Lisbon School of Economics & Management
Universidade de Lisboa

MASTER
APPLIED ECONOMETRICS AND FORECASTING

MASTER´S FINAL WORK
DISSERTATION

SOME THINGS DON'T EVER CHANGE: HOW PORTUGAL'S POLITICAL PARTY OUTCOME INFLUENCES VOTER TURNOUT

LUÍS MIGUEL CARDOSO CASADO

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SUPERVISION:
ISABEL MARIA DIAS PROENÇA

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DISCLOSURE

This study revolves around the analysis of the effect that the continuity of the party with the majority of votes in successive elections has on voter abstention within municipalities. Sometimes this will be referred to as the party that won the election in a given municipality. Factually, this statement is incorrect, being that the study revolves around the parliament elections. Regardless, this statement will be used for the sake of simplicity and non-monotony.

Re-elections were calculated since the 1975 election. While technically not a legislative election, it was instrumental in securing the re-election results in the 1976 election. For the sake of simplicity, the 1975 election will be referred to as legislative, for the same reasons as stated above.

GLOSSARY

FE Fixed Effects. iii, 15, 16, 18, 19, 23

LE "Longevity" Effect. iii, iv, 23, 27

MFW Master's Final Work. iii

ML Maximum Likelihood. iii, 15, 18, 24, 28

NEE "Newly Elected" Effect. iii, iv, 23, 25–27

OLS Ordinary Least Squares. iii, 3, 4, 16, 18, 24

R.A.A. Autonomous Region of Azores - Região Autónoma dos Açores. iii, 2

R.A.M. Autonomous Region of Madeira - Região Autónoma da Madeira. iii, 2

SAR Spatial Autoregressive. iii, 3, 4, 15, 17, 28

SE Standard Error. iii, 16

SEM Spatial Error Model. iii, 4, 15, 17, 24, 28

SPD Spatial Panel Data. iii, 15, 16

ABSTRACT, KEYWORDS, AND JOURNAL OF ECONOMIC LITERATURE (JEL) CODES

This study tests the hypothesis that in the Portuguese legislative elections from 2011 to 2022, municipalities where the political party with the majority of the votes is the same as the one in the prior election, have a higher abstention rate compared to municipalities where the majority of the votes shifts to a different political party.

No significant differences in voter turnout were found among municipalities that re-elected a party from those that did not. However, when examining how many times the party has been re-elected two effects were observed: the "Newly Elected" Effect (NEE), where municipalities that re-elected a party for the first and second time saw an increase in abstention, and an opposite effect, designated as "Longevity" Effect (LE), where municipalities that re-elected a party for the fifth to eighth time observed a decrease in abstention.

Finally, when trying to understand the impact that re-electing a party had in each election year on the voter turnout, there was no significant change in abstention throughout the years, suggesting that the absence of re-election impact on abstention is a systemic issue.

KEYWORDS: Abstention; Re-elected; Spatial Models; Voter Turnout.
JEL CODES: C50; D72; R15; R50.

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I am very grateful to Professor Isabel for her input, her eye for detail, and for the engaging discussions we had throughout.

1 INTRODUCTION

On the $25^{th}\ of\ April\ 1974$, twenty minutes past midnight, the radio station Rádio Renascença played "$Grândola,\ Vila\ Morena$" by Zeca Afonso, confirming the $coup\ d'état$ on the fascist government known as $Estado\ Novo$[1] was going to take place. With the successful overthrow, a temporary government was set up beginning the transition to a democratic regime, and in 1975 on the anniversary of the revolution, the first free election, after the dictatorship was held in Portugal. The main objective of this election was to elect an Assembly that would create a new constitution to replace the one by $Estado\ Novo$. That summer was marked by high tensions between the right and left parties, all leading to a breaking point with the failed $coup\ d'état$ of $25^{th}\ of\ November$ led by left-wing extremists with the intent of creating a communist state.

Once the smoke blew over, with the new constitution written, the 1976 elections were held. The first government of Portugal was elected. In terms of party results these elections held similar results to the one prior. Again, $Partido\ Socialista$ (PS) lead by $Mário\ Soares$ was the party with the most votes. Followed by $Partido\ Social\ Democrata$ (PSD) lead by $Francisco\ Sá\ Carneiro$.

Almost half a century since the revolution, it is unfortunate to see that abstention values in the legislative elections in Portugal almost reach half of the total electorate (see Figure (1)). This effect of less voter turnout has also been felt in other established democracies in recent years (Kostelka, 2017), in parallel, followed by a growth of far-right parties in Europe (Golder, 2016).

Abstention is a choice. An individual chooses to refrain from casting the right to vote, unlike null or blank votes, where the voting ballots are simply rendered unreadable or left blank. There has been numerous research in trying to understand the behaviour of voter turnout, and it is not an easy behaviour to study since as time moves forward new effects must also be taken into account (Blais and Dobrzynska, 2009; Carreras and Castañeda-Angarita, 2019; Rastogi and Jones-Correa, 2023; Rodrıguez-Pose, 2022; Soininen and Bäck, 1993).

Namely, one consensus reached is that abstention is a systematic issue in the working class (Carreras and Castañeda-Angarita, 2019; Heath, 2018; Lahtinen et al., 2017). Aside from this, many authors have also argued the geographical impact on voter turnout (Dijkstra et al., 2020; McCann, 2020; Rodrıguez-Pose, 2018; Rodrıguez-Pose, 2022). Other common factors when handling abstention include education and age (Blais et al., 2014; Ley, 2018; Lijphart, 2007). These are but a few effects that need to be taken into account. Taking this into consideration, the task of modelling abstention is not a novelty. Many

[1] Portuguese dictatorship regime that spanned for forty-one years from 1933 to 1974.

authors have modelled voter turnout (Bourdin and Tai1, 2022; Saib, 2017), some even in Portugal (dos Santos et al., 2021; Freire and Magalhães, 2002; Manoel et al., 2022; Martins and Veiga, 2013). What differentiates this work from the rest is the analysis of the interplay between party results in a municipality and voter turnout.

This study poses the question: $What\ is\ the\ impact\ of\ the\ same\ party\ having\ the\ most\ votes\ on\ abstention?$ The legislative elections in Portugal have been dominated by two parties, PS and PSD, in recent years (see Figure 6 $\&$ Appendix Table (XIV)). Not to fall into a rabbit hole regarding political alignment and how this affects voter turnout, this thesis conducts a straightforward analysis to determine whether there is an increase in abstention in municipalities where the party that secured the majority of votes is the same as in the previous election ($RQT.1$). Further on, testing if this behaviour has any significant deviation in a specific election ($RQT.2$).

Using data from the Portuguese Legislative elections from 2011 to 2022 on a municipality level, including Continent, Autonomous Region of Azores - Região Autónoma dos Açores (R.A.A.), and Autonomous Region of Madeira - Região Autónoma da Madeira (R.A.M.). This study offers insights into how re-election behaviour affects voter turnout in Portuguese elections, and also how re-election behaviour should be incorporated when modelling abstention. A simple dummy variable methodology is not adequate due to contrary effects that might be captured leading to inadequate conclusions.

The results and analysis were conducted using R (R Core Team, 2022). Plots were obtained using the package $ggplot2$ (Wickham, 2016).

This thesis is structured according to the following: it commences with a literature analysis of voter turnout articles, proceeding to a description and examination of the data employed in the study, and subsequently providing an overview of the estimation and modelling framework employed. Leading to the analysis of the obtained results and the presentation of conclusions, followed by a comprehensive discussion of these findings. Finally, it concludes with a synopsis of the key insights derived throughout.

2 LITERATURE REVIEW

In Western countries, there has been a decline in voter turnout for the past 30 years (Kostelka, 2017). Voter turnout remains a persistent and contemporary issue that has been studied over time. Its ongoing relevance still persists in recent studies tackling a variety of problems that could explain the abstention behaviour (Ezrow and Krause, 2023; Himmelroos and von Schoultz, 2023; Rastogi and Jones-Correa, 2023; Vintila et al., 2023).

The issue of abstention is a complex and multifaceted matter that encompasses both socioeconomic and demographic characteristics. Abstention, in fact, is frequently perceived as a systemic issue prevalent within the working class demographic (Carreras and Castañeda-Angarita, 2019; Heath, 2018; Lahtinen et al., 2017).

But aside from the socioeconomic and demographic features the impact of territorial characteristics and their dynamic evolution on voting behaviour should also be taken into consideration (Dijkstra et al., 2020; McCann, 2020; Rodrıguez-Pose, 2018; Rodrıguez-Pose, 2022).

There is existing research that demonstrates a correlation between greater economic advancement in countries leads to a higher voter turnout (Blais and Dobrzynska, 2009; Fornos et al., 2004; Norris, 2004). This impact can also translate to the municipal level, looking at local economic conditions and seeing the impact that they have on voter turnout (Los et al., 2017).

Sociological variables, with a particular emphasis on age and education, have consistently stood out as significant explanatory factors in these studies (Blais et al., 2014; Ley, 2018; Lijphart, 2007).

Furthermore, other challenges and demographic aspects also can impact the abstention namely the immigrant and female population. Immigrants who have recently acquired citizenship and voting rights, often exhibit lower levels of political engagement compared to native-born citizens (Soininen and Bäck, 1993). In their study, Córdova and Rangel (2017) investigated variations in voter turnout between men and women finding divergent results highlighting the influence of contextual factors in shaping the transformation of gender disparities into disparities in political participation.

