountability models are used to analyze how electoral concerns can motivate incumbents to promote the public interest. At the heart of our model lies a moral-hazard problem. Mayors must be encouraged to prepare proposals for EU grants. Getting grants allows a mayor to launch projects from which the citizens in her municipality benefit. Elections incentivize mayors to spend time and energy on grant proposals if obtaining grants increases their reelection chances. We develop a political accountability model to help our thinking of how introducing a term limit affects mayors' incentives to apply for grants.

We divide the discussion of the model into three parts. First, we discuss how the EU allocates its budget to municipalities. This part shows how mayors' efforts affect their chances of obtaining grants. Next, we discuss mayors' preferences. We show how introducing a term limit affects mayors' time horizons. Finally, we discuss voter behavior. This part of the model deviates from the standard political accountability model, in which citizens coordinate on a voting rule stipulating the conditions under which the incumbent is reelected or sent home. In the seminal paper by Barro (1973), the electorate chooses a "control level" of spending such that if spending is below this control level, the incumbent is reelected. If spending exceeds the control level, the incumbent is not reelected. To demonstrate how elections can induce politicians to act in the general interest, the assumption that citizens coordinate on a voting rule is very natural. However, it is unclear *how* citizens coordinate on a voting rule. Coordination becomes especially hard when citizens have divergent preferences. In the political accountability model discussed below, citizens' vote decisions are driven by social image concerns. Harbaugh (1996) and DellaVigna et al. (2016) show how social image concerns can explain turnout.[8] We show how social image concerns can

[8]There is strong evidence that citizens care about how others perceive their voting behavior. Silver et al. (1986) reports that 27.4% of the respondents who *did not vote* reported that they *voted* in the 1980 United States presidential elections. Lying about nonvoting is detected by comparing self-reported voting with electoral registration records. DellaVigna et al. (2016) conducted a field experiment providing direct evidence that citizens do not want to be perceived as abstainers. In this paper, we introduce social image concerns to explain for whom citizens vote.

explain for whom citizens vote and how elections provide incentives to mayors to apply for grants.

4.1. **The Grant System.** We consider a society that consists of n municipalities and lasts an infinite number of periods ($t = 0, 1, ..$).[9] In each period t, the EU allocates a budget of g to these municipalities. How much municipality i receives from the budget, $g_{i,t}$ with $\sum_{i=1}^{n} g_{i,t} = g$, depends on its mayor's effort, $e_{i,t}$, relative to the other mayors' efforts. We assume that the EU is unbiased in allocating grants:

$$g_{i,t} = \frac{e_{i,t}}{\sum_{h=1}^{n} e_{h,t}} g. \tag{1}$$

4.2. **Mayors.** During their terms, mayors compete with each other to get grants. They simultaneously choose effort levels. Municipality i's mayor, mayor i, receives utility from holding office. In addition, she is effort-averse. Her preferences are described by the utility function

$$U_i = \delta^t \sum_{t=0}^{\infty} (\mathrm{I}_{i,t} - \frac{\lambda}{2} e_{i,t}^2), \tag{2}$$

where δ is the discount factor, $\mathrm{I}_{i,t} = 1$ if i holds office in term t, $\mathrm{I}_{i,t} = 0$ if i does not hold office in term t, and λ measures how costly effort is relative to the benefit from holding office. Without a binding term limit, voters can reelect a mayor an infinite number of times. To see how a term limit affects a mayor's utility in our model, suppose that mayor i runs for election in $t = 0$ for the first time. We assume that a law that imposes that a mayor can only be reelected z times means that $\mathrm{I}_{i,t} = 0$ for $t > z$.

4.3. **Voters.** Now consider an election in municipality i. In this election, many citizens vote. Each citizen k votes for the mayor, $v_k = i$, or the opponent, $v_k = o$. The opponent is a passive player. The candidate who receives the most votes wins the election.

We assume that citizens "vote to tell others" in the spirit of Harbaugh (1996) and DellaVigna et al. (2016). Each citizen k makes two decisions: for whom to vote, v_k, and what to tell j about v_k after the election, $m_i \in \{i, o\}$. Each citizen k has two social image concerns. First, k wants to be perceived by j as a responsible person who rewards a well-performing mayor and punishes a poorly-performing one. Let $\pi_j(m_k)$

[9] A period refers to a mayor's term.

denote the probability j assigns to the event that $v_k = i$, conditional on m_k: $\pi_j(m_k) = \Pr(v_k = i|m_k)$. We assume that the social image concern "being a responsible citizen" adds

$$\pi_j(m_k)[g_{i,t} - \bar{g}]$$

to k's utility, where $\bar{g}$ is a benchmark for good performance. The better (worse) mayor i performed, the more (less) k wants to be perceived as having voted for i.

The second social image concern is that k wants j to perceive him as loyal to his representative. Loyalty varies across citizens. It may be rooted in, for instance, ideology, ethnicity, or religion [see Casey (2015) and Banerjee and Pande (2007)]. Let l_k denote k's loyalty to the mayor. Both k and j know l_k. If $l_k > 0$, k feels attached to the mayor. If $l_k < 0$, he feels attached to the opponent. We assume that the social image concern "being loyal" adds

$$\pi_j(m_k)l_k - [1 - \pi_j(m_k)]l_k$$

to k's utility. Hence, voter k's utility equals

$$U_k^V = \pi_j(m_k)l_k - [1 - \pi_j(m_k)]l_i + \pi_j(m_k)[g_{i,t} - \bar{g}]. \tag{3}$$

In our model, k has no reason to lie about her vote decision. Consequently, any lying cost induces k to tell j the truth: $m_k = v_k$. Using (3), it is easy to see that $v_k = i$ yields a higher payoff than $v_k = o$ if and only if

$$\begin{aligned} l_k + [g_{i,t} - \bar{g}] \geq -l_k \text{ , so that} \\ l_k \geq l^T = \frac{\bar{g} - g_{i,t}}{2}. \end{aligned} \tag{4}$$

Equation (4) defines a threshold l^T for which each citizen k with $l_k \geq l^T$ votes for i and each citizen k with $l_k < l^T$ votes for o. This threshold is decreasing in $g_{i,t}$, meaning that a mayor can attract voters by obtaining more EU grants. The mayor wins the election if (4) holds for the median voter, $k = mv$: $l_{mv} > l^T$.

In the spirit of Calvert (1985) and Alesina (1988), we assume that when deciding how much effort to put into grant applications in term t, each mayor is uncertain about the median voter's loyalty, $l_{mv,t}$. It is common knowledge that $l_{mv,t}$ is uniformly distributed over the interval $[l^e - z, l^e + z]$. As a result, the probability that mayor i

wins the election in term t, $P_{i,t}(e_{i,t})$, equals

$$P_{i,t}(e_{i,t}) = \Pr(l_{mv} > l^T | e_{i,t}) = \frac{g_{i,t} - \bar{g} + z - l^e}{2z}. \tag{5}$$

Equation (5) shows that, as long as $P_{i,t}(e_{i,t}) < 1$, mayor i increases her chances of winning the election by acquiring more grants. As usual, more uncertainty about the median voter's loyalty, z, makes the election outcome less sensitive to the grants i obtains.

