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Do voters reward mayors for obtaining EU grants? The impact of EU grants on electoral outcomes in Portuguese municipalities

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Abstract

This paper studies the relationship between European Union (EU) grants and re-election probability of incumbent mayors in Portuguese local elections. This thesis explores the impact of EU grants on re-election probabilities in Portuguese municipalities, specifically examining whether voters reward incumbent mayors for securing consistent EU grants in the pre-election period, by re-electing them in subsequent elections. The primary hypothesis is that consistent EU grants obtained in the pre-election period increase the re-election probability of incumbent mayors. Through answering this question, this thesis aims to contribute to the broader literature on political economy, electoral behaviour, and the effectiveness of EU funding by examining this relationship. The main result found is that EU grants significantly decrease re-election probabilities of incumbent mayors in the studied period 1998-2021.

The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam.

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2 Introduction

The relationship between public funding and electoral outcomes represents a critical area of investigation in political economy. The European Union (EU) allocates financial resources to member states through its Cohesion Policy¹, aiming to correct regional imbalances and to support economic growth and sustainable development. This policy is primarily implemented via funds such as the European Regional Development Fund (ERDF) and the Cohesion Fund (CF), which support a variety of local development projects, from infrastructure improvements to environmental sustainability initiatives (European Commission, 2021). Understanding how these funds impact local electoral outcomes can offer significant insights into political accountability and voter behaviour.

Portugal, characterized by a relatively low GDP per capita compared to the EU average, is a major beneficiary of the Cohesion Fund. This fund is designed for EU member states with a Gross National Income (GNI) per inhabitant below 90% of the EU average (European Commission, 2021). For the 2021-2027 programming period, the EU has allocated approximately €24.9 billion to Portugal, underscoring the importance of these funds for the country's development.

Previous research has shown that public investments can significantly influence voter behaviour, often leading to electoral rewards for incumbents who secure substantial funding for their constituencies (Brender & Drazen, 2008). Spending this money by improving local infrastructure and services, could increase voter satisfaction and thus electoral prospects (Papp, 2019; Sakurai & Menezes-Filho, 2011; Veiga & Veiga, 2007a; Veiga & Veiga, 2007b). Opportunistic behaviour theory implies that incumbents might strategically time grant use to influence voter perceptions just before elections (Sakurai & Menezes-Filho, 2011; Solé-Ollé & Sorribas-Navarro, 2008).

This thesis explores the impact of EU grants on re-election probabilities in Portuguese municipalities, specifically examining whether voters reward incumbent mayors for securing consistent EU grants in the pre-election period, by re-electing them in subsequent elections. The primary hypothesis is that consistent EU grants obtained in the pre-election period increase the re-election probability of mayors. Through answering this question, this thesis aims to contribute to the broader literature on political economy, electoral behaviour, and the effectiveness of EU funding by examining this relationship.

The Portuguese context provides a unique setting for this analysis. In Portugal, voters directly elect both mayors and municipal assembly members, allowing them to hold mayors accountable for their performance, including their success in securing external funding (Freire, 2010; Silva, 2008; Veiga & Veiga, 2011). Research suggests that the ability of local politicians to secure EU grants can significantly affect their political survival. Henceroth & Oganessian (2019) demonstrate that Structural and Investment Funds from the EU significantly influence voter behaviour in European Parliamentary

¹ The EU goal of Economic, Social and Territorial Cohesion is defined in articles 174 to 178 of the Treaty on the Functioning of the European Union

elections, with regions receiving higher funds showing increased support for incumbent parties. This finding supports the economic voting theory (Lewis-Beck & Paldam, 2000), suggesting that financial benefits, from in this case EU grants, can sway voter preferences. However, the relationship between EU grants and local electoral outcomes remains complex and context-dependent, influenced by various local factors such as political, socioeconomic and demographic variables conditions.

The importance of this thesis lies in addressing a critical research gap. While numerous studies have examined the impact of public spending on electoral outcomes (Brender & Drazen, 2008; Di Tommaso et al., 2022; Drazen & Eslava, 2010), there is limited research focusing specifically on the role of EU grants in local elections. On one hand, existing literature of EU funding focuses mostly on the level of national elections, instead of local (Dellmuth & Stoffel, 2012; Papp, 2019; Vergioglou, 2023). On the other hand, existing literature on electoral outcomes in local elections are mostly focused on total grants, not EU grants (Balaguer-Coll et al., 2015; Bracco et al., 2014; Spáč, 2021). An exception to this, is the study by Banaszewska & Bischoff (2021), where the electoral consequences of EU funding in Polish municipalities is studied. However, in their study, the impact of per capita EU grants is studied over the entire term, without considering the timing. By investigating this relationship in the Portuguese context, this thesis provides new insights into how EU funding can influence local political dynamics.

The theoretical framework of this thesis is informed by the principal-agent problem, which explores the challenges that arise when one party (the principal) delegates tasks to another party (the agent) (Ross, 1973). In the context of this study, voters act as principals who delegate the responsibility of securing and managing public funds to mayors, who are the agents. The principal-agent problem highlights the potential for misaligned incentives and information asymmetry, where mayors might prioritize securing grants to enhance their re-election prospects rather than focusing on the optimal use of these funds for local development. Swank (2023) emphasizes two crucial roles of elections in his political accountability model: selection and disciplining of politicians. Elections enable citizens to select competent and honest politicians while disciplining those in office to act in the public interest rather than their own. This model (Swank, 2023) helps to understand why and how voters might reward or punish mayors with re-election, based on the perceived benefits of them obtaining EU grants. To investigate this relationship and test the main hypothesis, first this thesis employs Ordinary Least Squares (OLS) regression and then follows with logistic regression models to analyse the impact of EU grants on the re-election probability of mayors, controlling for political, socioeconomic, and demographic factors. To test for the sub-hypothesis, whether the positive impact of consistently obtained EU funds is stronger in municipalities highly dependent on EU grants, sub-group and interaction term logistic regression analysis is performed. Furthermore, robustness checks are performed. The analysis is based on data from Portuguese municipalities, including information on EU grants, local election results, and various control variables. By focusing on the Portuguese context, this study aims to provide

a comprehensive understanding of the electoral impact of EU grants in a highly dependent EU Member State.

The thesis is structured as follows. First, Section 3 describes the political and institutional background of Portuguese municipalities, local elections and municipal revenues. Section 4 describes specifically the role of EU grants in Portugal. Then, the literature is reviewed in Section 5. Further, Section 6 and 7 describe the data and the methodology and Section 8 discusses the results. Lastly, the conclusion and discussion can be found in Section 9 of the thesis.

3 Background: Portuguese municipalities

In the following section the political and institutional context of Portugal is described. First, a general description of Portuguese municipalities and its bodies. Subsequently, information about the legislative and local elections is provided. Last, the revenue composition of Portuguese municipalities is explained, with particular focus on European Union grants.

3.1 Local structure

Portugal, officially known as the Portuguese Republic, is a southern European country situated on the Iberian Peninsula. It shares its only land border with Spain to the east and north, while the Atlantic Ocean borders it to the west and south. With a population of approximately 10 million people, Lisbon serves as both the capital and the largest city (World Bank, 2021). The country is renowned for its rich cultural heritage and significant historical contributions. Portugal has been a member of the European Union since 1986, which has influenced its economic and social development (European Commission, 2021).

Portugal's administrative structure is divided into several levels of governance: the national government, regions, and municipalities. The mainland is subdivided into 18 districts, while the Azores and Madeira form two autonomous regions with their own regional governments. The municipalities, known as "*municípios*," play a crucial role in managing local affairs. As of 2021, Portugal consists of 308 municipalities, each governed by an elected municipal chamber (*câmara municipal*) and a municipal assembly (*assembleia municipal*) (Direção-Geral da Administração Local, 2021). These municipalities are further divided into 3,091 civil parishes (*freguesias*), representing the smallest administrative units (Instituto Nacional de Estatística, 2021). From these 308 municipalities, 278 are on the Continental Portugal, 11 on the Autonomous Region of Madeira and 19 on the Autonomous Region of the Azores. In this thesis, the focus will be on the 278 municipalities on the mainland.

Municipalities in Portugal enjoy significant autonomy and are responsible for a wide range of services and functions. According to the 1976 Constitution of the Portuguese Republic, along with the first Local Finance Law (Law No. 1/79), the responsibilities and authority of municipalities expanded. This legal framework facilitated local financial reform and the consolidation of financial decentralization (Veiga & Pinho, 2007). Municipal governments are tasked with increasing residents' wellbeing, such as by promoting social and economic development and providing local public goods such as water, energy, transportation, housing, healthcare and education. Important to note, is that public goods are highly visible to citizens (Veiga & Pinho, 2007; Silva, 2008)

As mentioned, municipal decision-making authority in Portugal is vested in two main bodies: the municipal chamber (also: Town Council) and the municipal assembly. The Town Council, led by the mayor, is tasked with the executive functions, including policy implementation and municipal service management. The mayor (*presidente da câmara*) has substantial power in decision-making,

often acting as the face of the municipality and being directly accountable to the voters (Veiga & Veiga, 2007a; Veiga & Veiga, 2011). The election of the mayor follows a direct voting system, where the top candidate of the list of the winning party becomes the mayor. The municipal assembly acts as the deliberative body, consisting of elected representatives who approve budgets, plans, and major policy decisions proposed by the municipal chamber. This structure ensures a system of checks and balances within municipal governance (Veiga & Veiga, 2007a; Veiga & Veiga, 2011).

3.2 Portuguese municipal elections

Local elections in Portugal are held every four years, and consist of the election of the municipal chambers, municipal assembly and parish assembly. From 2001 to 2021, local elections occurred on the last Sunday in September or the first Sunday in October, ensuring a consistent electoral calendar. Major political parties such as the Socialist Party (PS), Social Democratic Party (PSD), Portuguese Communist Party (PCP) in coalition with the Ecologist Party "The Greens" (PEV) under the Unitary Democratic Coalition (CDU), the Left Bloc (BE), and the People's Party (CDS-PP), along with independent candidates and local movements, compete for (re-)election (National Election Commission, 2021).

Over the 2001-2021 period, the Socialist Party (PS) has often secured the majority of municipalities, including big municipalities like Lisbon and Porto. The Social Democratic Party (PSD) remains influential, particularly in conservative areas. Recent elections have seen a rise in independent candidates and local movements, indicating a shift towards more localized and diverse political representation. The 2021 local elections highlighted this trend, with smaller parties and independents gaining ground, leading to more coalition-led local governments (National Election Commission, 2021).

Local elections in Portugal use a proportional representation system to allocate seats within municipal bodies. The *d'Hondt* method, a highest averages method, ensures fair distribution of seats among competing parties based on their share of the vote (Veiga & Pinho, 2007; Freire, 2010). Veiga & Pinho (2007) describe this method as follows: "The formula for this average is $\frac{V}{s+1}$, where V is the number of votes each party list received and s is the number of seats the party has been allocated so far." The seats are allocated to the highest resulting averages, slightly favouring larger parties to ensure stable governance (Lobo, 2007). The municipal chamber, led by the mayor, and the municipal assembly are then formed based on these results (Veiga & Veiga, 2010; Lobo, 2007).