The political landscape can also play an important factor when handling this issue. There has been evidence supporting the significance of competitiveness and its favourable impact on voter turnout (Geys, 2006).

The use of spatial econometric models to model voter turnout in the literature has been well-established over the years (Bourdin and Tai1, 2022; Manoel et al., 2022; Saib, 2017). In their study, Saib (2017) investigated voting behaviour during the 2007 French Presidential Elections and the 2010 French Regional Elections, employing Spatial Autoregressive (SAR) and Ordinary Least Squares (OLS) models. Their research revealed

a significant improvement in model fit when using the SAR model compared to the OLS model for both elections, concluding that accounting for spatial autocorrelation may produce a better fit and provide more robust conclusions. Still in the French context, Bourdin and Tai1 (2022) employed socio-economic and demographic data at the municipal level to construct a spatial model for voting abstention in the Metropolis of Paris for the first and second round of the French presidential elections in 2017. The authors employed both SAR and Spatial Error Model (SEM) models, obtaining results that support the idea that abstentionism represents both disengagement and protest behaviours.

Shifting to the Portuguese context, Manoel et al. (2022) utilized a Semiparametric Geographically Weighted Regression (SGWR) approach to explore the factors influencing voter turnout in the 2015 legislative elections. The authors found that various sociodemographic variables had varying effects across regions, while others exhibited consistent effects throughout the country, such as the percentage of residents with higher education or proximity to Lisbon or Oporto. Further studies have been made regarding modelling voter turnout for Portuguese elections (dos Santos et al., 2021; Freire and Magalhães, 2002; Martins and Veiga, 2013).

In their work, Martins and Veiga (2013) applied a GMM methodology using data from 1979 to 2005 of both legislative and municipal elections, disclosing that the performance of the national economy holds significance exclusively during legislative elections. dos Santos et al. (2021), conducted a large-scale randomized experiment using a treatment group where a civic message would appear instead of advertisement time during the 2017 local Portuguese elections, finding a statistically significant increase in the likelihood of voting.

This thesis revolves around the objective of addressing two key research questions:

> *RQT.1: Is there evidence indicating a rise in voter abstention within the municipalities that re-elected a political party?*
>
> *RQT.2: Has there been any significant change in the behaviour of the municipalities that re-elected a party in the past four elections?*

This structure consists in first identifying whether or not there is an effect, and secondly, if that effect is punctual or systemic.

3 DATA SET

Data used in this study was obtained in $PORDATA$ [2].

This study examines the impact of re-electing a party on voter abstention in Portugal using data from the 2011 to 2022 legislative elections. This period saw a transition from a PSD government to a PS lead government in 2015, which was followed by PS dominance, reaching an absolute majority in the 2022 election. The period also saw the rise of new political parties, such as $Iniciativa\,Liberal$ (IL) and $Pessoas\text{-}Animais\text{-}Natureza$ (PAN), that already hold sway in the political landscape. By focusing on the most recent years, there is a gain in the understanding of current voter behaviour cancelling other time effects like the 2008 crisis, for example, that could plague the models. Limiting to just the legislative elections other effects that might be related to the presidential, municipal, and European parliament elections are also negated.

Using information regarding the number of valid votes each party had in each election year and municipality, starting from the first one after the fall of $Estado\,Novo$ in 1975. It becomes possible to identify which party had the most votes in each legislative election.

Before doing this calculation, to ensure that the parties were being correctly identified, firstly there was a classification procedure of the parties' names to be in line with the same acronym used in today's political landscape, once this was done, the party with the majority of votes was identified, allowing the assessment of when and where a re-election occurred.

In the process of identifying re-election, it is important to treat coalitions between parties as distinct entities. This distinction is vital because a coalition represents an alliance involving two or more political parties. Acknowledging that when one party secures the majority of votes, this outcome can be primarily attributed to the support base it has. In the case of a coalition, the support derives from all the parties within it, emphasizing the collective nature of their backing. In the study, coalitions were handled the following way, consider the coalition "$Portugal\,à\,frente$!" ($PàF$) involving PSD and $Centro\,Democrático\,Social$ - $Partido\,Popular$ (CDS). If $PàF$ garnered the most votes in a specific municipality, and in the following election, in the same municipality, PSD secured the highest vote count, then this is not considered as a re-election.

When calculating the parties with the most votes in each election in the municipalities of Nordeste and Crato, in the continent, respectively, in 2009 and 2011, the parties PS and PSD both had the same number of votes. This situation was categorized as a "coalition" ($PS\ \&\ PSD$). Same rule as stated above was applied.

With this, the variable of study, $Same\ Party$, was created, and from it information

[2]Description of the variables used in Appendix Table (V).

regarding the number of times a party is re-elected was obtained, creating $Re\text{-}elect$. This variable counts the number of times a municipality re-elects the same party for the parliament elections since 1975. For example, in 2011 there was a municipality where in the last four elections the party with the majority of votes was the same then $Re\text{-}elect = 3$, and in 2015, the party with the most votes was different, than, for the same municipality, $Re\text{-}elect = 0$.

Drawing inspiration from a control variable utilized in the study conducted by Martins and Veiga (2013). The variable assumes a value of one when the local government party aligns with the ruling party at the national level, zero otherwise. In this work, a slight nuance was added when creating the variable $Gov.\ Party$. This variable is defined as one when the political party that secured the highest number of votes corresponds to the governing party prior to the election results, zero otherwise. When calculating the variable $Gov.\ Party$, the coalitions with PSD were considered to be the same party as the previous government in the 2015 election. For the 2011, 2019 and 2022 elections, the previous government was PS.

To assess competitiveness within each municipality, the metric $Win\ Rate$ was calculated. This variable represents the growth rate between the two political parties that garnered the highest vote count in the municipality in each election.

To account for the heterogeneity linked with the winning party, dummy variables for each distinct party that secured a majority of votes in the municipalities were created ($Party$). The parties that registered the majority of votes are the following: PS; PSD; $PàF$; "$Aliança\ Democrática$" (AD), coalition between $PSD\ \&\ CDS\ \&\ Partido\ Popular\ Monárquico$ (PPM); and $Coligaçâo\ Democrática\ Unitária$ (CDU), coalition between $Partido\ Comunista\ Português$ (PCP) $\&$ $Partido\ Ecologista$ "$Os\ Verdes$" (PEV).

Turning the attention to the socioeconomic variables included in the study, there are: $Young$, $Elder$, $Fem.$, $Unemp.\ Rate$, $Higher$, GVA, $Pop.\ Den$, $Immigrant$, and $Sector$. Data for $Unemp.\ Rate$ and $Higher$ was sourced from both the 2011 and 2021 Census. The variable $Sector$ signifies the prevalence of non-financial companies and societies in the municipality. Notably, this percentage is relative to seventeen sectors[3], with one sector, $Others$, being omitted from the study due to multicollinearity concerns.

[3]For detailed information see Appendix Table (VI).