4.4. **Equilibria.** Our model without term limits is an infinitely repeated game. We determine the symmetric Nash equilibrium of this game. "Symmetric" imposes two requirements. First, mayors in identical situations follow the same strategy. Second, how mayors play in term t is how they play in any other term. At any time, each mayor anticipates current and future mayors' behavior and how the electorate punishes or rewards mayors now and in the future. Throughout, we assume that z is sufficiently large so that, in equilibrium, $0 < P_{i,t}(e^*_{i,t}) < 1$.

In the symmetric Nash equilibrium of the model, each mayor i chooses $e_{i,t}$ that maximizes (2). Let P^* denote the equilibrium probability that the incumbent wins the election in any period t. Furthermore, let e^* denote equilibrium effort in any period t. Mayor i maximizes

$$\begin{aligned} U_i &= 1 - \frac{\lambda e_{i,0}^2}{2} + \delta P_{i,0}(e_{i,0}) \left(1 - \frac{\lambda e^{*^2}}{2}\right) + \delta^2 P^* \left(1 - \frac{\lambda e^{*^2}}{2}\right) \\ &+ \delta^3 P^{*^2} \left(1 - \frac{\lambda e^{*^2}}{2}\right) + \delta^4 P^{*^3} \left(1 - \frac{\lambda e^{*^2}}{2}\right) + ... \\ &= 1 - \frac{\lambda e_{i,0}^2}{2} + P_{i,0}(e_{i,0}) \frac{\delta}{1 - \delta P^*} \left(1 - \frac{\lambda e^{*^2}}{2}\right), \end{aligned} \tag{6}$$

with respect to $e_{i,0}$ subject to (1) and (5). The last term of (6) shows that winning the next election also allows winning future elections. We assume that the rents from holding office exceed the effort cost in equilibrium. Hence, the term in parentheses is higher than zero. The first-order condition is:

$$-2\lambda e_{i,0} + \frac{\sum_{h=1}^n e^*_{h,t} - e_{i,0}}{z \left(\sum_{j=h}^n e^*_{h,0}\right)^2} g \frac{\delta}{1 - \delta P^*(e^*)} \left[1 - \frac{\lambda}{2} e^{*^2}\right] = 0. \tag{7}$$

In equilibrium, all mayors choose the same level of effort. Consequently, (7) can be written as:

$$-2\lambda e^* + \frac{n-1}{2zn^2e^*}\frac{\delta}{1-\delta P^*(e^*)}\left[1-\frac{\lambda}{2}e^{*2}\right]g = 0, \tag{8}$$

Equation (8) implicitly defines e^* as a function of the model's parameters. Applying the implicit function theorem shows that g and δ increase the equilibrium effort level. Thus, a higher total budget induces effort. Moreover, more future-oriented mayors exert more effort. The equilibrium effort level decreases in n (for $n > 2$) and λ. More competition means that the pie is allocated to more municipalities. This discourages mayors from exerting effort.

Let us now analyze the effects of the introduction of a term limit. The direct impact of a term limit is that the marginal benefit of effort for all mayors decreases. If these effects were equal for all mayors, a term limit would not affect the allocation of grants. Each mayor would receive $\frac{g}{n}$. However, this effect varies across mayors. The closer a mayor is to her maximum number of terms, the weaker her incentive to apply for grants. Of course, mayors in their last terms do not exert any effort in the present model. In reality, however, career concerns go beyond mayor positions in a specific municipality. Due to this, we expect term-limited mayors to exert some effort. Moreover, winning all possible z elections might be a clear signal of competence to the market. This may mitigate the effect of the introduction of term limits on the efforts of second-term mayors. For Portugal, this brings us to Hypothesis 1:

Hypothesis 1. *The introduction of term limits causes term-limited mayors to receive fewer EU grants than mayors eligible for reelection.*

Hypothesis 1 presents the central prediction of the agency approach to electoral competition applied to effort provision. As such, we regard it as the primary hypothesis to be tested.

The model shows that less competition increases the pie for those mayors who do compete. As we discuss in Section 5, a relatively high share of mayors were lame ducks in the 2010-2013 term. Hypothesis 2 follows.

Hypothesis 2. *Mayors who could be reelected in the 2013 elections benefited most from introducing the binding term limit.*

In the model, we assumed a fixed budget. A fixed (or closed) budget rather than an open one creates competition. In practice, EU programs can be open for several years. Hence, it is unclear how relevant Hypothesis 2 is to our empirical application.

Finally, the model predicts that *the announcement* of a term limit affects the allocation of grants. This result is relevant to Portugal since the term limit became binding for the 2013 elections but was announced before the 2009 elections.[10] In the 2005-2009 term, mayors knew that they could not stay in office forever. The announcement weakened the incentives of mayors close to their final terms.

Hypothesis 3. *In the 2005-2009 term, mayors closer to their final terms got fewer grants. The effect of term limits on EU funding is smaller for the 2005-2009 term than for later terms.*

Hypothesis 3 hinges on the assumption that the discount factor is stable over time. An important reason why some mayors especially do not want to lose the *next* election is that if they are defeated, they are jobless. Due to this, the personal costs of losing the next election are huge for those mayors. More generally, Hypothesis 3 requires that mayors look beyond the next election. Again, whether or not they do so is an empirical question.

5. Data and empirical methodology

This section describes the data gathered and the empirical strategy followed to test our three hypotheses.

5.1. **Data.** We have built an extensive panel database covering all 278 Portuguese mainland municipalities with annual data from 1998 to 2022.[11] This rich data set contains information on municipal accounts, demographic and socioeconomic data for local jurisdictions, and election data for local and central governments.[12] Municipal revenue data was collected from the Directorate General of Local Authorities (*Direção Geral das Autarquias Locais* - DGAL). Electoral and other political data were obtained

[10] The Law 46/2005, which imposes term limits, was approved in 2005 and came into effect in 2006.

[11] The 30 municipalities of the autonomous regions of Azores and Madeira are not included in the sample because they are eligible for the EU funds attributed to ultraperipheral regions. Therefore, they are different from the municipalities located on the Portuguese mainland.

[12] We use data after 1998 because three municipalities (Odivelas, Trofa, and Vizela) were created in that year and because 1997 is the first year for which there is data on municipal unemployment (one of the control variables used).

from the Ministry of Internal Affairs (*Ministério da Administração Interna* – MAI). Socioeconomic and demographic data were mostly obtained from the Portuguese Institute of Statistics (*Instituto Nacional de Estatística* - INE), and unemployment data from the Institute for Employment and Professional Training (*Instituto do Emprego e da Formação Profissional* - IEFP).