3.2.1 Term limits

A significant reform in Portuguese local governance is the introduction of term limits for mayors and parish presidents. In 2005 the Portuguese parliament approved a law, Law n°. 46/2005, restricting mayors to three consecutive terms, totalling twelve years. This law became binding in the 2013 local elections, preventing 52% of the mayors from running for re-election, which led to a significant turnover of local candidates. This reform aimed to prevent the entrenchment of political power at the local level

and to encourage political renewal (Veiga & Veiga, 2018). Research by Veiga and Veiga (2018) shows that term limits positively impact voter turnout by increasing competition, attracting more quality candidates, and enhancing campaigning efforts by parties. However, Veiga et al. (2024) also found that term limited mayors, receive up to 50% less EU grants than mayors eligible for re-election.

Besides Portugal, several countries have introduced term limits for mayors and other local officials to enhance political accountability and governance. In the United States, term limits are commonly applied to executive positions, including the presidency. The 22nd Amendment to the U.S. Constitution (1951), limits the president to two terms in office. Many states also impose term limits on governors and state legislators. For example, California limits its governors to two four-year terms (Petracca, 1996). In Brazil, mayors are limited to two consecutive four-year terms. This policy is intended to prevent long-term incumbency and promote political competition (Kehoe, 2011). Mexican municipalities also have term limits for mayors, restricting them to a single term of three years. This policy aims to reduce the risk of corruption and ensure regular political turnover (Langston, 2010). Italy limits mayors to two consecutive terms of five years each. This rule is designed to foster political accountability and prevent the concentration of power (De Benedetto & De Paola, 2019).

3.3 Municipal revenues

The Local Finance Law distinguishes the different sources of the revenue composition of Portuguese municipalities.

Local taxes constitute a major source of revenue. Two are based on real estate properties: the municipal property tax (IMI) is imposed on property owners based on the assessed value of real estate, and the municipal tax on real estate transfers (IMT) is collected on the sale or transfer of real estate properties. Since 2012, municipalities can individually choose the IMI tax rate from a government set range, while the IMT rate is controlled by the government. Municipalities also receive a portion of the personal income tax (IRS) collected from residents within their jurisdiction, which generally represents a significant contribution to local budgets. Additionally, municipalities generate revenue from fees and charges for services provided, such as water supply, waste management, public transportation, and business licenses (Bravo, 2016; Silva, 2008).

This law also establishes rules for receiving grants. Grants from the central government and the European Union form a significant portion of municipal revenues. National grants include general transfers, which are unconditional and provided to support various local services, and specific grants earmarked for purposes such as infrastructure, education, and social services. In 2020, national grants accounted for approximately 30% of municipal revenues (Direção-Geral do Orçamento, 2020). EU grants also play a crucial role, with funds allocated for projects related to infrastructure, economic development, and environmental sustainability under broader regional development programs (European Commission, 2021).

4 Background: EU grants in Portugal

EU grants play a significant role in Portuguese municipalities, particularly in the context of electoral incentives and local governance. These grants, primarily from the European Regional Development Fund (ERDF) and the Cohesion Fund (CF), are crucial for local development, reducing regional inequalities, and fostering sustainable growth (Veiga et al., 2024).

4.1 The European Regional Development Fund (ERDF)

The European Regional Development Fund (ERDF) was established in 1975 to address regional imbalances within the European Economic Community. Its primary objective is to strengthen economic and social cohesion by correcting imbalances between regions. The ERDF focuses on several key investment areas: innovation and research, the digital agenda, support for small and medium-sized enterprises (SMEs), and the low-carbon economy. The fund supports projects that enhance competitiveness, foster job creation, and promote sustainable development (European Commission, 2021). ERDF funding in Portugal is allocated based on a combination of formula-based criteria and project-based grants. For the 2021-2027 programming period, the ERDF continues to prioritize innovation, digitalization, and sustainability. Approximately €200 billion has been allocated across the EU to support these priorities. The ERDF emphasizes smart specialization strategies, which tailor investments to the unique strengths of each region, thereby maximizing the impact of EU funding (European Commission, 2021).

4.2 The Cohesion Fund

The Cohesion Fund, established in 1994, aims to support member states with a Gross National Income (GNI) per inhabitant below 90% of the EU average. Its main goals are to reduce economic and social disparities and to promote sustainable development. The fund primarily finances large-scale infrastructure projects in the fields of transport and the environment. This includes investments in trans-European transport networks, energy efficiency, renewable energy, and waste and water management (European Commission, 2021). Like the ERDF, the Cohesion Fund includes both formula-based allocations and project-based grants. In the 2021-2027 period, the Cohesion Fund has a budget of around €48 billion. This funding is directed towards projects that contribute to the EU's environmental and climate goals, as well as the development of comprehensive transport networks. The fund also supports initiatives aimed at improving energy efficiency and increasing the use of renewable energy sources (European Commission, 2021). Portugal, with its relatively low Gross Domestic Product (GDP) per capita compared to the EU average, is one of the primary beneficiaries of the Cohesion Fund. For the 2021-2027 programming period, Portugal is set to receive approximately €24.9 billion from the EU under the Cohesion Policy. This allocation includes funds from both the ERDF and the Cohesion Fund.

4.3 Distribution process

The distribution of ERDF and Cohesion Fund grants in Portugal involves a multi-step process managed by national and regional authorities in collaboration with the European Commission. This process begins with the programming and planning stage, where Operational Programmes (OPs) are developed (Veiga, 2011). These strategic documents outline the priorities and objectives for ERDF and Cohesion Fund spending over a specific period, aligned with regional needs and EU cohesion policy goals. The Partnership Agreement between Portugal and the European Commission sets the overarching strategy for utilizing these funds, specifying the key areas of focus and expected outcomes (European Commission, 2021).

The application and selection process for these grants involves issuing specific calls for proposals by managing authorities, detailing the criteria, eligibility requirements, and deadlines for project submissions. Proposals are evaluated based on predefined criteria such as relevance, impact, feasibility, and alignment with EU and national priorities. This evaluation process often includes technical assessments and stakeholder consultations. Approved projects receive funding agreements that specify the grant amount, project timelines, and reporting requirements (Direção-Geral do Orçamento, 2020).

Implementation and monitoring are critical phases to ensure that projects adhere to the agreed objectives and timelines. Beneficiaries must provide regular progress reports, and managing authorities conduct audits and on-site visits to verify compliance and progress. Examples of ERDF-funded projects in Portugal include the expansion of the metro system in Lisbon and Porto to enhance urban mobility, development of innovation hubs and technology parks to support startups and research initiatives, and renewable energy projects such as wind and solar power installations (European Commission, 2021).

The Cohesion Fund has supported projects such as upgrades to the national rail network to improve connectivity between major cities and regions, construction of wastewater treatment plants, and development of port infrastructure to enhance maritime transport and trade (European Commission, 2021). These projects illustrate the impact of EU funding on regional development and infrastructure improvement.

The primary aim of these grants is to foster economic growth, reduce regional disparities, and promote sustainable development. However, the allocation and distribution of these funds can also be influenced by political considerations. Local and national politicians may be incentivized to secure more funding for their constituencies to enhance their political standing and improve their re-election prospects. This phenomenon, known as "political rent-seeking," occurs when politicians lobby for grants to signal competence and responsiveness to their constituents, particularly during election periods (Veiga & Veiga, 2007).

In terms of distribution, EU funds are typically allocated to the national government, which then distributes them to regional and local authorities based on the priorities outlined in the Operational Programmes and the Partnership Agreement. The national government plays a crucial role in

coordinating the allocation of these funds, ensuring that they align with both EU objectives and national development strategies. However, some project-based grants are directly allocated to municipalities or other local entities based on their specific proposals and needs (European Commission, 2021).

The process of applying for and managing these grants can be complex and bureaucratic, posing challenges for smaller municipalities and organizations with limited administrative capacity (Lorvi, 2013; Mukhtar-Landgren & Fred, 2018). Ensuring that allocated funds are used effectively to achieve the intended outcomes requires robust monitoring and evaluation mechanisms. Despite these challenges, the strategic use of ERDF and Cohesion Fund grants presents significant opportunities for regional development, reducing disparities, and promoting sustainable growth in Portugal (Veiga & Veiga, 2007).

5 Theoretical framework

The theoretical framework for this thesis is grounded in the principal-agent theory and the concept of political accountability. In a representative democracy, voters act as principals who delegate the responsibility of securing and managing public funds to mayors, who serve as their agents. According to Swank (2023), this delegation of power raises moral hazard problems, as politicians might sometimes abuse their power to serve themselves, their relatives, and friends. Elections play a dual role in addressing these issues: they serve as mechanisms for both selecting honest politicians and disciplining them to act in the public interest. The principal-agent problem highlights potential misaligned incentives and information asymmetry. Mayors might prioritize securing grants to enhance their re-election prospects rather than focusing on the optimal use of these funds for local development (Ross, 1973). This misalignment can lead to opportunistic behaviour, where mayors time the use of grants to coincide with elections to maximize voter support (Besley & Case, 1995).

The political business cycle theory suggests that incumbents may manipulate fiscal policy to influence electoral outcomes. Incumbents might strategically time public spending, including the utilization of EU grants, to coincide with election periods to maximize voter support (Rogoff & Sibert, 1988; Veiga & Veiga, 2013). This opportunistic behaviour is driven by the desire to create favourable economic conditions or perceptions thereof, which can sway voter preferences (Sakurai & Menezes-Filho, 2011). Research shows that intergovernmental grants tend to increase during election years, reflecting the strategic manipulation of grants to benefit incumbents' re-election prospects (John & Ward, 2001; Samuels, 2002; Spáč, 2021). Studies highlight that grant announcements during campaigns are influenced by political considerations (Anagnoson, 1982). It is hypothesized that municipalities consistently receiving EU funds in the pre-election period are more likely to re-elect their incumbent mayors due to the positive impact of these grants on local development and public services. Literature suggests that targeted government spending can enhance incumbents' electoral prospects by improving local infrastructure and services, increasing voter satisfaction (Veiga & Veiga, 2007a; Sakurai & Menezes-Filho, 2011; Papp, 2019). Opportunistic behaviour theory implies that incumbents might strategically time grant use to influence voter perceptions just before elections (Solé-Ollé & Sorribas-Navarro, 2008; Sakurai & Menezes-Filho, 2011).

Economic voting theory indicates that voters reward incumbents for positive economic performance and punish them for negative economic outcomes (Lewis-Beck & Paldam, 2000). This theory suggests that the effective use of EU grants to improve local economic conditions, such as reducing unemployment or enhancing infrastructure, could enhance the re-election prospects of mayors. Conversely, if the benefits of these grants are not perceived by the electorate, incumbents may not receive electoral rewards. Studies have shown that higher wages and lower unemployment rates are associated with better economic performance, which can increase the re-election probability of incumbents by creating a positive perception of their governance (Sakurai & Menezes-Filho, 2011;

Spáč, 2021; Veiga & Veiga, 2007). The theory of economic voting indicates that voters reward incumbents in good times and punish them in bad times (Lewis-Beck & Paldam, 2000; Posner & Simon, 2002). Economic performance, as reflected in wages and unemployment rates, directly impacts voter satisfaction and, eventually, electoral outcomes (Papp, 2019; Spáč, 2021; Veiga & Veiga, 2007). However, local economic conditions are also part of the conditions to receive EU funding, so with better economic conditions, the effects of grants could be less strong or less grants flow to these regions.