4 DESCRIPTIVE STATISTICS

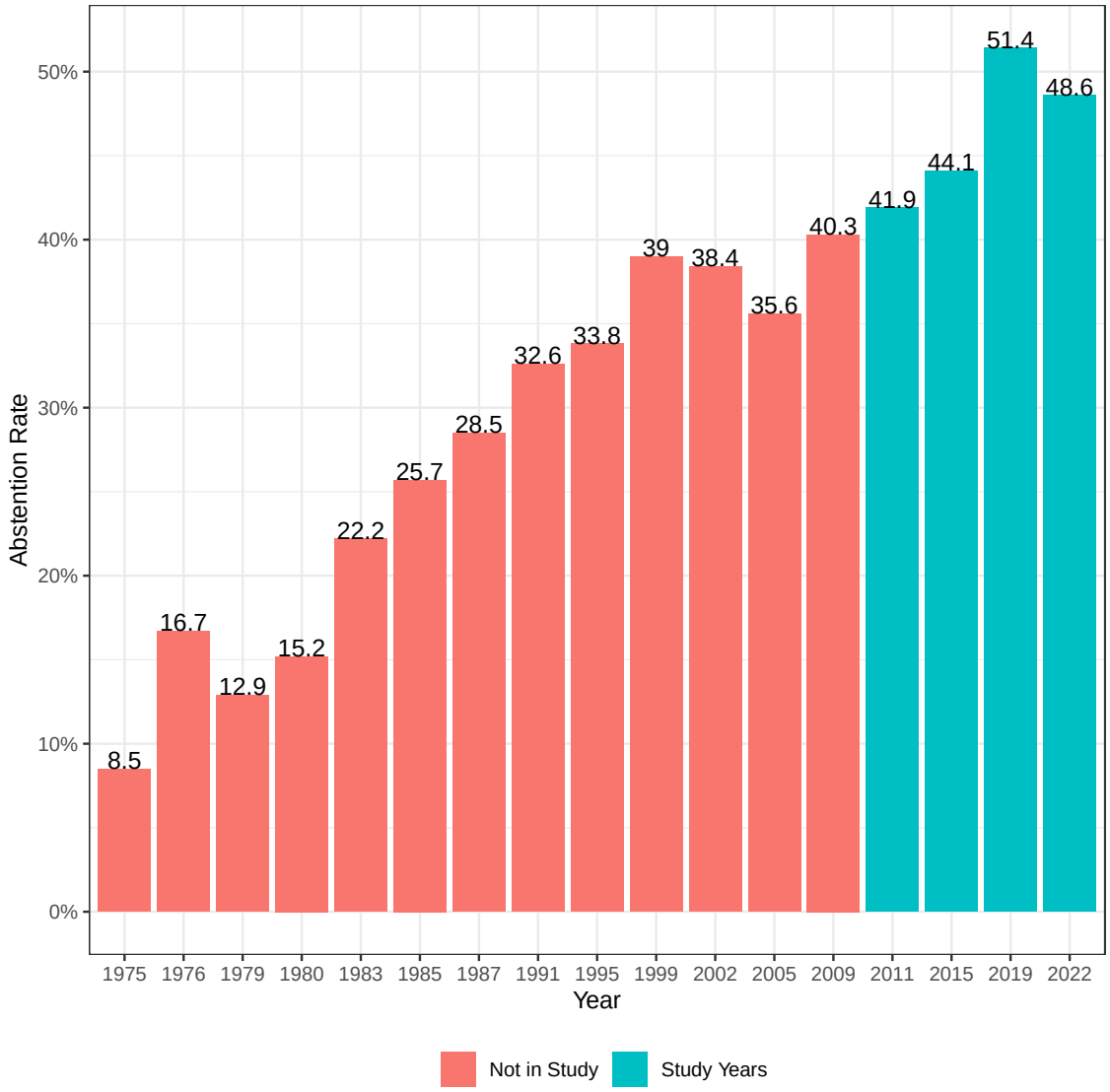

FIGURE 1: *Abstention Rate* In Portugal Legislative Elections Overtime

The overall results in abstention shown in Figure (1) confirms what was stated by Kostelka (2017) regarding the decline in voter turnout. In fact, the election of 2019 presented the worst results registered in Portugal. A reason for this can be that this election took place after the election of 2015, which is marked by the creation of an agreement between the parties PS, $Bloco\ de\ Esquerda$ (BE), and CDU after the announcement of the election results, effectively changing the elected government from PSD & CDS ($PàF$) to a PS minority government with the support of the other mentioned parties.

	Min	$Q_{25\%}$	Mean	Std. Dev	Median	$Q_{75\%}$	Max
Abstention Rate	29.53	41	45.81	6.78	44.81	49.94	74.2
Same Party	0	0	0.51	0.5	1	1	1
Re-elect	0	0	2.21	3.45	1	2	15
Young	2.51	4.52	5.05	0.8	5.05	5.5	8.4
Elder	8.14	20.08	25.14	7.06	24.53	29.47	47.11
Fem.	44.27	51.54	52.09	1.1	52.11	52.69	56.86
Unemp. Rate†	2.7	6.8	9.83	3.68	9.45	12.2	22.9
Higher†	2.8	7.9	11.51	5.24	10.4	13.7	41.2
GVA	0.45	20.93	299.23	1329.79	65.15	209.46	23130.86
Pop. Den	4.4	26.37	294.87	809.41	69.7	175.18	7366.4
Immigrant	5	98	1630.82	5569.19	263.5	864.5	108653
Agriculture	0.17	5.73	17.96	15.22	12.83	27.53	71.76
Extractive	0	0	0.21	0.48	0.06	0.21	5.27
Manuf.	0	4.66	7.11	3.92	6.15	8.33	27.99
Energy	0	0	0.25	0.4	0.14	0.34	4.99
Water & Waste	0	0	0.14	0.2	0.1	0.2	2
Construction	1.88	6.49	9.5	4.15	8.65	11.78	35.22
Whsle. & Auto.	7.12	16.71	20.13	4.81	20.45	23.44	36.27
Trns. & Stg.	0	1.85	2.89	1.53	2.54	3.52	11.95
Hospit. & Food	2.9	6.8	9.2	4	8.29	10.17	37.38
Comm.	0	0.48	0.91	0.68	0.77	1.13	5.61
Real Estate	0	1.31	2.54	1.7	2.22	3.48	12.08
Consultancy	0.99	4.95	6.77	2.65	6.5	8.12	18.89
Admin.	1.33	5.91	8.26	3.43	7.72	10.29	21.46
Education	0	2.42	3.42	1.43	3.31	4.29	9.93
Health	0	3.32	4.87	2.26	4.52	6.12	17.25
Art	0	1.18	1.89	0.99	1.77	2.41	9.31
Win Rate	0	6.5	15.4	11.07	13.34	22.56	60.22
Gov. Party	0	0	0.57	0.49	1	1	1
PS	0	0	0.53	0.5	1	1	1
PS & PSD	0	0	0.0008	0.03	0	0	1
PSD	0	0	0.31	0.46	0	1	1
PàF	0	0	0.14	0.35	0	0	1
AD	0	0	0.0008	0.03	0	0	1
CDU	0	0	0.01	0.12	0	0	1

† Data from the Census. *GVA* results are in the thousands.

TABLE I: Summary Statistics (N=1232)

	Abstention Rate		*Same Party*	
Year	Mean	Std. Dev	Mean	Std. Dev
2011	44.27	6.36	0.54	0.50
2015	45.47	6.63	0.22	0.41
2019	48.24	6.59	0.44	0.50
2022	45.27	6.93	0.84	0.36

TABLE II: Yearly *Abstention Rate* & *Same Party* Statistics

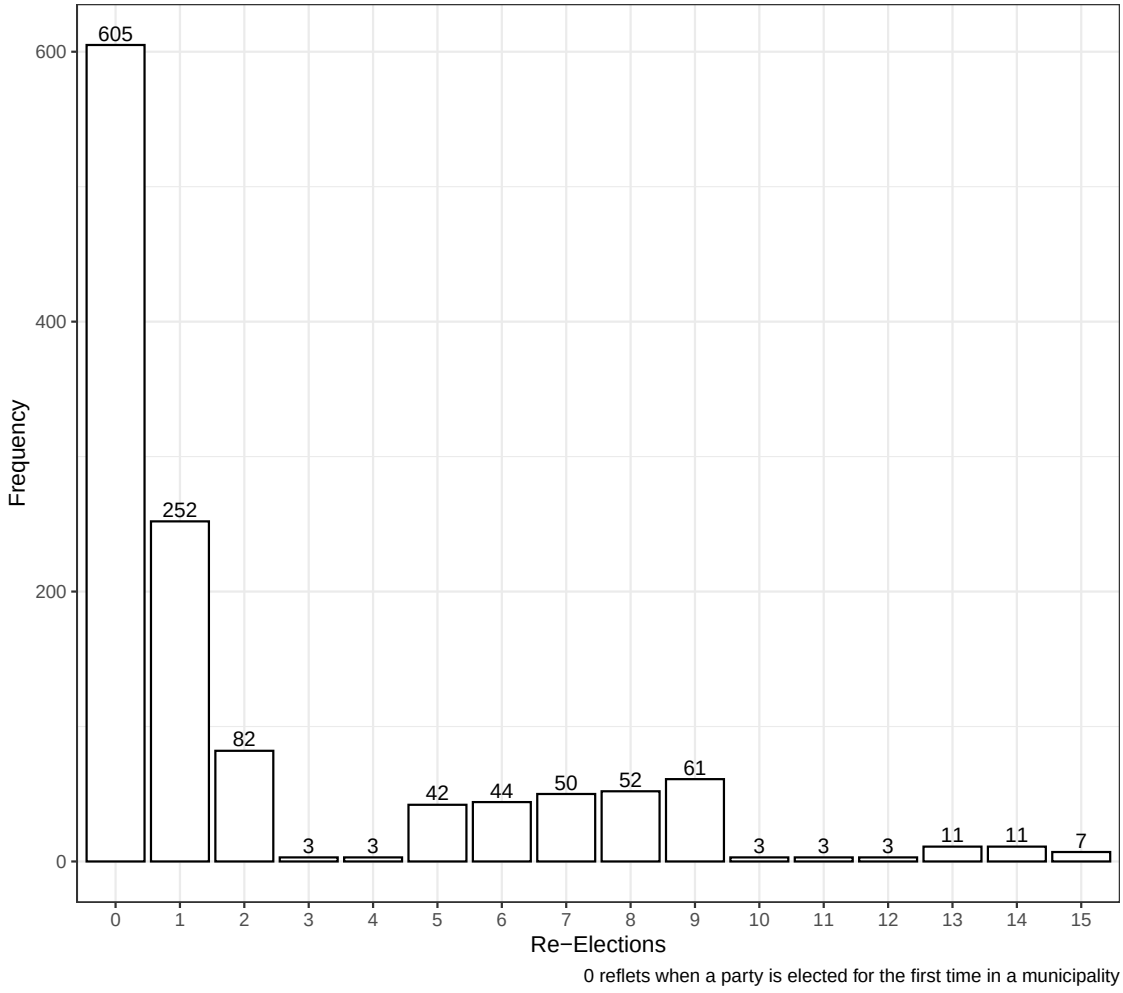

FIGURE 2: Re-Elections Histogram (N=1232)

Table (I) provides a comprehensive pooled data summary statistics of the variables[4] used in the study. With regard to the variable *Same Party*, a substantial portion, 51%, of the dataset corresponds to instances where a municipality re-elects a political party. When analyzing *Abstention Rate* the behaviour is stable within the sample years given the close values of the quantiles and mean, there is a clear tendency for abstention to be in the high forties. The highest value registered for abstention was in Ribeira Grande in

[4]Description of the data used in Appendix Table(V).