The revenues from EU grants used as the dependent variable are measured in euros per capita at constant prices of 2021. Since DGAL uses the cash basis accounting method, revenues from EU grants (and other sources) are registered in the year cash is received. Due to the considerable variation across municipalities in the levels of per capita grants received, we take their natural logs.[13] We use several control variables in our specifications. The EU conditions part of its funding decisions on local socioeconomic circumstances. To account for the need for EU assistance, we include the first lags of the average real wage in the private sector, the unemployment rate, and the share of senior citizens in the municipal population as control variables.

We also control for differences across municipalities regarding political circumstances. As more experienced mayors may have a greater ability to obtain grants for their municipalities, it is important to control for experience effects on the allocation of intergovernmental grants (Alt et al., 2011). For that purpose, we include a dummy variable for experienced eligible mayors (*T3el*) who have been in office for three or more terms and were eligible for reelection until 2009.[14]

The extent to which elections provide incentives to mayors to exert effort depends on the expected closeness of the elections. We include two political control variables to account for the degree of electoral competition. First, the presence of swing voters (Case, 2001; Dahlberg and Johansson, 2002; Johansson, 2003; Cadot et al., 2006) is proxied by electoral volatility in the municipality, calculated as the average of the changes in the vote shares of the five main political parties from the two preceding legislative elections, divided by the national average change. Second, the percentage

[13] Since the theoretical model implies that mayors exert little effort to obtain grants in their last terms, it is essential to avoid losing more than 300 observations for which EU grants are equal to zero. Thus, we set the log of grants equal to zero in those cases to prevent generating missing values. We also set the log of EU grants to zero when per capita real EU grants are smaller than 1 euro (when log grants would be negative).

[14] The baseline category is that of less experienced mayors who are in their first or second term in office.

of votes obtained by the mayor's party in the previous local election proxies the electoral support base of the mayor. We expect that little electoral volatility and a large base weaken a mayor's incentives to exert effort.

We include municipal-specific time trends which, according to Angrist and Pischke (2009), allow treatment and control municipalities to follow different trends in a limited but potentially relevant way. Finally, we include municipality-fixed and year-fixed effects.

5.2. **Empirical Anaylsis.** To test our primary hypothesis that term-limited mayors put less effort into acquiring EU grants, we exploit the introduction of term limits that became binding in the elections of 2013. We apply a difference-in-differences approach across time, with mayors being eligible for reelection and mayors not being eligible for reelection.

The empirical analysis uses the panel database described in Section 5.1. The sample period (1998 to 2022) covers a total of six complete 4-year terms, with three municipal elections before term limits became binding (2001, 2005, and 2009) and three with term-limited mayors (2013, 2017, and 2021). Of the 278 municipalities, 149 had lame ducks in the 2010-2013 term,[15] 38 in 2014-2017 and 46 in 2018-2021, while the remaining 45 municipalities never had a term-limited mayor during the sample period. Thus, there are three treatment cohorts of municipalities, starting in 2010, 2014, and 2018, respectively, and a never-treated group of 45 municipalities.[16]

Our empirical analysis consists of three stages:

(1) We estimate a dynamic Two-Way Fixed Effects (TWFE) model to generate event study plots that are used for three purposes. First, the plots are used to check the balance between treatment and control groups. According to Hypothesis 2, anticipation effects are possible, as term limits were announced in 2005 but only became binding for the 2013 elections. Second, the plots provide information about the timing of treatment effects. Because of lags between mayors' efforts in acquiring EU grants and municipalities receiving EU money, we do not expect a one-to-one relationship between treatment and the

[15]Since these mayors were elected in October 2009 and inaugurated some weeks later, they governed their municipalities for just one or two months in 2009. They did not influence the intergovernmental grants received that year. Therefore, in the dataset, we treat their terms as starting in 2010. The same procedure is used for the following elections.

[16]The data for 2022 is used only to check if the effects of term limits persist after the term-limited mayors of the 2018 cohort leave office.

dependent variable. Third, the plots are used to test Hypothesis 3, stating that less competition among municipalities for grants increases the effect of a term limit on EU funding.

(2) Since our application has multiple periods and three treatment timings, the standard DiD approach would compare newly-treated municipalities with already-treated ones. For example, because of lags, already-treated municipalities are not the same as not-yet-treated municipalities. In stage 1, we avoid bad comparisons between treated and non-treated municipalities by excluding municipalities after their treatment window ends. In stage 2, we use recently developed DiD estimators that account for heterogeneous treatment effects and variations in treatment timing proposed by de Chaisemartin and D'Haultfœuille (2021), Borusyak et al. (2024), Callaway and Sant'Anna (2021), Sun and Abraham (2021), and Wooldridge (2021). Although only the estimator proposed by de Chaisemartin and D'Haultfœuille (2021) accounts for the possibility of switching out of treatment (as happens to our treated municipalities after four years), the other estimators fit well to a setting where municipalities are no longer observed in the years after their treatment window.

(3) Finally, we use a placebo falsification. To this end, we replace our dependent variable EU grants with formula-determined grants. How much formula-determined budget a municipality receives depends on its population, geographic characteristics, and income. By definition, the allocation of formula grants to municipalities does not depend on mayors' efforts. Consequently, formula grants form an excellent candidate for placebo falsification.

6. Empirical Results

This section presents and discusses the empirical results. Firstly, we present the empirical specification and show the event plots of the dynamic TWFE model. Secondly, we show the results obtained when using alternative DiD estimators, which account for staggered treatment and heterogeneous treatment effects. Finally, we show the results of the placebo tests.

6.1. Dynamic TWFE DiD model.

We first estimate a dynamic TWFE model to generate event-study plots. Let $TL^{j}_{i,t}$ be a dummy indicator equal to 1 j periods relative

to i's first year of treatment ($j = 0$). We estimate the following dynamic TWFE specification:

$$(9) \qquad ln(g_{it}) = \sum_{j=-8}^{-1} \delta_j TL_{it}^j + \sum_{j=0}^{3} \delta_j TL_{it}^j + \sum_{j=4}^{5} \delta_j TL_{it}^j + \mathbf{X}_{it}'\gamma + \mu_i + \lambda_t + \delta_i.t + \varepsilon_{it},$$