The allocation of EU grants can be understood within the framework of fiscal federalism, which examines the financial relationships between different levels of government (Oates, 1999). Intergovernmental transfers, such as EU grants, are intended to address regional disparities and support local development projects. The strategic distribution of these grants can be influenced by political factors, including the alignment of local and national governments (Solé-Ollé & Sorribas-Navarro, 2008). Research has found that political alignment between local and national governments affects the flow of resources and support, increasing the re-election prospects of aligned incumbents (Muraközy & Telegdy, 2016; Papp, 2019; Veiga, 2012).

Existing literature provides mixed findings on the impact of EU grants on electoral outcomes. Banaszewska and Bischoff (2021) discovered that in Poland, EU funds did not universally increase re-election chances, emphasizing the moderating role of local factors such as human capital endowment and Euroscepticism. Besides, one of their conclusions was that municipalities with already very poor conditions, EU grants might not lead to significant improvements, failing to enhance political support. Glaurdić and Vuković (2015) provided a unique perspective from Croatia, showing that while politically motivated EU grant allocation was common, its effectiveness in securing local re-election was limited. They suggested that inefficiency in vote-buying operations and specific local contexts could reduce the electoral benefits of EU grants. While some studies suggest that securing substantial EU funding can improve re-election prospects for incumbents by demonstrating effective governance and resource acquisition (Banaszewska & Bischoff, 2021; Papp, 2019), others indicate that the timing and visibility of funded projects are critical factors (Bracco et al., 2014; Spáč, 2021; Veiga & Veiga, 2007). Research by Balaguer-Coll et al. (2015) in Spain found that the capital expenditure over the whole term positively affects the re-election probability, while pre-electoral expenditures have an even stronger effect on the chances of re-election.

Despite the potential benefits, there are also negative effects associated with EU grants that could impact electoral outcomes. EU grants often require co-financing from local governments, which can strain municipal budgets and force local governments to reallocate funds from other important areas or raise local taxes. This additional financial burden can lead to voter dissatisfaction, particularly if the co-financed projects do not yield immediate visible benefits (Bachtler & Ferry, 2013). The inflow of large amounts of EU funds can increase opportunities for corruption and mismanagement. If voters perceive that EU grants are being misused or that projects funded by these grants are not completed efficiently, this can lead to a loss of trust in incumbents and negatively impact their re-election prospects (Charron,

2016). Mukhtar-Landgren and Fred (2018) explore the complexities of EU funding in Swedish municipalities, emphasizing the administrative challenges and political implications of managing these funds. This especially holds for smaller municipalities, Lorvi (2013) finds that smaller municipalities in Estonia have not been able to use the EU Structural Fund support as effectively as large municipalities because their administrative capacity has been weaker, and their co-financing possibilities have not been sufficient. Also, when Euroscepticism is high or approaching, EU funds could be perceived negatively. Crescenzi et al. (2019) found that EU funds do not influence citizens' support for the EU unless they are coupled with tangible improvements in local labour market conditions. Papp (2019) also found EU funds can have a negative impact on re-election probability if they do not result in tangible improvements for local communities. Fazekas et al. (2013) find that despite regulations, the use of EU funds poses greater corruption risks compared to national funds. This is particularly true for large projects, where corruption often operates through high-level contractual relationships, benefiting political and business elites. This inefficiency in the use of funds decreases public trust and voter confidence in the efficacy of EU grants, ultimately affecting voter perceptions and potentially influencing electoral outcomes.

In addition to the primary focus on EU grants, various control variables have been identified in the literature as influencing the re-election probabilities of incumbents. Research shows that political experience can enhance re-election chances as experienced mayors navigate the political landscape more effectively and maintain voter support (Papp, 2019; Sakurai & Menezes-Filho, 2011). However, long incumbency could lead to voter fatigue or stricter inspection of the competences of the incumbent, potentially decreasing re-election chances (Freille & Iturralde, 2021; Kalman, 2021). The alignment between local and national governments can facilitate the flow of resources and support, increasing the re-election prospects of the incumbent mayor (Sakurai & Menezes-Filho, 2011; Papp, 2019). This is particularly relevant in contexts where central governments have significant control over the allocation of resources to local governments (Solé-Ollé & Sorribas-Navarro, 2008). On the other hand, voters might not be willing to concentrate power in one or more governing parties across various political levels (Alesina & Rosenthal, 1996; Spáč, 2021; Veiga & Veiga, 2013). Also, if voters are unhappy with the governance of the legislative party, the party similarity could have a negative effect on re-election.

Higher vote shares are indicative of a stronger political support base, which can positively influence re-election chances (Papp, 2019; Veiga & Veiga, 2007; Veiga et al., 2024). The vote share of the governing party reflects the broader political landscape and the strength of political alliances, while the vote share of the mayor's party specifically indicates the mayor's support base (Solé-Ollé & Sorribas-Navarro, 2008). High volatility can indicate political instability, potentially decreasing the re-election prospects of incumbents (Papp, 2019). In regions with high electoral volatility, incumbents might find it challenging to maintain consistent voter support due to shifting political dynamics and voter preferences (Freille & Iturralde, 2021). On the other hand, high electoral volatility could proxy for the amount of swing voters (Veiga et al., 2024), who could be more sensitive to positive policy changes and thus respond more positively to an incumbent securing more grants.

The Portuguese context offers a unique setting to explore these theoretical perspectives. Portugal is a major beneficiary of EU Cohesion Policy funds, which aim to reduce regional disparities and support local development. The direct election of mayors and municipal assembly members in Portugal allows voters to hold mayors accountable for their performance, including their success in securing and utilizing EU grants (Freire, 2010). Research shows that term-limited mayors receive significantly less EU funding, indicating the importance of electoral incentives in driving efforts to secure external funding (Veiga et al., 2024). Veiga and Veiga (2007) have shown that in Portugal, when investment expenditures are increased and spending is more focused on highly visible items, vote shares for incumbent mayors are higher in subsequent elections. Furthermore, empirical results reveal that political motivations also influence the distribution of funds by the national government across municipalities in Portugal (Veiga, 2012). By incorporating these theoretical perspectives, this thesis aims to provide a comprehensive understanding of how EU grants impact electoral outcomes in Portuguese municipalities.

6 Data

6.1 Data source

This study utilizes a comprehensive dataset covering 278 mainland municipalities in Portugal from 1998 to 2022. The data includes information on municipalities, demographic and socioeconomic characteristics, and electoral outcomes. The data is collected from the following sources. The Directorate General for Local Authorities (DGAL) provides detailed financial information, including revenues from EU grants and other sources. The Ministry of Internal Affairs (MAI) supplies electoral data, including vote shares for mayors and other political variables. The Portuguese Institute of Statistics (INE) offers demographic and socioeconomic data and the Institute for Employment and Professional Training (IEFP) provides data on unemployment. The dataset used for this research is structured by Veiga, Veiga and Swank (2024).

6.2 Data structure

6.2.1 Dependent variable

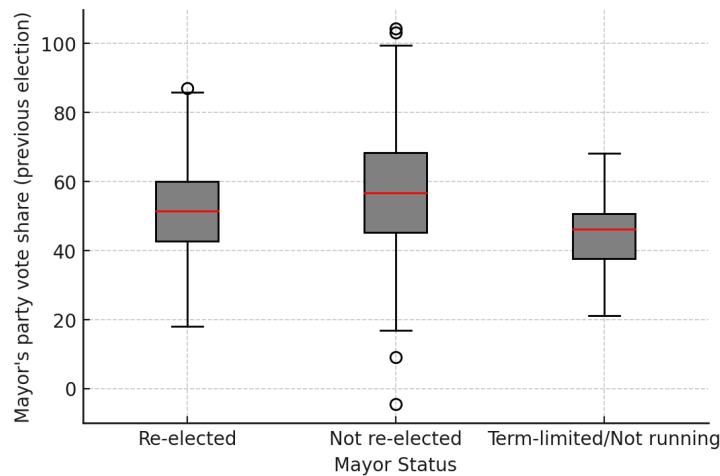
The dependent variable in this study is the binary variable *Re-election*, indicating whether the incumbent mayor was re-elected in the year following an election year. To construct this variable, the binary variable that marks election years as 1 and non-election years as 0 is used. The dataset also includes the names of the incumbent mayors, allowing to track continuity or change in mayoral leadership. If the names matched comparing the election year and the previous election, the *Re-election variable* was set to 1, indicating re-election. Otherwise, it was set to 0. This variable was set to missing for non-election years to ensure accuracy.

Approaching elections, there are multiple positions that an incumbent mayor may be in: "*running for re-election and re-elected*", "*running for re-election but not re-elected*" and "*not eligible for re-election*".

1. Incumbent mayor is eligible for re-election, thus not term-limited and decides to run, and gets re-elected.
2. Incumbent mayor is eligible for re-election and does not get re-elected, thus gets replaced by electorate.
3. Incumbent mayor is not eligible for re-election, thus term-limited or decides not to run. Incumbent mayor gets replaced by someone from their party or a different party.

Figure 1

Boxplots of vote share of mayor's party by mayor status.



Note: Boxplots indicating three positions an incumbent mayor can be in against vote shares. From left to right: running for re-election and re-elected, running for re-election, not re-elected, not eligible for re-election. Source: own elaboration based on the dataset.

Following Banaszewska & Bischoff (2021) rationale, it is important to note that the observational unit is the incumbent mayor who runs for re-election. From the dataset, it is impossible to determine if a mayor who is not eligible for re-election and gets replaced, is from the incumbent mayor's party or a different party. When an incumbent mayor runs for re-election and loses, it indicates their party has lost. However, if the incumbent mayor does not run for re-election, it is unclear whether the incumbent mayor's party or the opposition has won. This means dropping all observations where the incumbent mayor decides not to run for re-election. Given that almost 78 percent of all mayors run for office again, the largest part of local elections in Portugal is still covered.²

6.2.2 Independent variable

The primary independent variable *consistent EU grants*³ captures the consistency of EU grant receipt over the final two years of a mayor's term, namely the pre-election period. This variable is binary, indicating 1 if significant EU grants were received consistently in both years and 0 if not. It measures a mayor's sustained ability to secure funding during the pre-election period. The value is based on the 10th percentile threshold of the logarithm of EU grants real per capita, distinguishing municipalities receiving

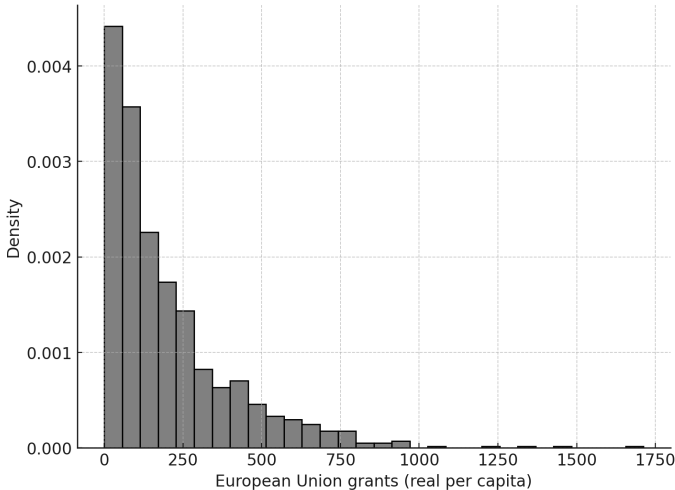
² Out of the total observations, in 5,060 observations mayors were eligible for re-election, while 1,890 were not. In election years, 1,278 observations were eligible, and 390 were not.