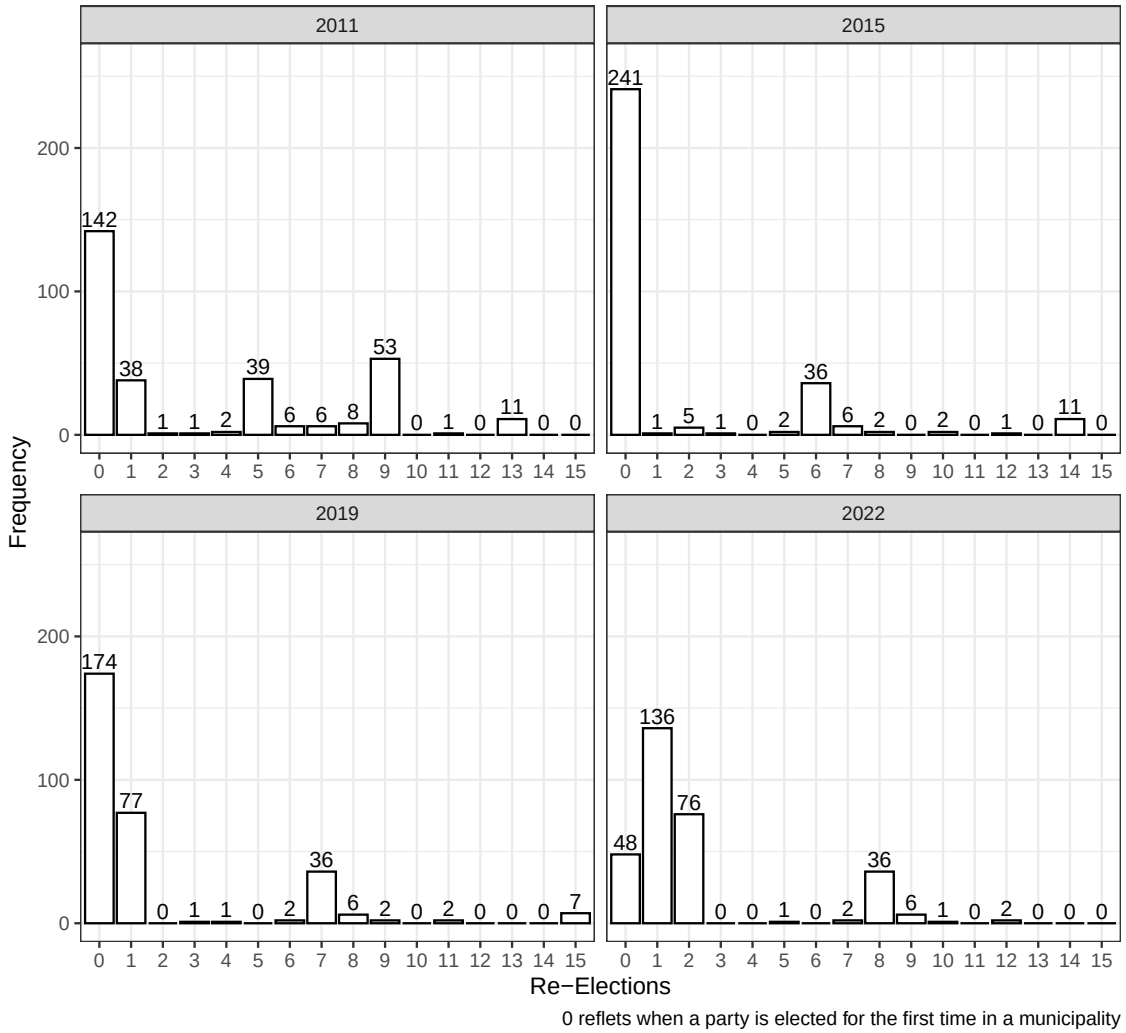

FIGURE 3: Re-Elections Histogram Yearly

the 2022 election whereas the lowest was in Sardoal in the 2015 election.

Analyzing the yearly results concerning the $Abstention\ Rate$ and $Same\ Party$ in Table II, it is evident that the mean and standard deviation for abstention remain relatively consistent across the years, except for 2019. In 2019, the $Abstention\ Rate$ spiked by nearly 3 percentage points compared to the preceding election. The trend for $Same\ Party$ representation shows less consistency. In 2015, re-elections hit their lowest percentage, whereas 2022 witnessed the highest percentage of re-elections.

Analyzing the outcomes depicted in Figure (2), a clear pattern emerges: out of all the re-elections that occur in the dataset, 53.27% occurred within the first and second time a party is re-elected, 39.71% occurred when a party was re-elected from the fifth to ninth time. In total, these two periods account for close to 93% of all re-elections. There is a noticeable drop in re-election in the third and fourth periods, followed by a resurgence in the fifth period, indicating that the likelihood of reaching a fifth re-election period is

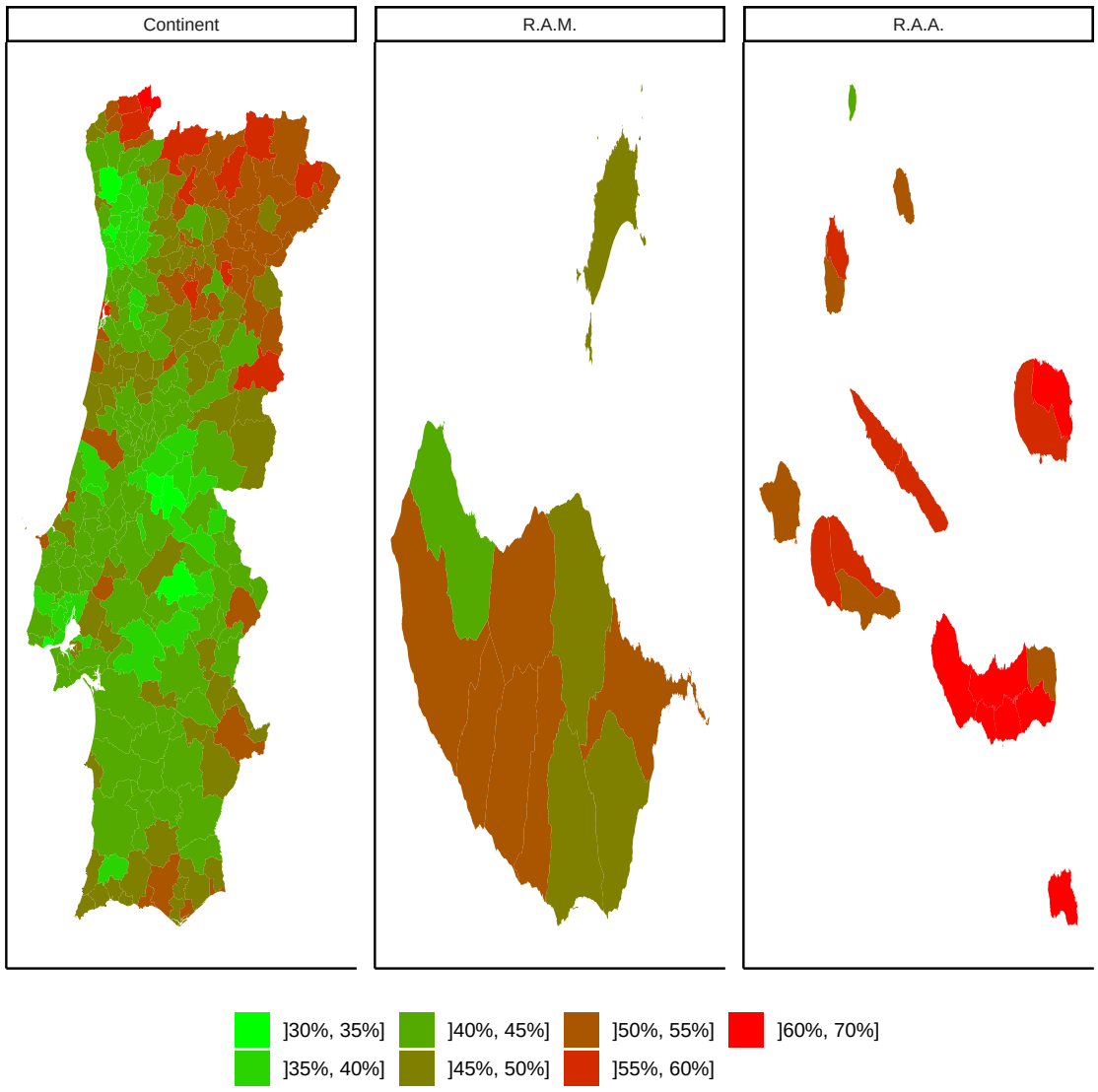

FIGURE 4: Portugal Municipality *Abstention Rate* Average For The Legislative Elections From 2011 To 2022 (N=1232)

low, this behaviour is also felt in the tenth re-election period with a significant drop in re-elections compared with the previous.