$$i = 1, ..., 278 \qquad t = 1998, ..., 2021$$

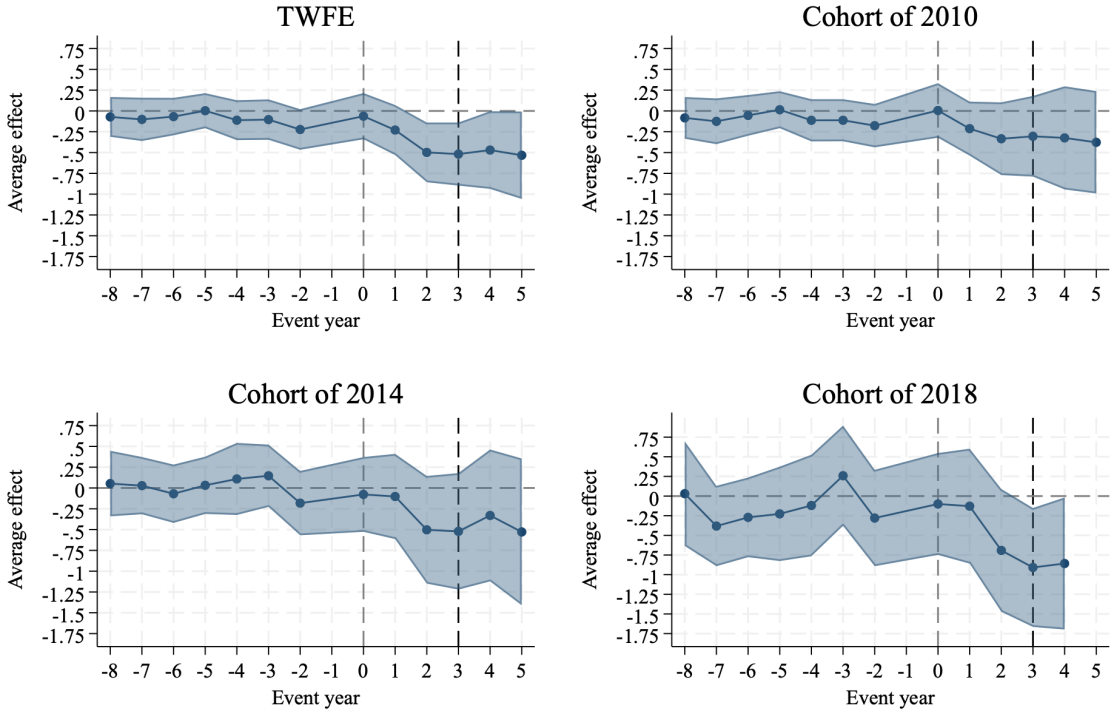
where $ln(g_{it})$ is the natural logarithm of EU grants in municipality i in year t, $\mathbf{X}_{it}$ is the vector of control variables, μ_i are municipality fixed effects, λ_t are year fixed effects, $\delta_i.t$ are municipal specific time trends, and ε_{it} is the error term.

The first term of the right-hand side of (9) includes eight leads. The parallel-trends assumption requires that the control and treatment groups are comparable in the pre-treatment period. The eight pre-treatment parameters must be close to zero. Anticipation of term limits jeopardizes the validity of this assumption (see Hypothesis 2). The second term represents the treatment years, the term in which municipality i's mayor is not eligible for reelection. Because of the proposal and implementation lags, we expect δ_0, and possibly δ_1, to be close to zero. The third term includes two post-treatment (or lagged-treatment) effects. Because of the proposal and implementation lags, the respective coefficients could be negative. In estimating (9), never-treated and not-yet-treated municipalities form the control group. We assume that the coefficients δ_0 to δ_5 represent treatment.[17] In this way, we can identify lagged effects and avoid assuming that not-yet-treated municipalities and already-treated municipalities are similar.

Figure 1 displays the estimates of the effects of term limits (δ_j) on EU grants. The estimated ATETs and t-statistics for event years 0 to 5 are reported in Table A.2 in the Appendix. The top-left graph presents the estimates for the entire sample. At the beginning of event year 0, a term-limited mayor takes office. At the end of event year 3, she leaves office. The estimates for the eight pre-treatment years are nearly at the zero line and are never statistically significant at the 5% level.[18] This indicates that the municipalities in the treatment and control groups are similar. The estimate for δ_1 and especially the estimate for δ_0 are also nearly zero. However, in the third and fourth

[17] Hence, we do not really have post-treatment coefficients. δ_4 and δ_5 represent possible lagged effects.
[18] The hypothesis of joint nullity of the pre-treatment effects is not rejected for the entire sample nor the individual cohorts (see the last row of Table A.2 in the Appendix.

treatment years ($j = 2$ and $j = 3$), the estimated coefficients are close to -0.5 and significantly different from zero. These results indicate a time lag of at least one, and more likely, of two years. The estimates for the lagged-treatment coefficients ($j > 3$) are also statistically significant, but less precise than the estimates for $j = 2$ and $j = 3$. They do not reveal a return to pre-treatment levels. Overall, the top-left graph of Figure 1 provides support for Hypothesis 1 that term-limited mayors acquire fewer EU funds. Moreover, the graph shows that this decrease in EU budget occurs in the second half of a term-limited mayor's term. Finally, the graph suggests that term limits affect municipalities' EU budgets beyond term-limited mayors' terms.



Note: This figure shows the estimated effects (ATET) of mayoral term limits on the EU grants received by Portuguese mainland municipalities. Event-study plots for dynamic TWFE estimations, using the not-yet-treated municipalities as the control group. Standard errors are clustered at the municipal level and 95% confidence intervals are shown. The vertical dashed lines indicate the first and last years of the treatment period. Estimated ATET and t-statistics for the post-treatment period are reported in Table A.2.

FIGURE 1. Average Treatment Effects of Term Limits on EU Grants

The other three graphs in Figure 1 present event-study plots for each cohort separately. In all cases, the estimates for the pre-treatment years do not significantly differ from zero. This gives extra credibility to the parallel-trends assumption. Note that the estimates for the pre-treatment years for the 2010 Cohort are nearly zero and

relatively precise. Hence, we reject Hypothesis 2 that the announcement of binding term limits in 2005 for the 2010 cohort affects obtaining EU grants. Though the estimates for δ_j for each cohort are less precise than the estimates for the entire sample, the graphs show very similar patterns. For each separate cohort, the estimates indicate the most pronounced effects in the last two years of limited mayors' terms. Moreover, the estimates remain negative for $j = 4$ and $j = 5$.[19]

Finally, a comparison among the estimates of the three cohorts shows that, if anything, the estimates for 2010 are smaller than those for 2014 and 2018. Hence, we reject Hypothesis 3 that less competition for grants in 2013 leads to larger effects of term limits on receiving EU budgets.