³ Initially, this variable represents whether a municipality received any EU grants consistently over the pre-election period. When only distinguishing between zero grants received and more than zero, a relatively small number of datapoints is found (7.28% or 93 observations). So, it is decided to use a threshold of the 10th percentile. The variable represents whether a municipality received very little to no EU grants, or substantial grants. Has a higher proportion of zeroes (13.69% or 175 observations).

minimal to no grants from those receiving substantial amounts. This binary variable is computed as follows.

In the dataset, revenues from EU grants used are measured in euros per capita at constant prices of 2021. Since DGAL uses the cash basis accounting method, revenues from EU grants are registered in the year cash is received (Veiga et al., 2024). This could mean that obtained grants in the first period of the term, are mostly due to the effort of the previous mayor. To take into account the lags and since elections are held at the end of a calendar year, the pre-election period is defined as the year preceding the local election and the election year. Important to note is that in this research, there is no data on the expenditures of EU grants, which is an important limitation. It is not possible to see if and on what the obtained EU grants are spent and if this is visible to the voter. The variable *EU grants* represents the real per capita EU grants, with its logarithmic transformation *EU grants (logarithm)*. Initially, there were 325 data points with zero EU grants obtained. After correcting negative values to 0, the count increased to 327. This adjustment was crucial to avoid invalid logarithmic transformations, as the logarithm of a negative number is undefined. The relatively small negative values were likely due to accounting errors or discrepancies in financial reporting, which required correction for meaningful analysis.

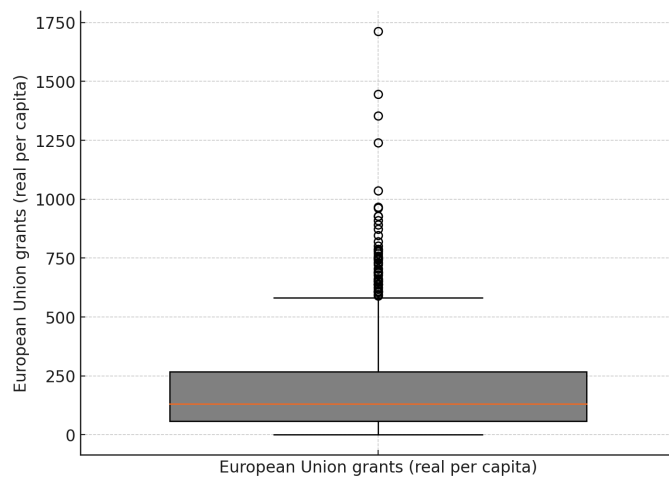
Figure 2
Histogram of distribution of EU grants (real per capita)



Note: Histogram indicating the distribution of EU grants (real per capita) in 278 municipalities in Portugal, from 1998-2021. Source: own elaboration based on the dataset.

Figure 3

Box plot of distribution of EU grants (real per capita)



Note: Boxplot indicating the distribution of EU grants (real per capita) in 278 municipalities in Portugal, from 1998-2021. Source: own elaboration based on the dataset.

Figure 2 and Figure 3 reveal a highly skewed distribution of EU grants, with many municipalities receiving little to no grants and a few receiving exceptionally high amounts. The summary statistics showed that while the mean EU grants per capita is 94.291 units, the distribution has a high standard deviation of 110.34 units. The skewness and kurtosis values indicate a sharp peak and heavy tails, with outliers skewing the distribution. The histogram in Figure 1 and boxplot in Figure 2 confirm these findings, showing a high concentration of municipalities with low EU grants and a long tail of higher values. The interquartile range (IQR) is relatively narrow, with outliers extending well beyond the upper whisker, indicating significant disparity in grant allocation.

Governments and municipalities are bound to differing availabilities of EU grants. When looking at the dataset, it should be noted that sometimes amounts of EU grants could be lower or higher due to (limited) availability. In general, this would then not depend on the mayor's effort or competence, but due to external cause. Banaszewska & Bischoff (2021) concluded that the availability of EU grants does not influence mayors' vote share but is an essential condition for the mayor to be able to obtain and spend EU grants in their municipality. To take the differing availability of EU grants into account, the continuous variable is transformed into a binary: *received EU grants*. Following the literature in section 3, research indicates that intergovernmental grants not only tend to increase during election years (John & Ward, 2001; Veiga & Veiga, 2013; Samuels, 2002; Spáč, 2021), but voters also respond better to transfers near elections (Veiga & Veiga, 2013; Samuels, 2002).

6.2.3 Control variables

To ensure the validity of the results and to isolate the effect of EU grants on the re-election probabilities of mayors, several control variables are included in the analysis. These control variables account for

potential confounding factors that could influence electoral outcomes and can be categorized into political, socioeconomic and demographic control variables.

The political control variables are as follows. *Experienced mayor* is a binary variable indicating whether a mayor has served one or more terms prior to the current term. Research shows that political experience can enhance re-election chances, as experienced mayors navigate the political landscape more effectively and maintain voter support (Papp, 2019; Sakurai & Menezes-Filho, 2011). However, long incumbency could lead to voter fatigue or stricter inspection of the competences of the incumbent, potentially decreasing re-election chances (Freille & Iturralde, 2021; Kalman, 2021). *Party similarity* measures the similarity between the party of the mayor and the ruling national government. The alignment between local and national governments can facilitate the flow of resources and support, increasing the re-election prospects of the incumbent mayor (Sakurai & Menezes-Filho, 2011; Papp, 2019). *Vote share of the prime minister's party* and *vote share of mayor's party* capture the vote shares obtained by the governing party and the mayor's party in the previous election. Higher vote shares are indicative of a stronger political support base, which can positively influence re-election chances (Veiga & Veiga, 2007; Papp, 2019; Veiga et al., 2024). The vote share of the governing party reflects the broader political landscape and the strength of political alliances, while the vote share of the mayor's party specifically indicates the mayor's support base (Solé-Ollé & Sorribas-Navarro, 2008). It is expected that a high vote share of the mayor's party in the previous election indicates a higher support base of the mayor and thus have a positive sign (Veiga & Veiga, 2007; Papp, 2019; Veiga et al., 2024). *Electoral volatility* measures the electoral volatility in the municipality, capturing changes in voter preferences between elections. High volatility can indicate political instability, potentially decreasing the re-election prospects of incumbents (Papp, 2019). In regions with high electoral volatility, incumbents might find it challenging to maintain consistent voter support due to shifting political dynamics and voter preferences (Freille & Iturralde, 2021). On the other hand, high electoral volatility could proxy for amount of swing voters (Veiga et al, 2024), that could be more sensitive to positive policy changes and thus respond more positively to an incumbent securing more grants. Following Veiga et al. (2024), it is expected that little electoral volatility and high vote share, increase the mayors' re-election chances, without raising the effort.

Furthermore, the socioeconomic control variables consist of the following variables. The lagged values of *wage* and *unemployment rates* are economic indicators that control for the local economic conditions. Higher wages and lower unemployment rates are typically associated with better economic performance, which can increase the re-election probability of incumbents by creating a favourable perception of their governance (Sakurai & Menezes-Filho, 2011). On the other hand, local economic conditions are part of the conditions to receive EU funding, so with better economic conditions, the effects of grants could be less strong. The lagged values are used to address the issue of reverse causality. *Effective Revenues* is a control variable representing the financial health of the municipality, measured as the lagged value of the logarithm of effective revenues per capita. The financial capacity of a

municipality is crucial for its ability to provide services and infrastructure, which in turn affects voter satisfaction and electoral outcomes. However, there are potential endogeneity concerns, as higher revenues could both result from and lead to higher grant allocations and re-election probabilities (Veiga & Veiga, 2007). Lagging the variable helps mitigate these concerns by addressing the issue of reverse causality (Sakurai & Menezes-Filho, 2011). Besides, the variable for effective revenues is transformed into a logarithm to reduce skewness.

Lastly, demographic control variables are taken into account. The percentage of the population aged 65 and above, *Senior citizens*, controls for demographic influences on voting behaviour. In many contexts, older voters tend to have higher voter turnout rates and might prioritize stability and continuity, potentially influencing re-election outcomes (Solé-Ollé & Sorribas-Navarro, 2008). It is thus expected that the proportion of senior citizens has a positive effect on re-election probability. The *logarithm of municipal population* controls for the effect of municipality size on re-election prospects. Larger municipalities might have more complex political dynamics and different voter behaviour compared to smaller ones (Papp, 2019). The logarithmic transformation helps address skewness in the population distribution and provides a more normalized measure for analysis (Sakurai & Menezes-Filho, 2011). Spáč (2021) researched that in smaller municipalities, voters might be more aware of the use of EU grants, which could impact their voting behaviour (Solé-Ollé & Sorribas-Navarro, 2008). He found that this enhances the incumbent's ability to claim credit for grants received, which positively affect re-election prospects. Additionally, in the analysis, there will be controlled for the linear time trend.

6.3 Sample selection

The dataset consists of data on mayoral elections from 1998-2022, consisting of six election years: 2001, 2005, 2009, 2013, 2017 and 2021. In the original dataset, there are 6,950 observations and 337 variables. After dropping all variables where a mayor is ineligible for re-election, there are 5,060 observations left. There are 278 municipalities in the dataset, thus there are 1,278 observations on mayoral elections in each of the municipalities.

6.4 Descriptive statistics

The variables used in this research are summarised in Table 2. Their observation count, mean, standard deviation, minimum and maximum values are included. The observations for re-election and consistent EU grants are lower, due to the variables only taking a value in an election year, so there are 1,278 observations where it is an election year. Effective revenues also have lower observations due to the lagged transformation of the variable. It should be noted that no observation for effective revenues is missing in election years. The average wage across municipalities differs greatly, from around 581 to 2392 euros. The same holds for the unemployment rate. Also, the mean close to 1 for re-election and consistent EU grants indicates a relatively high number of observations where respectively re-election occurs, and consistent EU grants are obtained. The percentage of senior citizens shows that there are

great differences between municipalities with relatively low and some with high senior population. However, no conclusions can be drawn based on the descriptive statistics, thus the statistical analyses in the next sections will test whether significant results can be found between re-election probability and consistent EU grants.

Table 1

Descriptive statistics

| Variable | Observations | Mean | Std. Dev. | Min | Max |
|---|--------------|---------|-----------|----------|-----------|
| Dependent Variable | | | | | |
| Re-election | 1,278 | 0.866 | 0.3406 | 0 | 1 |
| Independent Variable | | | | | |
| Consistent EU grants obtained | 1,278 | 0.863 | 0.3439 | 0 | 1 |
| Political Controls | | | | | |
| Experienced mayor | 5,060 | 0.350 | 0.4771 | 0 | 1 |
| Party similarity with the national government | 5,060 | 0.437 | 0.4961 | 0 | 1 |
| Prime minister's party vote share (previous election) | 5,060 | 42.214 | 10.7879 | 12.7347 | 81.7560 |
| Mayor's party vote share (previous election) | 5,060 | 51.627 | 8.7435 | 26.8342 | 83.1164 |
| Electoral volatility in previous legislative elections | 5,060 | 0.959 | 0.2843 | 0.1237 | 3.1228 |
| Economic Controls | | | | | |
| Effective revenues real per capita (logarithm) (lag) | 4,782 | 6.861 | 0.4510473 | 5.331674 | 8.398359 |
| Average real wage (lag) | 5,060 | 904.940 | 176.1834 | 581.3574 | 2391.9190 |
| Unemployment rate (lag) | 5,060 | 6.419 | 2.6278 | 1.4395 | 23.4150 |
| Demographic Controls | | | | | |
| Percentage of the population at least 65 years old (lagged) | 5,060 | 22.591 | 6.3435 | 7.9884 | 48.5764 |
| Total population (logarithm) | 5,060 | 9.794 | 1.1111 | 7.4776 | 13.2637 |
| Other | | | | | |
| EU grant dependency (high/low/medium) | 5,060 | 1.995 | 0.8166 | 1 | 3 |

| Variable | Observations | Mean | Std. Dev. | Min | Max |
|--|--------------|-------|-----------|-----|---------|
| EU grants (percentage of effective revenues) | 5,060 | 8.258 | 7.0119 | 0 | 64.4722 |

Note: The table includes all relevant variables, including the dependent variable, independent variable, political controls, economic controls and demographic controls used in the analysis. All variables are described with their means, standard deviations, minimum, and maximum values.