The histograms depicted in Figure (3) complement the trends outlined in Table (II). In particular, 2015 stands out as the year with the fewest re-elections, evident from the high frequency of Re-Elections = 0. Contrarily, 2022 emerges as the year with the most re-elections, showcasing a notable surge in instances where the party is re-elected for the first and second time. Moreover, an intriguing trend surfaces regarding municipalities consistently re-electing the same party. Notably, in 2015, 39 municipalities re-elected a specific party for the fifth time, among which 36 continued to do so in the subsequent election cycles. Finally, the second re-election period is an effect that is felt mostly in the

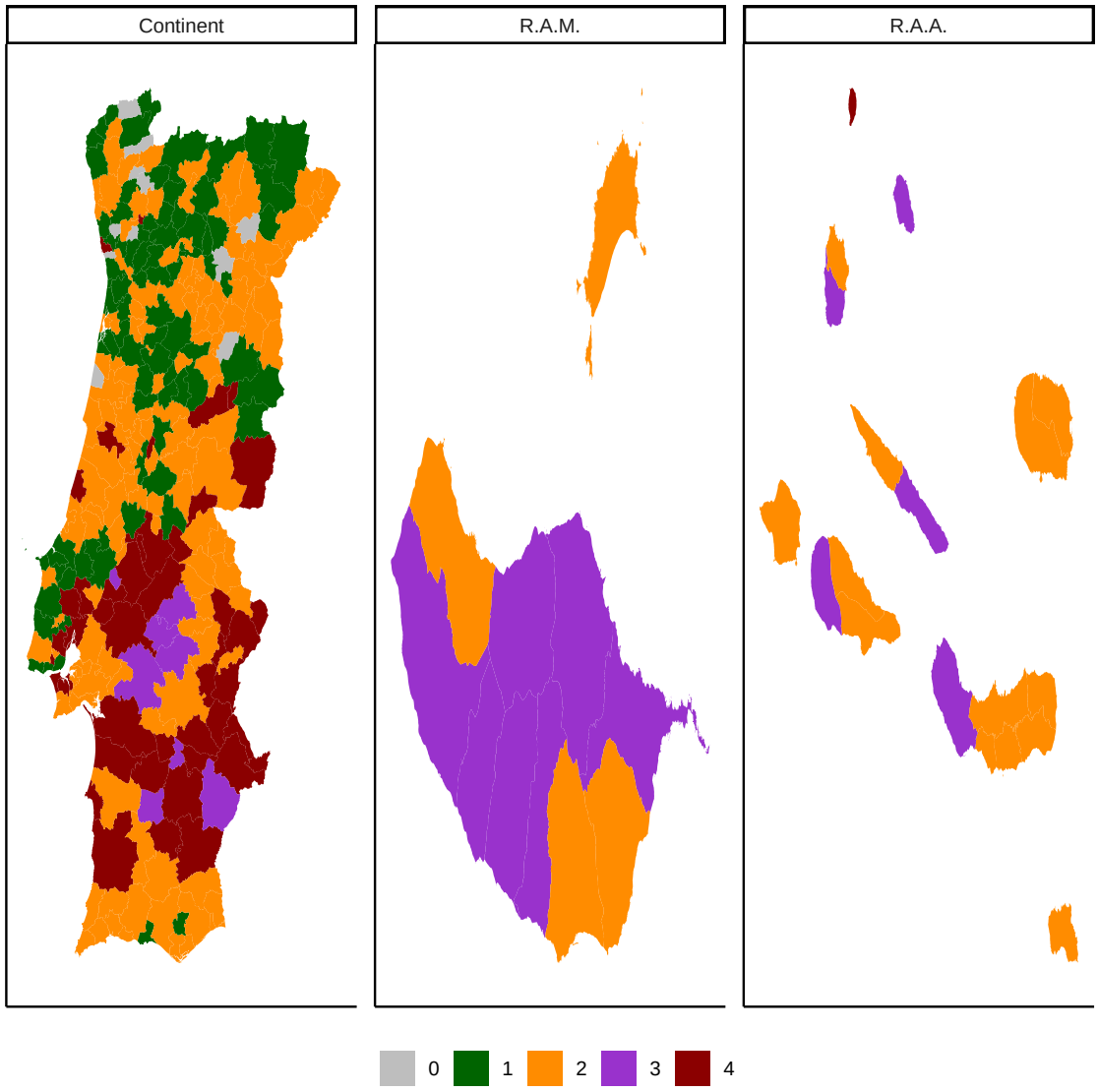

FIGURE 5: Number Of Times A Municipality Has Elected The Same Party In The Portuguese Legislative Elections From 2011 To 2022 (N=1232)

most recent year in the data set.

As mentioned previously, there is noticeable stability in the *Abstention Rate*, evident when comparing the standard deviation for the entire period in Table (I). When looking at Figure (4) the previous statement is reaffirmed, given that most of Portugal's municipalities (about 59%) have an *Abstention Rate* average between 40% and 50%. However, *Abstention Rate* is much more prevalent in the autonomous regions than in the mainland.

Figure (5) shows that there are few municipalities that in all four elections in the dataset elected a different party, suggesting that the likelihood of a party securing the most votes in at least two elections in a given municipality is high.

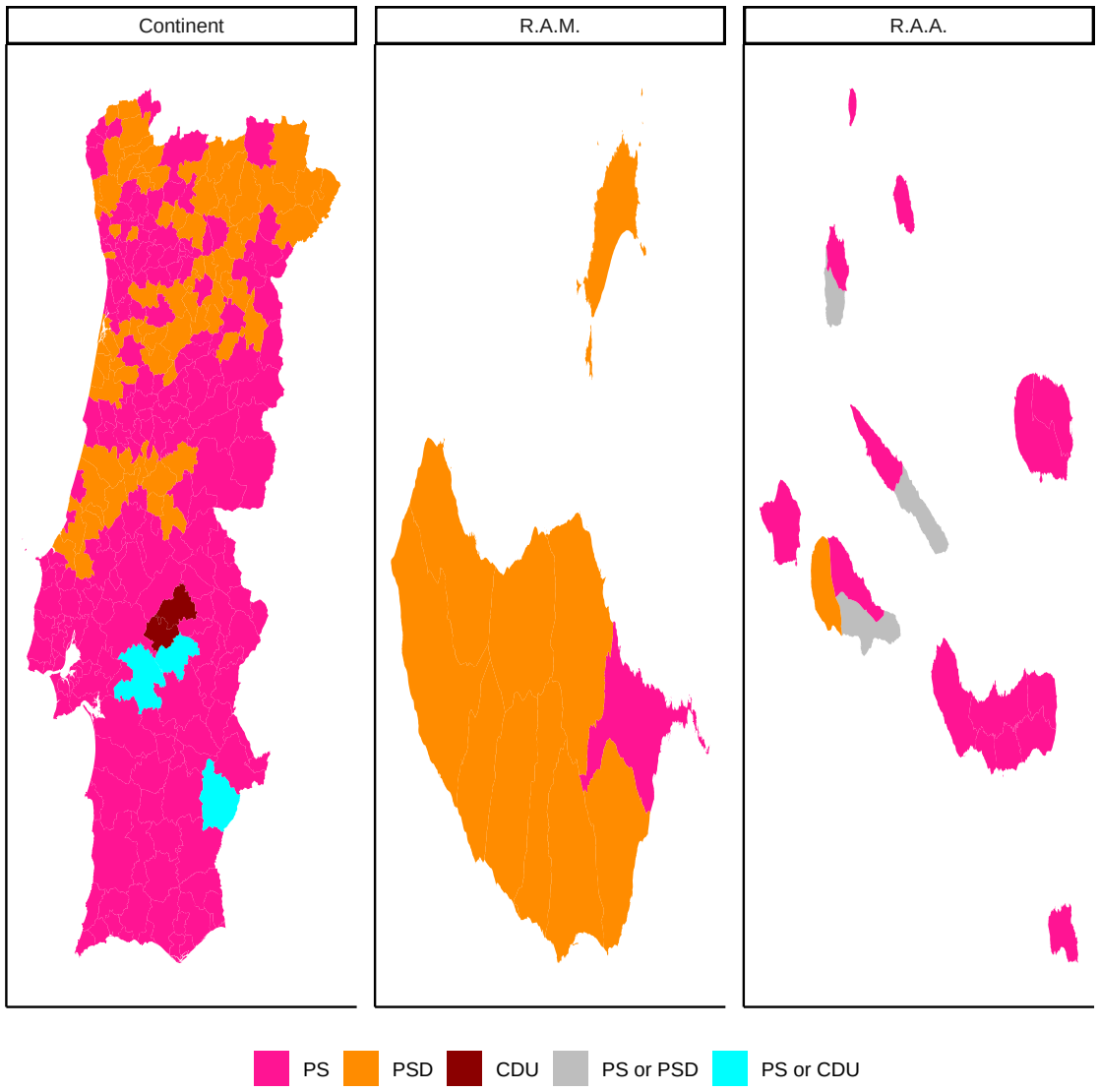

FIGURE 6: Most Frequent Elected Party In Each Municipality For The Portuguese Legislative Elections From 2011 To 2022 (N=1232)

Unsurprisingly, examining the leading parties in Figure (6) there is a clear dominance between the two most prevalent Portuguese parties, namely PS and PSD. This outcome distinctly mirrors the dualistic nature that characterizes Portugal's electoral landscape in state elections (see Appendix Table(XIV)).