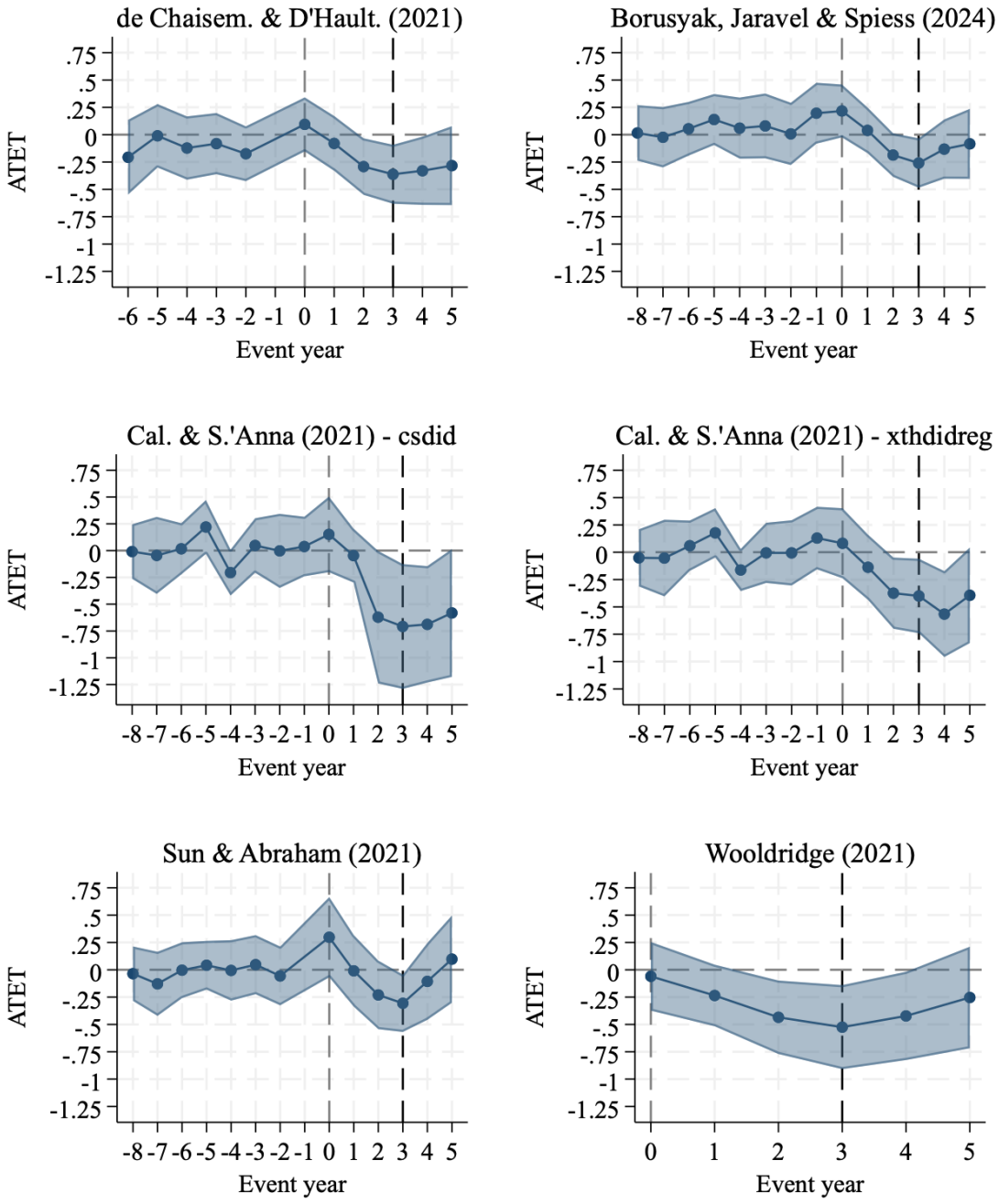
6.2. **Alternative DiD Estimators.** Recent studies argue that TWFE estimations may be biased in settings with multiple periods and cohorts if treatment effects are heterogeneous. Therefore, to further check the robustness of our results, we test for the effects of term limits on EU funding using the DiD estimators that account for heterogeneous treatment effects and variations in treatment timing proposed by de Chaisemartin and D'Haultfœuille (2021), Borusyak et al. (2024), Callaway and Sant'Anna (2021), Sun and Abraham (2021), and Wooldridge (2021).[20] The event plots of the estimations are shown in Figure 2. The estimated ATETs and t-statistics for event years 0 to 5 are reported in Table A.3 in the Appendix.[21]

The results are similar to those of the dynamic TWFE estimation that combines all cohorts (top-left graph in Figure 1), perhaps with the exception of the estimates for post-treatment coefficient δ_5. The pre-treatment and the first two treatment coefficients never differ significantly from zero. The last two treatment coefficients are negative and statistically significant at the 5% level, with the exception of Sun and Abraham (2021), for which only the ATET of the final year is statistically significant. The magnitudes of the ATETs are generally similar across estimators and tend to be slightly lower than those estimated with the dynamic TWFE model. Only the

[19] As the sample ends in 2022, we cannot present estimates for the second post-treatment year of the cohort of 2018.

[20] For surveys of the recent literature on DiD estimators for heterogeneous treatment effects, see de Chaisemartin and D'Haultfœuille (2023) and Roth et al. (2023).

[21] Figure 2 is inspired in Figure 3 of de Chaisemartin and D'Haultfœuille (2023) and their code available online was partially used to run the estimations. The Stata commands used are: *did_multiplegt* - de Chaisemartin and D'Haultfœuille (2021); *did_imputation* - Borusyak et al. (2024); *csdid* and *xthdidregress* (*aipw*) - Callaway and Sant'Anna (2021); *eventstudyinteract* - Sun and Abraham (2021); and *xthdidregress* (*twfe*) - Wooldridge (2021).



Note: This figure shows the estimated effects (ATET) of mayoral term limits on the EU grants received by Portuguese mainland municipalities. Event-study plots for the estimators proposed by de Chaisemartin and D'Haultfœuille (2021), Borusyak et al. (2024), Callaway and Sant'Anna (2021), Sun and Abraham (2021), and Wooldridge (2021) using the not-yet-treated municipalities as the control group. Standard errors are clustered at the municipal level. Estimated ATET and t-statistics for event years 0 to 5 are reported in Table A.3.

FIGURE 2. ATET Accounting for Heterogeneous Treatment Effects

Callaway and Sant'Anna (2021) estimator, when using the command *csdid*, generates

considerably higher ATETs.[22] Finally, the lagged-treatment coefficients again suggest effects of term limits beyond the terms of term-limited mayors. In all graphs in Figure 2, $\delta_5 > \delta_4$, indicating that in the second lagged-treatment year, the effect of term limits on EU funding declines.[23]

The upshot of this section is that the alternative DiD estimators provide support for Hypothesis 1 that term limits reduce EU funding with a lag of one or two years. Excluding the estimates obtained with the *csdid* command, the average estimated ATETs indicate that term-limited mayors receive 30% less EU grants in the third treatment year (δ_2) and less 37% in their final year (δ_3). Furthermore, there is no evidence for anticipation. Therefore, we can reject Hypothesis 2.

6.3. **Placebo.** In the previous subsections, our finding that the pre-treatment coefficients are close to zero confirms the validity of the DiD approach. Another well-known way to determine the validity of the DiD approach is placebo falsification.

A good candidate for placebo falsification is data on formula-determined national grants. These grants are determined by a formula stipulated in the local finance law. Hence, the grants received by a municipality do not depend on its mayor's effort, nor on whether she is term-limited or not.