7 Methodology

The aim of this paper is to test whether EU funds have a positive impact on the incumbent mayors' re-election prospects. Specifically, the focus is on consistently obtained EU grants in the pre-election period. voters reward incumbent mayors for the perceived benefits of obtaining EU grants, with re-election. The hypotheses are as follows.

Main Hypothesis: EU funds consistently obtained in the pre-election period increase the re-election probability for the incumbent mayor.

Sub Hypothesis: The positive impact of consistently obtained EU funds is stronger in municipalities highly dependent on EU grants.

The aim of this research is to test whether the receipt of consistent EU grants in the pre-election period increases the re-election probability for the incumbent mayor. Before continuing with the analysis, it is important to consider the perfect experiment

7.1 Perfect experiment

To investigate the causal relationship between the ability to apply for EU grants and the re-election probabilities of mayors in Portuguese municipalities, an ideal experimental design would involve a Randomized Controlled Trial (RCT). Randomized experiments are considered the gold standard for establishing causality because they eliminate bias by ensuring that the treatment and control groups are comparable in all respects except for the treatment itself. Municipalities would be randomly assigned to two groups: one group that can apply for EU grants but does not necessarily have to, and a control group that can and may not apply for EU grants. This randomization ensures that the only systematic difference between the two groups is their eligibility to apply for grants. This would help isolate the effect of grant eligibility on re-election probabilities. However, even if such a randomization were possible, it still would not eliminate all potential biases. The motivation to apply for grants could differ significantly between municipalities, introducing variability in effort and perceived competence. These unobserved factors, such as mayoral ambition or municipal capacity, could confound the results. Additionally, public awareness and local political dynamics could influence voter perceptions, complicating the establishment of a clear causal relationship. Therefore, while a randomized experiment would improve the validity of the findings, it cannot fully eliminate all sources of bias, highlighting the inherent challenges in causal inference in this context. Nonetheless, considering this ideal helps highlight the limitations of observational studies and underscores the importance of using robust statistical methods to approximate causal inferences as closely as possible.

The initial research plan aimed to investigate whether voters reward, or punish, incumbent mayors for obtaining more, or less, EU grants, through examining their vote share. Punishment could mean not getting re-elected, but it could also mean receiving substantially less votes than before, indicating dissatisfaction. However, due to the limited dataset, which lacks comprehensive information on vote shares for all candidates and parties, this approach proved unfeasible.

Since the dataset only includes the vote share of the winning mayor's party from the previous election, it is impossible to compare the vote shares of other parties or candidates. This limitation restricts understanding of the election's competitiveness and the extent of voter support for different political options. Furthermore, when an incumbent mayor runs for re-election and loses, the dataset does not provide any information on the losing party, including whether the loss was by a narrow or wide margin, which could be used in understanding voter dissatisfaction and the strength of the opposition. However, it is the victory that counts, winners receive the same mayoral power, whether they win with a narrow or wide margin (Spáč, 2020)

7.2 Analytical approach

The objective of this research is to assess the impact of EU grants on the re-election probabilities of mayors in Portuguese municipalities. This involves first using Ordinary Least Squares (OLS) regression to understand the relationships between the variables, followed by logistic regression to model the binary outcome of mayoral re-election. The dependent binary variable is whether the mayor was re-elected, and the main independent binary variable is the consistent receipt of EU grants. The control variables included mayor's experience, logarithm lagged effective revenues real per capita, party similarity with the government, prime minister's and mayor's party vote shares in the previous election, electoral volatility, lagged wages and unemployment rate, percentage of population over 65, logarithm of population size and time is controlled for. The control variables are chosen based on literature.

Each regression is performed on the same dependent and independent variable. First, without controls and later adding the control variables. Additionally, to test for robustness, a sub-group logistic regression analysis and an interaction term logistic regression analysis is performed. Lastly, a logistic regression analysis is performed with a smaller sample.

7.2.1 Ordinary Least Squares (OLS) regression

The first step is to run an OLS regression to understand the linear relationships between the independent variables and the dependent variable. The OLS regression model is specified as follows:

$$Re - election = \beta_0 + \beta_1 Consistent\ EU\ grants + \sum \beta_k Control\ Variables + \epsilon$$

In the model, β_0 is the intercept, β_1 represents the coefficient for consistent EU grants, β_k are the coefficients for the control variables, ϵ is the error term.

7.2.2 Baseline logistic regression

Following the OLS regression, the primary model evaluates the impact of consistent EU grants on mayoral re-election using logistic regression. This model is appropriate for the binary nature of the dependent variable. The dependent variable is whether the mayor was re-elected, and the main independent variable is the consistent receipt of EU grants. The control variables included mayor's experience, logarithm lagged effective revenues real per capita, party similarity with the government, prime minister's and mayor's party vote shares in the previous election, electoral volatility, lagged wages and unemployment rate, percentage of population over 65 and logarithm of population size. The standard errors are clustered by municipality.

$$\text{logit}(P(\text{Re-election}) = 1) = \beta_0 + \beta_1 \text{Consistent EU grants} + \sum \beta_k \text{Control Variables} + \epsilon$$

In the model, β_0 is the intercept, β_1 represents the coefficient for consistent EU grants, β_k are the coefficients for the control variables and ϵ is the error term.

7.2.3 Separate analyses by dependency group

Separate logistic regression analyses are performed for municipalities categorized into low, medium, and high dependency on EU grants. This stratified approach provides a more detailed understanding of how dependency on EU grants influences re-election outcomes. By analysing these subgroups separately, the varying effects of EU grants based on the level of dependency are accounted for, which might be overlooked in the overall sample. The logistic regression models for each dependency group are specified as follows.

For the low dependency group, the model evaluates the probability of re-election ($P(\text{Re-election}_{low} = 1)$):

$$\begin{aligned} \text{logit}(P(\text{Re-election}_{low}) = 1) \\ = \beta_{0,low} + \beta_{1,low} \text{Consistent EU grants} + \sum \beta_{k,low} \text{Control Variables} + \epsilon_{low} \end{aligned}$$

For the medium dependency group, the model evaluates the probability of re-election ($P(\text{Re-election}_{medium} = 1)$):

$$\begin{aligned}
\text{logit}(P(\text{Re} - \text{election}_{\text{medium}}) = 1) \\
&= \beta_{0,\text{medium}} + \beta_{1,\text{medium}} \text{Consistent EU grants} \\
&+ \sum \beta_{k,\text{medium}} \text{Control Variables} + \epsilon_{\text{medium}}
\end{aligned}$$

For the high dependency group, the model evaluates the probability of re-election ($P(\text{Re} - \text{election}_{\text{high}} = 1)$):

$$\begin{aligned}
\text{logit}(P(\text{Re} - \text{election}_{\text{high}}) = 1) \\
&= \beta_{0,\text{high}} + \beta_{1,\text{high}} \text{Consistent EU grants} + \sum \beta_{k,\text{high}} \text{Control Variables} + \epsilon_{\text{high}}
\end{aligned}$$

For each dependency group, the outcome ($P(\text{Re} - \text{election}_{\text{group}} = 1)$) is the probability of re-election for the specific dependency group. The coefficient $\beta_{0,\text{group}}$ is the intercept, $\beta_{1,\text{group}}$ represents the coefficient for consistent EU grants, $\beta_{k,\text{group}}$ are the coefficients for the control variables and ϵ_{group} is the error term.

7.2.4 Interaction term analysis

To examine how the impact of consistent EU grants varies across municipalities with different levels of dependency, interaction terms between dependency groups and consistent EU grants are included in the logistic regression model. The interaction term allows to examine how the effect of consistent EU grants varies across municipalities with different levels of dependency on these funds. This approach helps to capture the heterogeneity in the impact of EU grants on re-election outcomes (Papp, 2019). The interaction model is specified as follows:

$$\begin{aligned}
\text{logit}(P(\text{Re} - \text{election}) = 1) \\
&= \beta_0 + \beta_1 \text{consistent_eu_grants} + \beta_2 \text{dependency_group} \\
&+ \beta_3 (\text{dependency_group}) * (\text{consistent_eu_grants}) + \sum \beta_k \text{Control Variables} \\
&+ \epsilon
\end{aligned}$$

In the model with the interaction term analysis, β_0 is the intercept, β_1 represents the coefficient for consistent EU grants, β_2 represents the coefficient for the dependency group, β_3 represents the coefficient for the interaction term between the dependency group and consistent EU grants, β_k are the coefficients for the control variables and ϵ is the error term.

This methodology aims to provide robust insights into the relationship between EU grants and mayoral re-election, accounting for various influencing factors. By leveraging both OLS and logistic

regression, along with sub-group analysis and interaction terms, this multifaceted approach ensures a thorough analysis of the factors influencing electoral outcomes in the context of EU funding, enhancing the robustness and credibility of the findings.

8 Results

This section presents the results of the different regressions. First, an OLS regression is performed. Then, a logistic regression: first only the dependent and the independent variable, then including control variables. To check for robustness of the initial results, a sub-group analysis and interaction term analysis on the logistic regression is performed.

8.1 Ordinary Least Squares (OLS) regression

To explore the impact of consistent EU grants on the re-election probabilities of mayors, an Ordinary Least Squares (OLS) regression was performed with standard errors clustered by municipality. The regression results, based on 1,276 observations, indicate a statistically significant relationship between several key variables and the probability of mayoral re-election. The model's R-squared value of 0.0746 suggests that approximately 7.46% of the variance in re-election probabilities can be explained by the included predictors. The independent variable *consistent EU grants*, shows a negative and statistically significant coefficient (-0.077). This indicates that municipalities receiving consistent EU grants are less likely to re-elect their mayors. Specifically, the probability of re-election decreases by approximately 7.7 percentage points for these municipalities. The experience of the mayor also has a significant negative impact on re-election probabilities. The coefficient for *experienced mayor* is -0.095, indicating that incumbent mayors with prior terms are about 9.5 percentage points less likely to be re-elected. Economic variables show mixed effects. The coefficient for *effective revenues* is positive but not statistically significant, indicating that past revenue levels do not strongly influence re-election outcomes. Unexpectedly, the wage variable, also lagged by one year, has a negative significant coefficient (-0.001, $p = 0.015$), suggesting that higher wages slightly decrease the probability of re-election. The unemployment rate, lagged by one year, is not significant, indicating no clear relationship with re-election probabilities.