5 ECONOMETRIC FRAMEWORK

5.1 Estimation

The initial step in modelling spatial data involves a systematic assessment of spatial dependence to determine the need for its incorporation into the analysis. Typically, when examining the presence of spatial dependence, researchers employ tests such as Moran's I, LM, LR, and Rao's Score, among others. However, it is important to note that these tests are designed for assessing spatial dependence in cross-sectional data, and as such, they are not suitable for a panel data problem. Alternative methodologies and tests that account for the temporal or longitudinal aspect of the data have been created, one example of this, is the methodology proposed by the Ren et al. (2014).

However, for the purpose of this study, panel characteristics of the data set were ignored and the Moran's I statistics was calculated for each election year in the dataset. The following results were used to assess the presence of spatial autocorrelation in the data.

Spatial Panel Data (SPD) models encompass various approaches, this study focuses on two: SAR and SEM. These models offer the flexibility of being estimated by both random and Fixed Effects (FE), utilizing two principal methodologies: Maximum Likelihood (ML) and the Generalized Method of Moments (GMM). All models were estimated using a FE methodology assuming straight away that individual unobserved heterogeneity is correlated with the independent variables.

ML estimators deliver the most asymptotically efficient parameter estimates, assuming adherence to all distributional assumptions. On the other hand, the GMM estimator offers a more robust alternative, allowing for the relaxation of the normality assumption (Arbia, 2014). Aside from these, there is also literature on different estimations for spatial models. Mınguez et al. (2020) proposed a semiparametric P-Spline model, and Lee and Yu (2010) also proposed a quasi-maximum likelihood estimator of the SAR model. In this study, spatial models will be estimated using ML, GMM and P-Spline model proposed by Basile et al. (2014) will be used to validate ML results.

A crucial factor when it comes to any spatial analysis is the definition of the Spatial Weighted Matrix (W). W captures the spatial relationships among variables in a dataset (Fotheringham and Rogerson, 2008). The specification of the spatial weighting matrix is a crucial aspect of spatial analysis, as various matrices capture distinct channels of spillovers (Corrado and Fingleton, 2012; LeSage and Fischer, 2008). For this study, the Queen Matrix was used with row standardized weights with one addition.

One limitation when calculating Queen Matrix is that if a municipality is separated by a body of water then the regions are not considered as neighbours. Given that the data used for this project consists of all the 308 municipalities in Portugal and certain municipalities

in the autonomous regions are isolated, these regions would be assigned one neighbour that being the one closest to them. To ensure that the closest neighbour was selected a K Nearest Neighbour (KNN) algorithm with one neighbour based on distance was used. The following municipalities did not have any neighbours: Corvo, Horta, Santa Cruz da Graciosa, Vila do Porto, and Porto Santo. To them: Santa Cruz das Flores, Madalena, Velas, Povoação, and Machico were assigned, respectively.

One important note when it comes to spatial models is that traditional tests for assessing homoskedasticity in SPD can frequently be unavailable or unsuitable (Baltagi et al., 2021). With OLS models heteroskedasticity is controlled with the use of cluster robust Standard Error (SE), similarity between the results of spatial and non-spatial models will serve as a valuable confirmation mechanism.

5.2 Models

The method employed for modelling follows a bottom-up approach. It starts with models lacking any spatial dynamics, gradually making the models more complex, by including FE and integrating spatial dimensions into them.

In order to answer $RQT.1$, the first specification used in this study consists of the following:

$$Abstention\ Rate_{mt} = \alpha Same\ Party_{mt} + X_{mt}\boldsymbol{\beta} + \delta_m + \zeta_t + e_{mt} \tag{1}$$

Where m represents the municipality, $m = 1, ..., 308$, and $t = 2011, 2015, 2019$ & 2022. $Abstention\ Rate_{mt}$ is the abstention rate in the municipality for a specific election in the data set, and $Same\ Party_{mt}$ is a dummy variable with the value one if the party with the majority of votes in the municipality is the same as in the previous election, zero otherwise. α is coefficient associated with the study variable. X_{mt} represents the matrix with all the control variables, and β is a vector with the coefficients for each control covariate. δ_m corresponds to the unobserved heterogeneity in each municipality and ζ_t is the unobserved heterogeneity in each election year (time fixed effects). e_{mt} is the idiosyncratic error term where $e_{mt}|X \overset{\text{iid}}{\sim} N(0, \sigma_e^2)$.

For the control variables, X_{mt}[5], regarding the socioeconomic and demographic aspect, there is: $Elder_{mt}$, $Fem._{mt}$, $Unemp.\ Rate_{mt}$, $Higher_{mt}$, GVA_{mt}, $Pop.\ Den._{mt}$, and $Sector_{mt}$. Where $Sector_{mt}$ is a matrix $N \times 16$ with the propensity of each activity sector[6]. On the election side, there is: $Party_{mt}$, $Gov.\ Party_{mt}$, and $Win\ Rate_{mt}$. $Party_{mt}$ is a matrix $N \times 5$ with the dummy variables for each party, the party CDU will be used has base group.

[5]For more detailed information see Appendix Table (V).
[6]For the description of each sector see Appendix Table (VI).

$Unemp.\ Rate_{mt}$ and $Higher_{mt}$ are both obtained from census data, meaning that for the 2011 and 2015 elections information used is regarding the 2011 census whereas for the 2019 and 2022 elections, it is the 2021 census. Regarding the other socioeconomic and demographic regressors, information incorporated in the model is from the year prior to the election, following the methodology of Bourdin and Tai1(2022). In the models the quadratic term for $Unemp.\ Rate_{mt}$ was introduced following the methodology of Martins and Veiga (2013).

Moving on to the spatial specification, the following spatial autoregressive combined (SAC) model is presented:

$$\begin{gathered} Abstention\ Rate_{mt} = \lambda \sum_{j=1;j\neq m}^{308}(w_{mj} Abstention\ Rate_{jt}) + \\ \alpha Same\ Party_{mt} + X_{mt}\boldsymbol{\beta} + \delta_m + \zeta_t + u_{mt}, \\ where\ u_{mt} = \rho \sum_{j=1;j\neq m}^{308}(w_{mj}u_{jt}) + \varepsilon_{mt} \end{gathered} \tag{2}$$

Where λ is the spatial autoregressive term and ρ is the spatial autocorrelation term. Due to some limitations, in this study, only two versions of this model will be estimated. The SAR with $\rho = 0\ \&\ |\lambda| < 1$ and SEM with $\lambda = 0\ \&\ |\rho| < 1$. The term ε_{mt} represents the idiosyncratic error component term where $\varepsilon_{mt}|X \overset{\text{iid}}{\sim} N(0, \sigma_\varepsilon^2)$.

With the aim of assessing how the re-election behaviour impacts voter turnout, still addressing $RQT.1$, instead of looking if there is re-election from one election to the other ($Same\ Party$), for how long has the party been re-elected will also be put into perspective ($Re\text{-}elect$). The following models will be estimated:

$$Abstention\ Rate_{mt} = \sum_{i=1}^{15}(\alpha_i Re\text{-}elect(i)_{mt}) + X_{mt}\boldsymbol{\beta} + \delta_m + \zeta_t + e_{mt} \tag{3}$$

$$\begin{gathered} Abstention\ Rate_{mt} = \lambda \sum_{j=1;j\neq m}^{308}(w_{mj} Abstention\ Rate_{jt}) + \\ \sum_{i=1}^{15}(\alpha_i Re\text{-}elect(i)_{mt}) + X_{mt}\boldsymbol{\beta} + \delta_m + \zeta_t + u_{mt}, \\ where\ u_{mt} = \rho \sum_{j=1;j\neq m}^{308}(w_{mj}u_{jt}) + \varepsilon_{mt} \end{gathered} \tag{4}$$

Where $Re\text{-}elect(i)$, $i = 1, ..., 15$, represents each re-election stage dummy. For example, $Re\text{-}elect(2)$ has the value of one if the municipality has re-elected the party for the second time, zero otherwise, and so on.

To understand whether the conclusion made about $RQT.1$ is not solely influenced by a single election, specifically the 2019 elections, models (1) & (2) where enhanced by incorporating time interactions:

$$\begin{gathered} Abstention\,Rate_{mt} = \alpha_1 Same\,Party_{mt} + \alpha_2 Same\,Party(2015)_{mt} + \\ \alpha_3 Same\,Party(2019)_{mt} + \alpha_4 Same\,Party(2022)_{mt} + \\ X_{mt}\boldsymbol{\beta} + \delta_m + \zeta_t + e_{mt} \end{gathered} \tag{5}$$

$$\begin{gathered} Abstention\,Rate_{mt} = \lambda \sum_{j=1;j\neq m}^{308} (w_{mj} Abstention\,Rate_{jt}) + \\ \alpha_1 Same\,Party_{mt} + \alpha_2 Same\,Party(2015)_{mt} + \\ \alpha_3 Same\,Party(2019)_{mt} + \alpha_4 Same\,Party(2022)_{mt} + \\ X_{mt}\boldsymbol{\beta} + \delta_m + \zeta_t + u_{mt}, \\ where\,u_{mt} = \rho \sum_{j=1;j\neq m}^{308} (w_{mj} u_{jt}) + \varepsilon_{mt} \end{gathered} \tag{6}$$

$Same\ Party(t)$, where $t = 2015, 2019\ \&\ 2022$ represents the interactions between the dummy $Same\ Party$ and year dummies. For example, $Same\ Party(2015)$ is one if the municipality re-elected the same party and the election year is 2015, zero otherwise.