We estimate (9), and replace $ln(g_{it})$ with the natural logarithm of formula-determined national grants to generate event-study plots for the entire sample and for each cohort separately (as in Figure 1). The event plots, shown in Figure 3, indicate that our findings regarding the effects of term limits on EU funding are not the result of unobservables not captured by the year fixed effects, the municipality fixed effects, or the control variables. All coefficients are close to zero, showing that term limits do not affect the allocation of formula-determined grants across municipalities.[24]

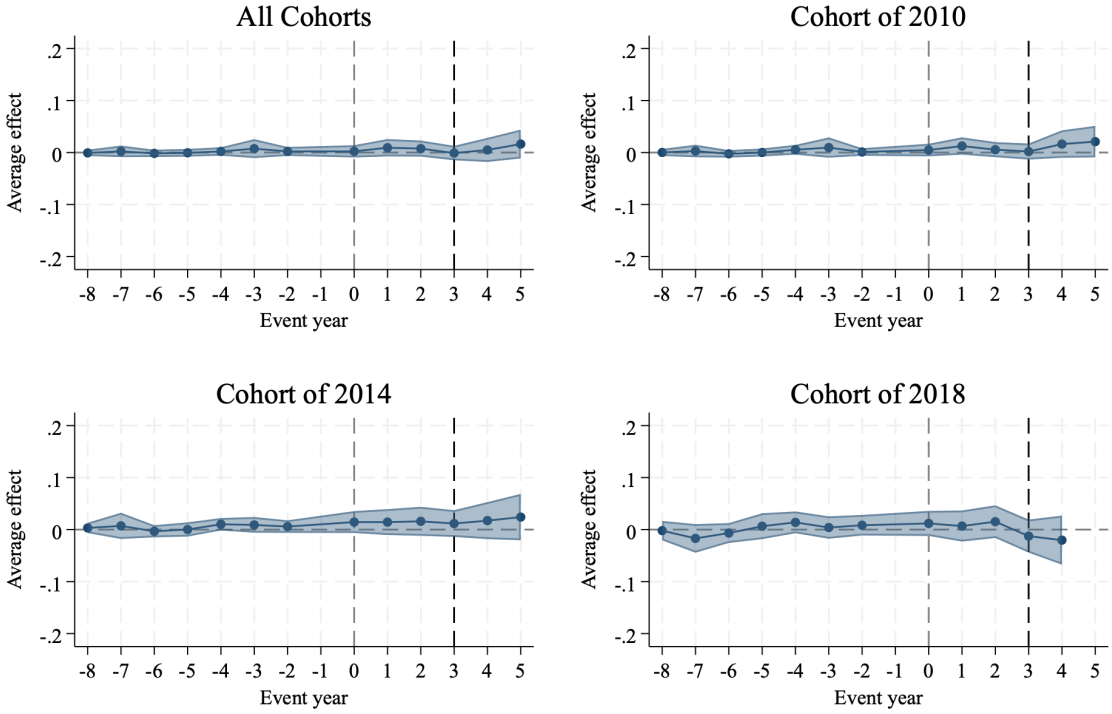
7. Conclusion

We have investigated how being eligible for reelection affects Portuguese mayors' incentives to apply for EU grants. Our main finding is that term-limited mayors

[22] These high ATETs are the reason why we also use the Stata command *xthdidregress* (with estimation method *aipw*) to run the Callaway and Sant'Anna (2021) estimator. As shown in Figure 2, it generates ATETs that are more in line with those of the other estimators.

[23] δ_5 is never statistically significant at the 5% level (see Table A.3 in the Appendix).

[24] The estimated ATET are all statistically insignificant (see Table A.4 in the Appendix).



Note: This figure shows the estimated effects (ATET) of mayoral term limits on the formula-determined grants received by Portuguese mainland municipalities. Event-study plots for dynamic TWFE estimations, using the not-yet-treated municipalities as the control group. Standard errors are clustered at the municipal level and 95% confidence intervals are shown. The vertical dashed lines indicate the first and last years of the treatment period. Estimated ATET and t-statistics for the post-treatment period are reported in Table A.4.

FIGURE 3. Average Treatment Effects of Term Limits on Formula-Determined Grants

reduce their efforts to acquire EU funding. In the last two years of their terms, term-limited mayors receive up to 50% less EU money than mayors eligible for reelection. Although our theoretical model predicts that the announcement of the introduction of term limits in 2005 affects mayors' incentives to obtain grants in the 2005-2009 period, we do not find an announcement effect. This suggests that mayors only care about winning the next election, not about winning later elections. Finally, we do not find evidence for a competition effect. How much EU funds municipalities receive does not depend on how many municipalities try to acquire grants.

REFERENCES

AD&C (2023). Boletim informativo dos fundos da união europeia. Agência para o Desenvolvimento e Coesão, I.P. December 31. Downloadable at https://www.adcoesao.pt/wp-content/uploads/bi_35.pdf.

Alesina, A. (1987). Macroeconomic policy in a two-party system as a repeated game. *Quarterly Journal of Economics*, 102(3):651–678.

Alesina, A. (1988). Credibility and policy convergence in a two-party system with rational voters. *The American Economic Review*, 78(4):796–805.

Alt, J., de Mesquita, E. B., and Rose, S. (2011). Disentangling accountability and competence in elections: Evidence from US term limits. *The Journal of Politics*, 73:171–186.

Angrist, J. D. and Pischke, J.-S. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton and Oxford: Princeton University Press.

Banerjee, A. V. and Pande, R. (2007). Parochial politics: Ethnic preferences and politician corruption.

Barro, R. J. (1973). The control of politicians: an economic model. *Public choice*, pages 19–42.

Besley, T. and Case, A. (1995a). Does electoral accountability affect economic policy choices? evidence from gubernatorial term limits. *The Quarterly Journal of Economics*, 110(3):769–798.

Besley, T. and Case, A. (1995b). Does electoral accountability affect economic policy choices? Evidence from gubernatorial term limits. *Quarterly Journal of Economics*, 110(3):769–798.

Bobonis, G. J., Cámara Fuertes, L. R., and Schwabe, R. (2016). Monitoring corruptible politicians. *American Economic Review*, 106(8):2371–2405.

Borusyak, K., Jaravel, X., and Spiess, J. (2024). Revisiting event-study designs: Robust and efficient estimation. *The Review of Economic Studies*, page rdae007.

Cadot, O., Roller, L., and Stephan, A. (2006). Contribution to productivity or pork barrel? The two faces of infrastructure investment. *Journal of Public Economics*, 90:1133–1153.

Callaway, B. and Sant'Anna, P. H. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2):200–230.

Calvert, R. L. (1985). Robustness of the multidimensional voting model: Candidate motivations, uncertainty, and convergence. *American Journal of Political Science*, pages 69–95.

Case, A. (2001). Election goals and income redistribution: Recent evidence from Albania. *European Economic Review*, 45(3):405–423.

Casey, K. E. (2015). Crossing party lines: The effects of information on redistributive politics. *American Economic Review*, 105(8):2410–2448.