Political variables reveal interesting insights. The *vote share of the governing party* has a negative and significant coefficient (-0.002), suggesting that higher vote shares for the national governing party slightly reduce the likelihood of mayoral re-election. This may reflect a preference for local independence from national politics or dissatisfaction. Also, the vote share of the mayor's party has a positive and highly significant coefficient, showing the role of previous electoral support in securing re-election.

Demographic factors also play a role. *The percentage of the population aged 65 and above* has a positive but not statistically significant coefficient, suggesting a potential but inconclusive effect of an aging population on re-election probabilities. *The logarithm of the population size* shows a positive and significant impact, indicating that mayors in larger municipalities have a higher probability of being re-elected.

Other variables, such as party similarity and electoral volatility, do not show statistically significant relationships with re-election probabilities. The constant term is also not significant, suggesting no inherent baseline probability of re-election after accounting for the included variables.

The expected signs for the coefficients were based on theoretical considerations and previous empirical findings. Contrary to expectations, the coefficient for consistent EU grants is negative and significant. This suggests that consistent EU grants are associated with a lower probability of re-election. The experience of the mayor, expected to have a positive impact, shows a negative and significant coefficient, indicating that experienced mayors are less likely to be re-elected.

Overall, the OLS regression results give an idea of the electoral dynamics in Portuguese municipalities. Consistent EU grants, mayoral experience, economic conditions, political affiliations, and demographic factors all seem to influence the likelihood of re-election for incumbent mayors. These initial findings from the OLS regression provide a foundation for further analysis using logistic regression, which is more suitable for modelling the binary nature of the dependent variable.

Table 2

OLS Regression Results: Effect of consistent EU grants on re-election.

| | Coefficient (standard error) |
|---------------------------------------|---------------------------------|
| Consistent EU grants | -0.077*** (0.023) |
| Experienced mayor | -0.095*** (0.023) |
| Party similarity | 0.057 (0.020) |
| Prime minister's party vote share | -0.002* (0.001) |
| Mayor's party vote share | 0.009*** (0.001) |
| Electoral volatility | 0.010 (0.033) |
| Effective revenues lagged (logarithm) | 0.042 (0.036) |
| Average real wage (lagged) | -0.001** (<0.001) |

| | Coefficient (standard error) |
|---|---------------------------------|
| Unemployment rate (lagged) | -0.003 (0.004) |
| Percentage of the population at least 65 years old (lagged) | 0.001 (0.002) |
| Total population (logarithm) | 0.053*** (0.016) |
| Time | 0.004** (0.002) |
| Intercept | -0.151 (0.356) |
| Observations | 1,276 |
| R-squared | 0.0746 |

Note: The table reports OLS regression coefficients for the impact of consistent EU grants on the re-election probabilities of mayors in Portuguese municipalities. Clustered standard errors at the municipal level in parenthesis. The dependent variable is a binary indicator of mayoral re-election (1 if re-elected, 0 otherwise). Significant coefficients are indicated at *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

8.2 Logistic regression

Given the binary nature of the dependent variable *Re-election*, a binary logistic regression is subsequently performed to provide a more appropriate analysis of the factors potentially impacting re-election probabilities. Logistic regression is suitable for binary outcomes as it estimates the odds of an event occurring, in this case, the re-election of mayors. The logistic regression model allows to assess the probability of re-election while controlling for various predictors and accounting for the non-linear relationship between the predictors and the outcome.

The primary variable of interest, *consistent EU grants*, has a negative and statistically significant coefficient across both the full and reduced models. Specifically, municipalities that received consistent EU grants have lower odds of re-election compared to those that did not receive such grants. This counterintuitive finding suggests that receiving minimal EU grants might not be sufficient to positively influence voter opinion or it might even be perceived negatively by the electorate. This result emphasises the complexity of the relationship between EU grant reception and electoral success. Further investigation into the underlying reasons for this negative association is necessary.

In addition to the primary variable, several other predictors were found to be significant in the full model. The variable for experienced mayors shows a negative and significant coefficient, indicating

that experienced mayors have lower odds of re-election. The vote share of the mayor's party in the previous election is a strong positive predictor of re-election, with higher previous vote shares significantly increasing the odds of being re-elected. Conversely, the vote share of the governing party shows a slight but significant negative association with re-election odds, suggesting that higher support for the national governing party might not translate into support for the local mayor, possibly due to local political dynamics or dissatisfaction with national policies. Economic variables also play a role in re-election outcomes. The coefficient for lagged wages is slightly negative and significant, indicating that higher wages per capita are associated with lower re-election odds. The population size of the municipality is another significant predictor, with larger municipalities showing higher odds of re-electing their mayors. While the variable for the effective revenues is positively associated with re-election odds, this result is not statistically significant, suggesting that the direct financial health of a municipality might not be as critical a factor as voter perceptions and political support. Similarly, the variable for electoral volatility does not show a significant effect, indicating that changes in voter preferences between elections might not have a straightforward impact on re-election probabilities. Since electoral volatility is calculated based on legislative elections, this could mean that high electoral volatility in legislative elections does not affect local elections in the same way.

Given these findings, the negative association between consistent EU grants and re-election odds is notable. Again, it suggests that further research is needed to understand how EU grants are perceived by voters. Both the OLS and logistic regression analyses highlight the significance of consistent EU grants, mayoral experience, previous vote shares, and economic conditions in influencing the re-election probabilities of mayors in Portuguese municipalities. While the OLS regression provides an initial exploration of these relationships, the binary logistic regression offers a more suitable and detailed examination of the factors affecting the likelihood of re-election, emphasizing the need for further research into the counterintuitive findings related to EU grants.

Table 3

Probability of re-election and consistent EU grants

| Coefficient/Odds ratio (standard error) | 1 | 2 | 3 |
|--|---------------------|----------------------|---------------------|
| Consistent EU grants | -0.734** (0.295) | -0.888*** (0.309) | 0.411*** (0.127) |
| Experienced mayor | | -0.863*** (0.202) | 0.441*** (0.089) |
| Party similarity | | 0.875 (0.178) | 1.070 (0.190) |

| Coefficient/Odds ratio (standard error) | 1 | 2 | 3 |
|--|--------|---------------------|---------------------|
| Prime minister's party vote share | | -0.018** (0.009) | 0.978** (0.009) |
| Mayor's party vote share | | 0.096*** (0.011) | 1.100*** (0.012) |
| Electoral volatility | | -0.056 (0.313) | 1.075 (0.342) |
| Effective revenues lagged (logarithm) | | 0.381 (0.357) | 1.502 (0.535) |
| Average real wage (lagged) | | -0.001** (0.001) | 0.999** (0.001) |
| Unemployment rate (lagged) | | -0.028 (0.029) | 0.985 (0.029) |
| Percentage of the population at least 65 years old (lagged) | | 0.019 (0.022) | 1.035 (0.020) |
| Population (logarithm) | | 0.464*** (0.156) | 1.640*** (0.270) |
| Time | | 0.030* (0.016) | 1.030* (0.017) |
| Intercept | | -7.474** (3.680) | <0.001** (0.002) |
| Observations | 1,276 | 1,276 | 1,276 |
| Pseudo R-squared | 0.0070 | 0.1016 | 0.1016 |

Note: Results from logistic binary regression for the panel comprising the 2001, 2005, 2009, 2013, 2017 and 2021 elections. Clustered standard errors at the municipal level in parentheses. *** p<0.01, ** p<0.05, *p<0.1. The successful outcome is re-election. *Column 1:* Model with consistent grants, not including controls. *Column 2:* Model with consistent grants, including controls. *Column 3:* Odds ratio of the model with consistent grants above threshold, including controls.

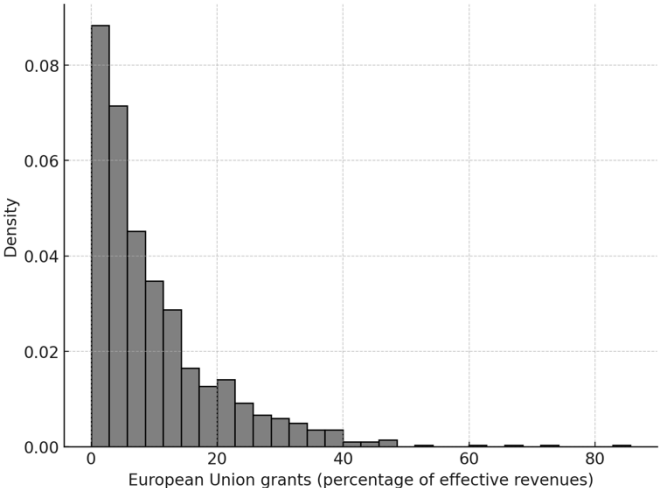
8.3 Analysis of EU Grant Dependency Groups

While the results displayed in Table 2 indicate a link between obtaining consistent EU grants and local re-election probability of mayors, a possibility is that the relationship between EU grants and local electoral outcomes is stronger where dependency on EU grants is higher. Di Cataldo and Renzullo (2024) write that awareness of e.g. EU Cohesion Policy is greater where EU investments are larger and

areas more that are more strongly targeted by redistributive policies tend to display stronger support for incumbent. Hence, the possibility that the relationship between EU funds and local voting is stronger in municipalities where EU grants are a bigger part of the effective revenues should be tested. This is done in two different ways to ensure robustness of the results: through sub-group analysis and interaction terms.

First, municipalities are categorized into three dependency groups based on the median percentage of effective revenues derived from EU grants. The dependency groups are defined using the 33rd and 66th percentiles of the median values to ensure a balanced distribution across the groups. This classification resulted in three categories: low dependency, medium dependency, and high dependency on EU grants.

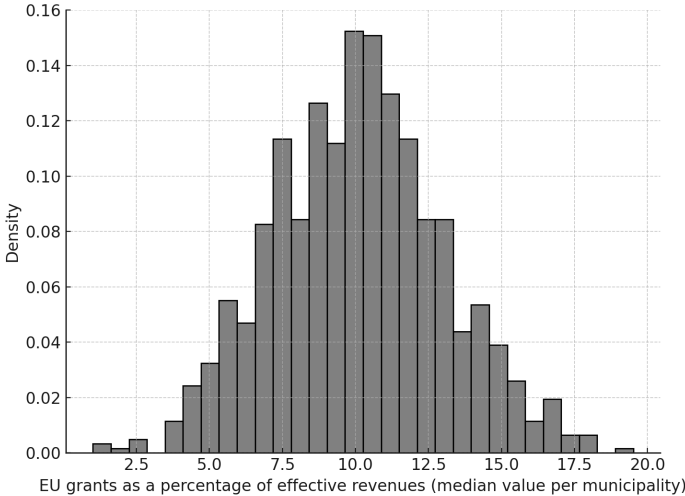
Figure 3
Histogram of European Union grants as a percentage of effective revenues



Note: Histogram indicating the distribution of EU grants as a percentage of effective revenues in 278 municipalities in Portugal, from 1998-2021. Source: own elaboration based on the dataset.

Figure 4

EU grants as a percentage of effective revenues (median value per municipality)



Note: Histogram indicating the distribution of EU grants as a percentage of effective revenues in 278 municipalities in Portugal, from 1998-2021. Source: own elaboration based on the dataset

The choice to use the median for determining the dependency groups was based on several factors. Figure 3 shows that the distribution of the EU grant dependency variable was highly skewed, with a long tail on the right side, indicating that a small number of municipalities had exceptionally high dependency on EU grants. In such skewed distributions, the median provides a better central tendency measure than the mean because it is less affected by extreme values. This makes the median a more robust and reliable measure for categorizing municipalities into dependency groups. By using the median, the groups reflect the typical dependency levels more accurately, avoiding the distortion that extreme values could introduce.