With this change, the models will be able to capture in the analysis the impact that the municipalities that voted for the same party had on the abstention in each election. Addressing the final research question of this study ($RQT.2$).

Models (1; 3; 5), were estimated using OLS, the results were obtained using the R package $fixest$ (Bergé, 2018). Results for the models (2; 4; 6) were obtained using ML from the R package $spml$ (Millo, Piras, et al., 2012). FE models were obtained by transformation, subtracting the average of both municipality and time. GMM[7] models[8] used for robustness checking were also estimated with the package $spml$ and semiparametric ML models[9] were estimated using the R package $pspatreg$ (Basile et al., 2014; Mınguez et al., 2020).

[7]GMM FE models were derived using a Weighted Two-Stage Least Squares (W2LS) methodology from the R package $spml$.

[8]Models (2; 4; 6) are estimated using GMM.

[9]In Appendix Models (7; 8; 9) are estimated using Basile et al.(2014) methodology.

6 RESULTS

This section analyzes the results obtained from the models designed in the previous section, as well as the robust models. Deriving also succinct conclusions of the estimates obtained.

Year	Moran's I
2011	0.697***
2015	0.694***
2019	0.648***
2022	0.722***

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

TABLE III: Moran's I Test Statistic

Taking a look at the results from Moran's I statistic in Table (III), there is clear evidence of spatial autocorrelation in the data for each election year. Suggesting the use of spatial models rather than models that do not incorporate any spatial parameters.

The estimates represented in Table (IV)[10] are regarding the models (1) & (2). The study variable, $Same\ Party$, reveals different findings between the spatial and the non-spatial models. The POLS is the only model that suggests a significant change in the abstention rate between the municipalities where the leading party is the same as the one from the preceding election. FEOLS coefficient estimate is the only positive out of the four models. However, FEOLS, FE-SAR and FE-SEM indicate that there is no evidence of a noteworthy shift in the abstention rate within these municipalities.

In light of these results, the output from POLS is not reliable since the model does not control for both time and municipal heterogeneity. The most important result is that all the FE models show no evidence of the estimate associated with $Same\ Party$ being statistically significant at any level. When looking at the robust checking models (see Appendix Table (XIII)), the same conclusions are reached. Across all models the coefficient estimate is negative, and there is no evidence of statistical significance.

It is a known issue for FE models that a lack of time variation of the regressor may lead to statistical insignificance regardless of actual impact. That being said, the within variance estimate of $Same\ Party$ (see Appendix Table (VII)) is not indicative that this issue is affecting the models.

When examining the estimates for the coefficients $Re\text{-}elect(i)$, where $i = 1, ..., 15$, of the models (3) & (4) in Figure (7)[11], at first glance, the POLS results are significantly dif-

[10] Output of the models in Appendix Table (VIII).

[11] Estimates of the coefficients for $Re\text{-}elect(i)$, where $i = 1, .., 15$, spatial parameters and control covariates in Appendix Tables (IX) & (X).

	POLS	FEOLS	FE-SAR	FE-SEM
$Same\ Party$	-1.161***	0.075	-0.051	-0.054
	(0.18)	(0.169)	(0.12)	(0.126)
$\widehat{\lambda}$			0.576***	
$\widehat{\rho}$				0.636***
Fixed Effects				
Municipality	No	Yes	Yes	Yes
Year	No	Yes	Yes	Yes
$Controls$	32	32	33	33
R^2	0.4	0.953	0.403	0.946
AIC	7651.951	5129.708	4174.02	9448.94
$AICc$	7653.824	5131.581	4176.009	9450.928
BIC	7825.909	6889.748	4347.978	9622.897
N	1232	1232	1232	1232
Municipality	308	308	308	308
Years	4	4	4	4

SE reported for the POLS and FEOLS are cluster robust on municipality. Control variables coefficients estimates omitted. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

TABLE IV: Estimate Of The Coefficient Of $Same\ Party$ Obtained Using OLS & ML

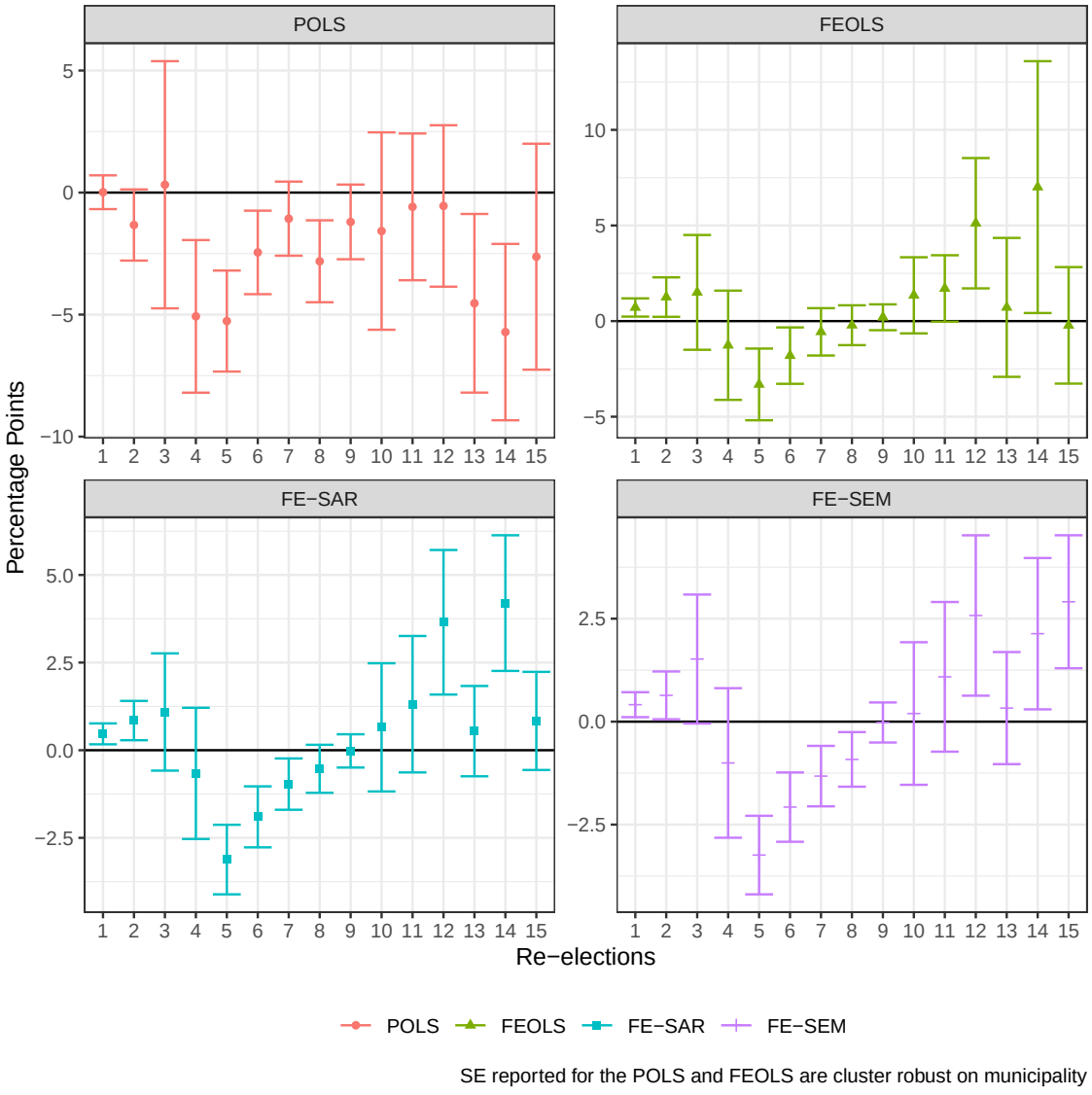

FIGURE 7: Estimates & 95% Confidence Bands Of The Coefficients Of $Re\text{-}elect(i)$, $i = 1, ..., 15$, Obtained Using OLS & ML