Dahlberg, M. and Johansson, E. (2002). On the vote-purchasing behavior of incumbent governments. *American Political Science Review*, 96(1):27–40.

de Chaisemartin, C. and D'Haultfœuille, X. (2021). Difference-in-differences estimators of intertemporal treatment effects. *arXiv preprint arXiv:2007.04267*.

de Chaisemartin, C. and D'Haultfœuille, X. (2023). Two-way fixed effects and differences-in-differences with heterogeneous treatment effects: A survey. *The Econometrics Journal*, 26(3):C1–C30.

De Janvry, A., Finan, F., and Sadoulet, E. (2012). Local electoral incentives and decentralized program performance. *Review of Economics and Statistics*, 94(3):672–685.

DellaVigna, S., List, J. A., Malmendier, U., and Rao, G. (2016). Voting to tell others. *The Review of Economic Studies*, 84(1):143–181.

Downs, A. (1957). *An Economic Theory of Democracy*. New York: Harper and Row.

Ferejohn, J. (1986). Incumbent performance and electoral control. *Public Choice*, pages 5–25.

Ferraz, C. and Finan, F. (2011). Electoral accountability and corruption: Evidence from the audits of local governments. *American Economic Review*, 101:1274–1311.

Harbaugh, W. T. (1996). If people vote because they like to, then why do so many of them lie? *Public Choice*, 89(1):63–76.

Hibbs, D.A., J. (1977). Political parties and macroeconomic policy. *American Political Science Review*, 71(4):1467–1487.

Johansson, E. (2003). Intergovernmental grants as a tactical instrument: Empirical evidence from Swedish municipalities. *Journal of Public Economics*, 87(5-6):883–915.

Johnson, J. M. and Crain, W. M. (2004). Effects of term limits on fiscal performance: Evidence from democratic nations. *Public Choice*, 119(1-2):73–90.

List, J. A. and Sturm, D. M. (2006). How elections matter: Theory and evidence from environmental policy. *The Quarterly Journal of Economics*, 121(4):1249–1281.

Lopes da Fonseca, M. (2020). Lame ducks and local fiscal policy: Quasi-experimental evidence from portugal. *The Economic Journal*, 130(626):511?533.

Persson, T. and Tabellini, G. (2000). *Political Economics - Explaining Economic Policy*. MIT Press, Cambridge.

Roth, J., Sant'Anna, P. H., Bilinski, A., and Poe, J. (2023). What's trending in difference-in-differences? A synthesis of the recent econometrics literature. *Journal of Econometrics*, 235(2):2218–2244.

Silver, B. D., Anderson, B. A., and Abramson, P. R. (1986). Who overreports voting? *American Political Science Review*, 80(2):613–624.

Sun, L. and Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, 225(2):175–199.

Veiga, L. and Veiga, F. (2019). The effects of electoral incentives on fiscal policy: Evidence from a legislative change at the local government level. *Journal of Law, Economics & Organization*, 35(2):394–421.

Wittman, D. (1973). Parties as Utility Maximizers. *American Political Science Review*, 67:490–498.

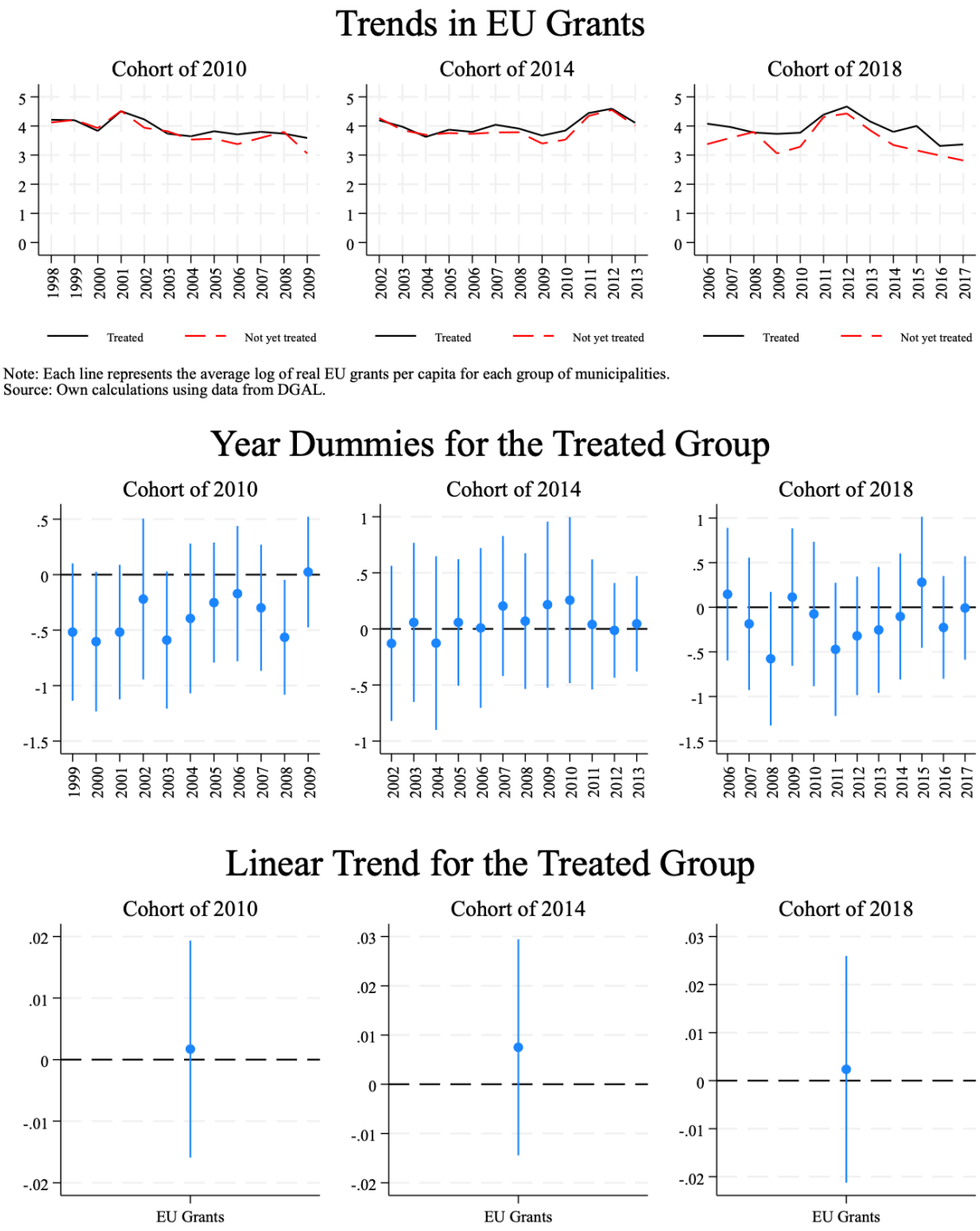
Wooldridge, J. M. (2021). Two-way fixed effects, the two-way Mundlak regression, and difference-in-differences estimators. *Available at SSRN 3906345*.