Table 4

EU Grant Dependency Groups

| EU Grant Dependency Groups | Observations | Percent | Cumulative |
|----------------------------|--------------|---------|------------|
| Low Dependency | 1,700 | 33.60 | 33.60 |
| Medium Dependency | 1,686 | 33.32 | 66.92 |
| High Dependency | 1,674 | 33.08 | 100.00 |
| Total | 5,060 | 100.00 | |

Note: Based on 33rd and 66th percentile of median value of percentage of EU grants of effective revenues (real per capita) per municipality. Total value including non-election years.

8.3.1 Sub-group analysis

Low EU grant dependency

For municipalities with low dependency on EU grants, the logistic regression results show that the coefficient for consistent EU grants is negative and statistically significant (-1.173). This indicates that in municipalities with low dependency on EU grants, receiving these grants is associated with a lower probability of re-election. Specifically, the odds ratio is 0.31, meaning that the likelihood of re-election is reduced by approximately 69% when consistent EU grants are received in these municipalities. The variable for experienced mayor also has a negative and significant coefficient (-1.011). The vote share of the mayor's party in the previous election is a strong positive predictor of re-election (0.081). Other variables, including economic indicators and demographic factors, do not show significant effects in this group.

Medium EU grant dependency

For municipalities with medium dependency on EU grants, the logistic regression results reveal that the coefficient for consistent EU grants is not significant, indicating that for this group, the grants do not have a negative significant impact on re-election probabilities. This suggests that voters in these municipalities do not perceive the receipt of EU grants as a crucial factor in their voting decisions. Experienced mayors had a negative and marginally significant coefficient (-0.691). The vote share of the mayor's party in the previous election remained a strong positive predictor, while the vote share of the governing party had a significant negative effect. Log effective revenues (2.060) and party similarity (0.622) also showed significant positive effects, indicating that financial health and political alignment influence re-election in these municipalities.

High EU grant dependency

For municipalities with high dependency on EU grants, the logistic regression results indicate that the coefficient for consistent EU grants is negative but not statistically significant, suggesting that while there is a negative trend, it is not strong enough to be conclusive. This may imply that in high dependency municipalities, the receipt of EU grants is expected and does not serve as a distinguishing factor for re-election. Experienced mayors again show a negative and significant coefficient. The vote share of the mayor's party in the previous election is a positive and significant predictor (0.097) consistent with the other groups. The unemployment rate shows a significant negative effect (-0.095), and the proportion of the population aged 65 and above has a positive and significant effect (0.088) indicating that demographic factors are influential in high dependency municipalities.

Table 5: Results sub-group analysis by level of dependency.

| | Low Dependency Group | Medium Dependency Group | High Dependency Group |
|---|-------------------------|----------------------------|--------------------------|
| Consistent EU grants | -1.173*** (0.395) | -0.050 (0.513) | -1.385 (0.974) |
| Experienced mayor | -1.011*** (0.315) | -0.691** (0.348) | -0.932** (0.461) |
| Party similarity | -0.368 (0.323) | 0.622* (0.323) | -0.159 (0.332) |
| Prime minister's party vote share | - 0.009 (0.020) | -0.039** (0.019) | -0.013 (0.015) |
| Mayor's party vote share | 0.081*** (0.022) | 0.120*** (0.019) | 0.097*** (0.020) |
| Electoral volatility | 0.229 (0.582) | - 1.162** (0.588) | 0.507 (0.474) |
| Effective revenues lagged (logarithm) | 0.317 (0.490) | 2.060*** (0.711) | -0.476 (0.332) |
| Average real wage (lagged) | -0.001* (0.001) | -0.002 (0.001) | -0.002 (0.001) |
| Unemployment rate (lagged) | 0.033 (0.056) | -0.047 (0.060) | -0.095** (0.047) |
| Percentage of the population at least 65 years old (lagged) | 0.012 (0.035) | -0.046 (0.038) | 0.088** (0.036) |
| Total population (logarithm) | 0.471** (0.223) | 0.957*** (0.355) | 0.382 (0.289) |
| Time | -0.067*** (0.025) | 0.027 (0.028) | -0.003 (0.026) |
| Intercept | -6.958 (5.693) | -21.515*** (7.124) | -1.375 (5.601) |
| Observations | 430 | 425 | 421 |
| Pseudo R-squared | 0.1261 | 0.1601 | 0.1254 |

Note: Results from logistic binary regression for the panel comprising the 2001, 2005, 2009, 2013, 2017 and 2021 elections. Clustered standard errors at the municipal level in parenthesis. *** p<0.01, ** p<0.05, *p<0.1. The successful outcome is re-election. *Column 1:* reports result for municipalities categorized by low EU grants

dependence. *Column 2*: reports result for municipalities categorized by medium EU grants dependence. *Column 3*: reports result for municipalities categorized by high EU grants dependence.

Additionally, it is observed that the constant terms in the regression models for the subgroup analysis were notably high, with large standard deviations, especially for the medium dependency group ($\beta = -21.515$, $\sigma = 7.124$). This indicates considerable variation in the baseline probability of re-election across different municipalities, suggesting that factors not included in the model might be influencing the re-election probabilities. Such variation underscores the complexity of local electoral dynamics and the multitude of factors that voters may consider beyond the receipt of EU grants.

8.3.2 Interaction term with base model

To further investigate the interaction between dependency on EU grants and the receipt of these grants, an interaction term is included in the logistic regression model. This interaction term allows us to see if the effect of receiving consistent EU grants on re-election probabilities differs depending on the level of dependency on these grants. The results of this analysis are more nuanced and provide a deeper understanding of how dependency on EU grants influences the impact of these grants on re-election probabilities. With the interaction term the analysis is done on the full sample. The interaction term analysis reveals the following findings.

For the medium dependency group, the interaction term between consistent EU grants and the dependency group is positive and significant ($\beta = 1.469$, $p < 0.05$). This suggests that in municipalities with medium dependency on EU grants, receiving these grants positively influences re-election probabilities. Specifically, the odds ratio for this interaction term was 4.34, indicating that the likelihood of re-election is significantly higher when consistent EU grants are received in municipalities with medium dependency on these grants. This finding contrasts with the overall negative effect of consistent EU grants observed in the full sample, highlighting the importance of considering the level of dependency when interpreting the impact of EU grants on electoral outcomes. The positive coefficient means that the more dependent a municipality is on EU grants, the more beneficial the consistent receipt of these grants becomes for the re-election of the mayor, in medium dependent municipalities.

For the high dependency group, the interaction term was not significant indicating that in these municipalities, the receipt of consistent EU grants does not significantly alter re-election probabilities. The odds ratio for this interaction term was 0.84, suggesting that the impact of receiving consistent EU grants in high dependency municipalities is negligible and does not significantly influence re-election chances. This lack of significance might be due to various factors, including voter expectations and perceptions of EU grants, the efficiency of grant utilization, or the political and economic context in these municipalities.

Table 6: Results from interaction effect by level of EU grant dependency

| Coefficients/ Odds ratio | 1 | 2 |
|--|----------------------|---------------------|
| Dependency group^a | | |
| Medium Dependency | -0.962 (0.614) | 0.382 (0.235) |
| High Dependency | 0.655 (0.974) | 1.925 (1.876) |
| Consistent EU grants | -1.279*** (0.396) | 0.278*** (0.110) |
| Dependency group x Consistent EU grants^b | | |
| Medium Dependency | 1.469** (0.642) | 4.344** (2.787) |
| High Dependency | -0.171 (1.017) | 0.843 (0.857) |
| Experienced mayor | -0.857*** (0.207) | 0.424*** (0.088) |
| Party similarity | 0.009 (0.188) | 1.009 (0.189) |
| Prime minister's party vote share | -0.019** (0.009) | 1.100*** (0.013) |
| Mayor's party vote share | 0.096*** (0.012) | 0.944 (0.289) |
| Electoral volatility | -0.058 (0.307) | 0.944 (0.289) |
| Effective revenues lagged (logarithm) | 0.473 (0.348) | 1.604 (0.558) |
| Average real wage (lagged) | - 0.001** (0.001) | 0.999** (0.001) |
| Unemployment rate (lagged) | -0.030 (0.031) | 0.970 (0.030) |

| Coefficients/ Odds ratio | 1 | 2 |
|--|----------------------|---------------------|
| Percentage of the population at least 65 years old (lagged) | 0.015 (0.021) | 1.015 (0.021) |
| Total population (logarithm) | 0.537*** (0.171) | 1.711*** (0.292) |
| Time | 0.028 (0.017) | 1.029 (0.017) |
| Intercept | -8.762*** (4.029) | 0.000** (0.001) |
| Observations | 1,276 | 1,276 |
| R-squared | 0.1254 | 0.1254 |

Note: Results from logit binary regression for the panel comprising the 2001, 2005, 2009, 2013, 2017 and 2021 elections. Clustered standard errors at the municipal level in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The successful outcome is re-election. Coefficients are reported in column 1. Odds-ratios are reported in column 2: odds higher than one indicate a positive impact on the re-election probability. ^a Reference is low dependency group. ^b Reference is low dependency group.

8.3.1 Summary of the results

The logistic regression results with the interaction term, were consistent with the previous analyses. Across all groups and analyses, the main effect indicates that obtaining consistent EU grants is associated with lower re-election probabilities. This suggests that the receipt of EU grants might be viewed negatively by voters in Portuguese municipal elections. Experienced mayors have a negative and significant effect on re-election probabilities. The vote share of the mayor's party in the previous election remains to have a significant positive effect on re-election probability, while the vote share of the governing party has a negative and significant effect. Economic indicators, such as lagged wages population size also influence re-election probabilities, with larger municipalities showing higher odds of re-electing their mayors.

The interaction term analysis provides insights into how different levels of dependency on EU grants influence the impact of these grants on mayoral re-election probabilities. The positive interaction effect in the medium dependency group suggests that the relationship between EU grants and electoral outcomes is complex. This finding emphasizes the need for further research to understand the underlying reasons for these dynamics, including voter expectations, perceptions of EU grants, and the efficiency of grant utilization. Understanding these factors can provide deeper insights into how financial aid and external funding influence local political outcomes and voter behaviour. The findings from the subgroup

analysis and the interaction term analysis do not fully align, which might seem to hurt the robustness of the results. There are some potential reasons that could explain the difference. First, interaction term analysis accounts for the combined effect of both consistent EU grants and dependency levels simultaneously. This may capture nuances and interactions between these variables that the subgroup analysis, which looks at each group in isolation, might miss. Furthermore, interaction term analysis may have greater statistical power due to the larger sample size and the inclusion of interaction effects, which could detect relationships that subgroup analyses might not identify as significant. Lastly, the relationship between EU grants and re-election probabilities is likely complex and influenced by multiple interacting factors. The interaction term analysis can better model these complexities by considering how dependency levels modify the effect of EU grants on re-election outcomes.

8.4 Robustness check

From the initial results presented in Tables 2 and 3, it is evident that the coefficient for consistent EU grants is negative. To verify the robustness of these findings, municipalities were categorized into three dependency groups based on the percentage of their effective revenues derived from EU grants: low, medium, and high dependency. The analysis across these groups consistently showed a negative coefficient for consistent EU grants, contrary to the expectation that the coefficient would be positive. Typically, one would expect that obtaining grants would positively influence re-election probabilities since grants provide revenue for projects without the need to raise local taxes. A plausible explanation for the negative coefficient could be related to the electoral dynamics in municipalities where mayors are already confident of their re-election. These municipalities might have a population that consistently votes for the same party across multiple election cycles, providing a strong and stable support base for the incumbent. In such scenarios, mayors might feel less incentivised to exert additional effort in securing EU grants or other electoral incentives because their re-election is almost guaranteed regardless of these efforts. Research by Veiga et al. (2024) found, that in municipalities with low electoral volatility and high support base, the incentive for mayors to exert extra effort is reduced. Consequently, there exists a subset of mayors who do not actively pursue EU grants yet still secure re-election, contributing to the overall negative coefficient observed for consistent EU grants.

To further validate the robustness of these results, a subsequent analysis is conducted with a reduced sample. This new analysis excluded observations that might skew the results, ensuring a more accurate assessment of the relationship between consistent EU grants and re-election probabilities. By excluding municipalities with historically low electoral volatility and/or strong incumbent support, the analysis aims to isolate the effect of EU grants from the confounding influence of near-certain re-election scenarios. The first column indicates the sample with 7 observations dropped where electoral volatility is below the 25th percentile, vote share mayor's party previous election above 75th percentile and no consistent EU grants received in pre-election period. The second column indicates the sample with 28 observations dropped where vote share mayor's party previous election above 75th percentile

and no consistent EU grants received in pre-election period. Table 7 reports the results of this final robustness check, which continues to show a negative relationship between consistent EU grants and re-election probabilities and similar results for the control variables.

The negative effect of consistent EU grants in the pre-election period does not confirm the hypothesis. The hypothesis indicated a positive effect of consistent EU grants on re-election probability. These findings are not in line with previous research on the subject.

Table 7

Results from logistic regression consistent EU grants on re-election, smaller sample.

| Coefficient (Standard error) | 1 | 2 |
|---|----------------------|----------------------|
| Consistent EU grants | -0.870** (0.311) | -0.818** (0.314) |
| Experienced mayor | -0.864*** (0.205) | -0.865*** (0.205) |
| Party similarity | 0.382 (0.343) | 0.383 (0.342) |
| Prime minister's party vote share | 0.028 (0.184) | 0.025 (0.184) |
| Mayor's party vote share | -0.018 (0.010) | -0.018 (0.010) |
| Electoral volatility | 0.096*** (0.011) | 0.094*** (0.011) |
| Effective revenues lagged (logarithm) | -0.051 (0.313) | -0.056 (0.312) |
| Average real wage (lagged) | -0.001** (0.001) | -0.001** (0.001) |
| Unemployment rate (lagged) | -0.028 (0.031) | -0.029 (0.031) |
| Percentage of the population at least 65 years old (lagged) | 0.019 (0.022) | 0.020 (0.022) |
| Total population (logarithm) | 0.464*** (0.158) | 0.465*** (0.157) |

| Coefficient (Standard error) | 1 | 2 |
|---------------------------------|---------------------|---------------------|
| Time | 0.030 (0.016) | 0.030 (0.016) |
| Intercept | -7.498** (3.684) | -7.512** (3.673) |
| Observations | 1,269 | 1,248 |
| R-squared | 0.1001 | 0.0956 |

Note: Results from logit binary regression for the panel comprising the 2001, 2005, 2009, 2013, 2017 and 2021 elections. Clustered standard errors at the municipal level in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The successful outcome is re-election. Column 1: 7 observations dropped. Column 2: 28 observations dropped.

9 Conclusion & Discussion

This thesis aims to answer the following research question: *Do consistently obtained EU funds in the pre-election period increase the re-election probability for the incumbent mayor?* The question is related to the economic voting theory and the political accountability model and investigates whether voters reward (or punish) mayors for exerting effort.

The study finds that there is a negative relationship between obtaining consistent EU grants and the likelihood of re-election. The expectation was that there would be a positive association, so this result is unexpected. The negative association suggests that in municipalities where mayors secured EU grants consistently, the probability of their re-election decreased, which contradicts most of the literature on this topic. Previous literature on the relationship between EU or external funding and re-election probabilities, the relationship found was either positive (Papp, 2019) or no convincing statistical evidence is found (Banaszewska & Bischoff, 2021). However, very little research is done on the effect of obtaining EU grants and re-election, especially not in local elections.

The negative relationship was found in the OLS regression and in the logistic binary regression, with and without control variables. The sub hypothesis that aims to test whether the positive impact of consistently obtained EU funds is stronger in municipalities highly dependent on EU grants, is tested with sub-group and interaction term logistic regression analysis. The results indicate that the relationship between EU grants and electoral outcomes is context-dependent, varying significantly with the level of dependency on these funds. In particular, the analyses show that while consistent EU grants negatively impact re-election probabilities in low dependency municipalities, they can positively influence electoral outcomes in medium dependency areas. In high dependency municipalities, the effect is not significant. These findings underscore the importance of considering local contexts and dependency levels when evaluating the electoral impact of EU grants. The high constant terms and their large standard deviations in the subgroup analyses also suggest that other unobserved factors may be significantly influencing electoral outcomes, reflecting the complexity of local political dynamics. After performing extra robustness checks by dropping observations where it is expected that mayors are sure of re-election, still a negative effect is found, confirming the robustness of the results.

The counterintuitive finding that consistent EU grants are negatively associated with re-election probabilities warrants further discussion. Possibly, the negative impact of EU grants on re-election probabilities could be influenced by co-financing requirements associated with these grants. Municipalities that receive significant EU funding might face financial strain due to the need to reallocate local resources or raise local taxes to meet co-financing obligations. If the benefits of EU-funded projects are not immediately visible or if the projects are perceived as mismanaged, voter dissatisfaction could increase, adversely affecting the mayor's re-election prospects (Bachtler & Ferry, 2013). Even if the money *is* spent, if the benefits are not tangible or visible to the voters, it could work adversely. Especially, when co-financing by the municipality was high. Fazekas et al. (2013) found that,

despite regulations, EU funds pose greater corruption risks than national funds, especially with large projects. This could explain voter dissatisfaction and trust in EU grants. Additionally, administrative burdens could play a role. Bureaucratic complexity can create substantial administrative burdens, influencing local policy and governance (Mukhtar-Landgren & Fred, 2018). Especially, smaller municipalities can have a hard time using the EU funds, because of their weaker administrative capacity and insufficient co-financing possibilities (Lorvi, 2013). In low dependency municipalities, where EU grants form a minor part of the budget, voters might be more critical of the additional bureaucratic burden and potential inefficiencies introduced by these grants. The lack of significant impact in medium and high dependency municipalities suggests that in areas where EU grants are crucial for local development, their receipt is perhaps expected and does not provide additional electoral advantage.

Moreover, Euroscepticism could play a role. Crescenzi et al. (2019) find that EU funds do not influence citizens' support for the EU unless they are coupled with tangible improvements in local labour market conditions. If this is not the case, EU funding could be perceived negatively. Papp (2019) also found EU funds can have a negative impact on re-election probability if they do not result in tangible improvements for local communities. One of the conclusions of Banaszewska & Bischoff (2021) was that for municipalities with already very poor conditions, EU grants might not lead to significant improvements, failing to enhance political support.

Since the revenues of Portuguese municipalities mostly consist of national (formula) grants, it could mean that EU grants are viewed as less important or less necessary. However, intuitively this would not mean a negative effect. Further research should take into account the relationship between EU grants and national grants, possibly finding a negative effect of EU grants on national grants.

This study is not without limitations in the data, methodology and local context. The lack of detailed data on the expenditure and visibility of EU grants limits the ability to fully understand voter perceptions. There is no data available on expenditures, only on revenue. Thus, it is impossible to see when EU grants are spent, on what and how. It could be the case that EU grants are coming in, but they are not spent. EU grant policy also includes monitoring the spending of the grants, but this does not always happen accordingly. Without this data, it is challenging to assess the visibility and effectiveness of funded projects, which are likely critical factors influencing voter perceptions. The study lacks direct data on voter perceptions and awareness of EU grants. Understanding how voters perceive the grants and their impact on local development would provide a deeper insight into the electoral dynamics. For further research, the use of surveys would be a great addition.

Additionally, there is limited data available on mayoral candidates. First, only data on the winning party is available. Also, there is no data available on the mayoral candidate challenging the incumbent. As mentioned, when a mayor is not eligible for re-election, it is impossible to measure if the party also is replaced or only the mayor. Furthermore, no data on mayor's characteristics is available, even though literature indicates these are important features for re-election, think of age, residency in the municipality, education.

The dataset covers the period between 1998-2021, where an important policy reform took place: the introduction of term limits. In this research, term limited mayors are dropped from the dataset the same way as if they were not running for re-election and therefore treated the same. However, these are two completely different decisions: the first is an obligation and the latter is a choice. Besides, the study only includes municipalities where mayors decided to run for re-election, potentially introducing selection bias. The factors influencing a mayor's decision to run for re-election might also affect their ability to secure EU grants and their electoral success.

The variable *consistent EU grants* is computed based on receiving or not receiving grants. This amount is based on the 10th percentile of the logarithm of total EU grants per capita, considering differences in municipality size. However, this does not take into account major changes in obtaining certain amounts of EU grants. For example, if the receipt of EU grants is consistent, but never really high and an incumbent starts obtaining significantly more grants, this would be more visible and potentially having a positive impact on re-election. Moreover, the use of a binary variable for consistent EU grants may oversimplify the nuances in grant receipt and utilization. A more detailed categorization of grant amounts and their specific uses could provide a richer analysis.

In this thesis the lagged values are used to try to reduce endogeneity issues but there remain potential endogeneity issues, such as reverse causality, where better economic conditions could lead to higher EU grants, and at the same time, higher grants could improve economic conditions. This makes it challenging to establish a clear causal relationship.

While taking into account the limitations in this study, this thesis does make several significant contributions to the existing literature on political economy, electoral behaviour, and the effectiveness of public funding, particularly in the context of EU grants and local elections. While much of the existing literature has focused on the impact of public spending on electoral outcomes at national levels, this study provides an examination of local elections within Portuguese municipalities. By focusing specifically on EU grants, this research adds a new dimension to the understanding of how EU funding influences local political dynamics. The study reveals a complex and context-dependent relationship between EU grants and electoral outcomes, highlighting the negative association between consistent EU grants and re-election probabilities, particularly in low dependency municipalities. This finding challenges the conventional idea that public funding universally enhances incumbents' re-election prospects and underscores the importance of local contexts and voter perceptions. The study integrates multiple theoretical frameworks, including the principal-agent theory, political business cycle theory, and economic voting theory, to explain the observed findings. This comprehensive approach enhances the theoretical understanding of the mechanisms through which EU grants could affect electoral outcomes and takes into account the role of political accountability and voter behaviour in this process.

This study addresses a critical research gap by focusing on the role of EU grants in local elections, a relatively underexplored area in the literature. It extends the existing body of research on public

spending and electoral outcomes by examining the specific context of EU funding and its unique challenges and opportunities.

In summary, this thesis contributes to a deeper understanding of the electoral implications of EU grants in local governance, providing valuable insights for both academic research and policymaking. Future research should continue to explore the nuanced effects of EU funding in various political and economic contexts to build on these findings and further increase understanding of the relationship.

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