APPENDIX

TABLE A.1. Descriptive Statistics

VARIABLES	N. Obs.	Mean	S.D.	Min.	Max.
Real per capita grants, at 2021 prices (Source: DGAL)					
Log of European Union Grants	5,769	3.86	1.52	0.00	7.09
Log of Formula Grants	5,769	6.03	0.74	4.08	7.81
European Union Grants	5,769	99.92	113.45	-5.39	1,200.64
Formula Grants	5,769	535.64	381.65	59.10	2,472.95
E.U. Grants (% Effective Revenues)	5,767	8.80	7.32	0.00	64.47
Formula Grants (% Effective Revenues)	5,769	47.34	17.09	3.02	87.94
Effective Revenues	5,769	1,054.84	498.99	206.78	3,706.30
Political variables (Source: MAI)					
Term-limited mayor (TL)	5,769	0.16	0.37	0.00	1.00
Experienced eligible mayor	5,769	0.24	0.42	0.00	1.00
Mayor 1st or 2nd term	5,769	0.60	0.49	0.00	1.00
Mayor's party % votes	5,769	51.85	8.51	26.83	83.12
Electoral volatility	5,769	0.96	0.28	0.12	3.12
L2.Party Similarity	5,769	0.43	0.50	0.00	1.00
Prime Minister's party % votes	5,769	43.22	11.00	12.91	81.76
Economic and demographic variables (Source: IEFP and INE)					
L.Average real wage	5,769	898.59	172.26	581.36	2,391.92
L.Unemployment rate	5,769	6.61	2.69	1.38	18.48
L.% Population above 65 years old	5,769	22.48	6.31	7.99	45.87

Sources: Directorate General for Local Authorities (DGAL), Ministry of Internal Affairs (MAI), National Institute of Statistics (INE), Institute of Employment and Professional Training (IEFP).



Note: Each line represents the average log of real EU grants per capita for each group of municipalities.
Source: Own calculations using data from DGAL.

FIGURE A.1. Validity of the Difference-in-Differences Framework

TABLE A.2. Dynamic DiD Model Results

	(1)	(2)	(3)	(4)
Event Year	All cohorts	Cohort of 2010	Cohort of 2014	Cohort of 2018
0	-0.063	0.006	-0.078	-0.100
	(-0.444)	(0.034)	(-0.339)	(-0.304)
1	-0.230	-0.213	-0.102	-0.128
	(-1.498)	(-1.284)	(-0.391)	(-0.344)
2	-0.498***	-0.334	-0.503	-0.691*
	(-2.723)	(-1.499)	(-1.523)	(-1.734)
3	-0.518***	-0.305	-0.521	-0.909**
	(-2.683)	(-1.232)	(-1.459)	(-2.354)
4	-0.470**	-0.324	-0.330	-0.858**
	(-1.973)	(-1.024)	(-0.816)	(-2.002)
5	-0.533**	-0.377	-0.528	
	(-1.987)	(-1.201)	(-1.173)	
Observations	5,769	4,989	2,823	2,256
Adj. R-squared	0.502	0.518	0.466	0.468
Test for the joint nullity of the pre-treatment effects				
P-value	0.782	0.838	0.841	0.313

Notes: Estimated ATET obtained using the dynamic TWFE specification. All estimations account for municipal and year fixed effects, and municipal-specific trends. T-statistics, based on robust standard errors, clustered by municipality, in parentheses. Significance level: *** $p<0.01$, ** $p<0.05$, * $p<0.10$.

TABLE A.3. DiD Estimators for Heterogeneous Treatment Effects

Event Year	(1) deCh&D'H	(2) B.J.S.	(3) C & S	(4) C & S 2	(5) S & A	(6) Wooldr.
0	0.094	0.217*	0.151	0.082	0.298	-0.060
	(0.747)	(1.761)	(0.841)	(0.501)	(1.593)	(-0.373)
1	-0.080	0.040	-0.046	-0.138	-0.010	-0.235
	(-0.625)	(0.372)	(-0.362)	(-0.905)	(-0.058)	(-1.636)
2	-0.292**	-0.187*	-0.621**	-0.374**	-0.230	-0.435**
	(-2.214)	(-1.833)	(-1.969)	(-2.257)	(-1.438)	(-2.536)
3	-0.362***	-0.260**	-0.708**	-0.400**	-0.306**	-0.525***
	(-2.632)	(-2.254)	(-2.383)	(-2.304)	(-2.286)	(-2.677)
4	-0.330**	-0.132	-0.688**	-0.566***	-0.106	-0.422**
	(-2.073)	(-0.953)	(-2.484)	(-2.824)	(-0.593)	(-2.049)
5	-0.283	-0.084	-0.582*	-0.394*	0.097	-0.254
	(-1.537)	(-0.513)	(-1.912)	(-1.768)	(0.478)	(-1.070)
Observations	5769	5769	5769	5769	5769	5769
Test for the joint nullity of the pre-treatment effects						
P-value	0.258	0.810	0.450	0.603	0.903	

Notes: Estimated ATET obtained using the estimators of de Chaisemartin and D'Haultfœuille (2021) - deCh&D'H, Borusyak et al. (2024) - B.J.S., Callaway and Sant'Anna (2021) - C&S (csdid) and C&S2 (xthdidregress), Sun and Abraham (2021) - S&A, and Wooldridge (2021) - Wool. All regressions include the full set of control variables. T-statistics, based on robust standard errors, clustered by municipality, in parentheses. Significance level: *** p<0.01, ** p<0.05, * p<0.10.

TABLE A.4. Dynamic DiD Model Results - Formula-Determined Grants

	(1)	(2)	(3)	(4)
Event Year	All cohorts	Cohort of 2010	Cohort of 2014	Cohort of 2018
0	0.002	0.005	0.014	0.012
	(0.388)	(0.778)	(1.353)	(0.970)
1	0.009	0.013	0.014	0.007
	(1.088)	(1.485)	(1.137)	(0.449)
2	0.008	0.006	0.016	0.015
	(0.969)	(0.758)	(1.120)	(0.952)
3	-0.001	0.002	0.012	-0.013
	(-0.144)	(0.245)	(0.888)	(-0.776)
4	0.005	0.016	0.017	-0.020
	(0.428)	(1.210)	(0.950)	(-0.844)
5	0.016	0.021	0.024	
	(1.159)	(1.359)	(1.062)	
Observations	5,769	4,989	2,823	2,256
Adj. R-squared	0.997	0.997	0.997	0.996
Test for the joint nullity of the pre-treatment effects				
P-value	0.912	0.478	0.588	0.378

Notes: Estimated ATET obtained using the dynamic TWFE specification. All estimations account for municipal and year fixed effects, and include control variables and municipal-specific trends. T-statistics, based on robust standard errors, clustered by municipality, in parentheses. Significance level: *** $p<0.01$, ** $p<0.05$, * $p<0.10$.