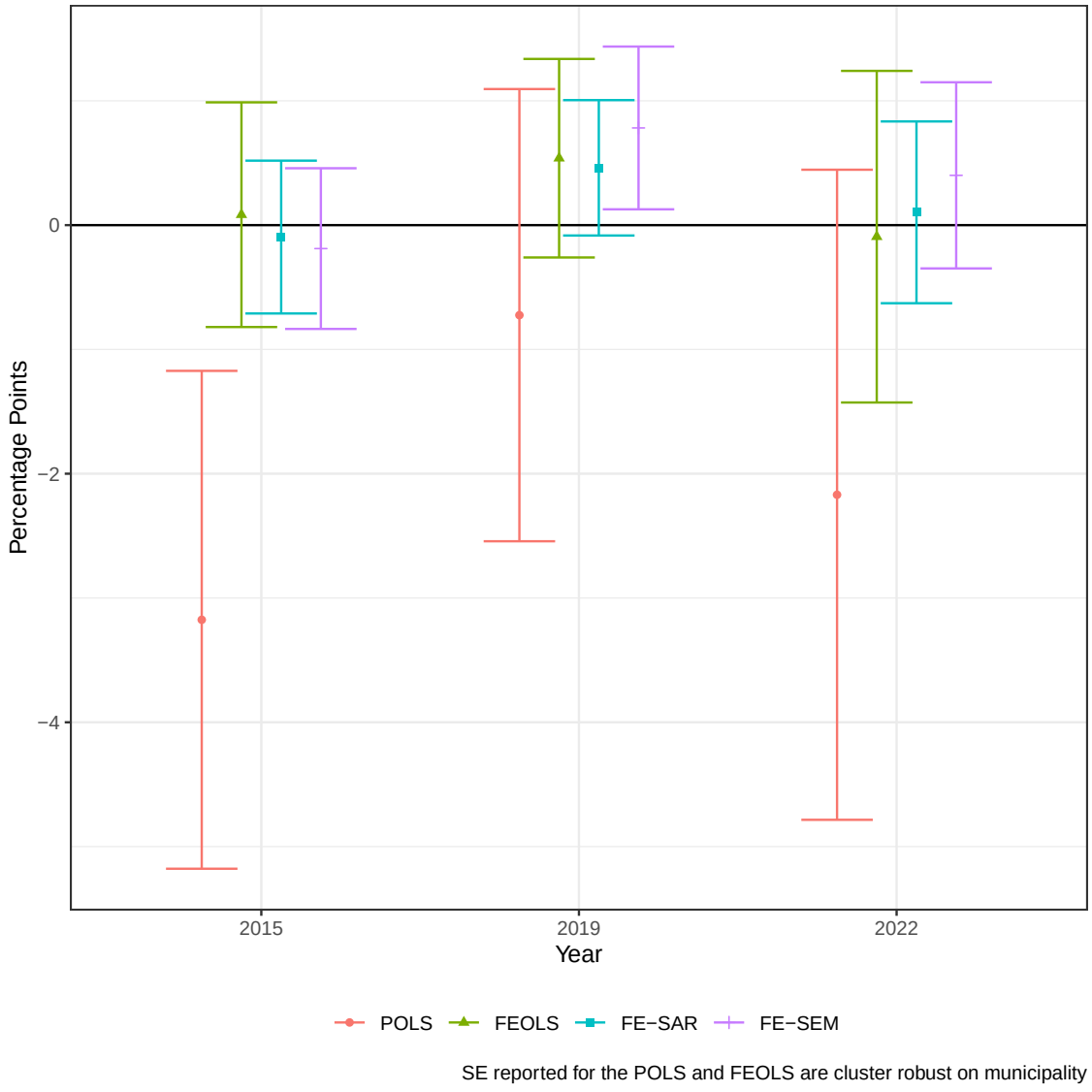

FIGURE 8: Estimates & 95% Confidence Bands Of The Coefficients Of $Same\ Party(t)$, $t = 2015, 2019$ & 2022, Obtained Using OLS & ML

ferent from the rest of the models, as before, and there appears to be no clear behavioural pattern as seen in the other estimations. From these estimations, two distinct patterns can be identified and investigated.

Firstly, let us discuss what this study will coin as the "Newly Elected" Effect (NEE) from this point on. This pertains to instances where a municipality elects a new party, and in the following two elections, the same party has the highest vote count. In such cases, there is clear evidence pointing to a significant increase in the abstention rate. However, this effect encounters opposition from another which will be labelled as the "Longevity" Effect (LE). This effect manifests when a party is re-elected for the fifth to eighth time, depending on the model, showing strong evidence of a decrease in the abstention rate. Another characteristic of the LE is the positive trend as the number of times a party is re-elected the abstention rate increases.

Again, all models used for validation (see Appendix Figure (9)) show evidence of the two effects mentioned above. In these models, the estimates of the coefficients for the variables $Re\text{-}elect(i)$ where $i = 1 \ \& \ 2$, are always statistically significant with a positive sign in the GMM models, whereas for the P-Spline models only the coefficient estimate associated with $Re\text{-}elect(1)$ is statically significant with a positive sign in the FE-SAR model, for the FE-SEM model the estimate is only just insignificant at a 5% level. The estimate of the coefficient associated with $Re\text{-}elect(5)$ always kickstarts the LE. How long this effect lasts again varies on the model, in some cases, it reaches the sixth re-election period in others the eighth.

It is worth noting that as the number of times a party is re-elected increases, the precision of our estimates becomes more challenging, except between five to nine re-elections. This is reflected in the widening of the confidence intervals observed in Figure (7) compared to the initial and intermediate values. This phenomenon aligns with the histogram presented in Figure (2), where it is observed a greater volume of observations within the ranges of zero to two and five to nine re-elections.

The NEE and the LE seem to be cancelling each other, which could be the reason why no FE model estimate associated with $Same\ Party$ showed sign of any statistical significance (see Table (IV)). However, something of note is that the impact of the LE is much bigger, in absolute terms than the NEE. However, the NEE is more frequent. This counterweight between the two can also be an explanation of the FEOLS positive sign, being indicative that the model is more sensitive to the LE than the others.

The answer to $RQT.1$ is not clear. On one hand, there is the NEE, on the other the LE. Overall, there is no evidence suggesting that if the party with the highest votes is the same in two elections in a municipality there is a significant change in abstention. However, if that party is being re-elected for the first or second time, then there is empirical evidence

that suggests an increase in abstention, while for the fifth to eighth re-election, there is evidence of a decrease. So, $RQT.1$ answer depends on the context and a simple black-and-white answer is not adequate.

Moving towards the next analysis, based on the outcomes from the models (5) & (6). Inspecting the results presented in Figure (8)[12], a notable trend between the models is again seen: POLS model consistently exhibits the most divergent behaviour among all the models, while the FEOLS, FE-SAR, and FE-SEM outcomes showcase a remarkable similarity in the yearly results.

It is worth highlighting that both FEOLS and FE-SAR share a common trait: both do not manifest in any election year empirical evidence that supports a significant difference in the abstention rate for municipalities that re-elected a party. However, a distinction arises in the case of the FE-SEM, which does indicate evidence of a significant change during the 2019 election. The SEM models used for robustness checking (see in Appendix Figure (10)) also show sign of significance in the 2019 election.

As stated above, this election is marked by being the follow-up election to the controversial 2015 election, and it is also the highest value of abstention in Portugal's parliament elections registered (see Figure (1)).

Based on these outcomes, it is now possible to provide insights into $RQT.2$. It appears that municipalities re-electing the same party as in the previous election generally exhibit no substantial shifts in behaviour between each voting cycle. The exception is the FE-SEM model which indicates a noteworthy positive impact in the 2019 election. However, interpreting this finding as a definite behavioural change should be done very cautiously, as the evidence might not be robust enough since it is only showing in SEM models. The overall evidence suggests that when comparing the various elections in the data set, no significant alterations in the abstention rate behaviour emerge. Suggesting that the results obtained in $RQT.1$ cannot be attributed to one election.

With the validation models[13] the same conclusions made with the OLS and ML models are reached. I am fairly confident that the results and the statements made are valid and robust.

[12] Estimates of the coefficients for $Same\ Party(t)$, where $t = 2015, 2019$ & 2022, spatial parameters and control covariates in Appendix Tables (XI) & (XII).

[13] See Appendix Table (XIII) & Figures (9) & (10).

7 DISCUSSION

This section addresses how the abstention challenge can be tackled within the context of the Portuguese legislative elections. To achieve this an examination of the discussion made by Cancela and Vicente (2019) was done. Their study offers an intensive analysis of electoral patterns in Portugal, encompassing legislative, presidential, local, and European parliament elections.

Given that their work already establishes a foundational understanding of voting behaviour, what this section will provide is a connection between their insights and the findings made in the previous section. Illustrating how the results from this study have the potential to enhance and build upon the author's recommendations to decrease abstention. Moving forward, this discussion will be centred on addressing the "Newly Elected" Effect (NEE), as it stands as a pivotal factor in the analysis of why abstention is rising.

One underlying effect taken from the NEE is that once there is a change in regards to the party with the most votes in a municipality, in the consequent two elections if the same party has again the most votes there is evidence of an increase in abstention. I interpret this as once there is a change, that change can be followed by voter stagnation. To combat this willingness by the masses, two points made by Cancela and Vicente (2019) were picked (making voting easier and having a more competitive political landscape) and analyzed how they intertwine with the NEE.

Regarding the subject of making voting easier, the authors offer some suggestions such as voting early, mobile voting, early voting by post, in-person electronic voting, and non-face-to-face electronic voting. This discussion will focus simply on non-face-to-face electronic voting. Although many authors criticize this type of voting (Birch et al., 2014; Muñoz, 2009) stating that voting secrecy and ensuring that the respective individual is the one voting can be put into question. The validity of these points will not be put into question, since they are relevant, however, has a counterargument there is a study made by Vassil et al. (2016). In the study, the authors showed that Internet voting holds the promise of being accessible to a diverse spectrum of voters, capable of bridging social divisions and poised to emerge as an inclusive and innovative voting technology. In the digital age, electronic voting represents a crucial step forward. It improves accessibility, ensures accuracy, and, with the right infrastructure, enhances security in our democratic processes. The idea is simply that by making voting easier for everyone there would be a mitigation of the NEE. This can be tested with the creation of a pilot test in regions where the NEE can be felt in the upcoming election, and in these regions perform a randomized control trial (RCT) in order to see if the treated regions (a.k.a., regions where non-face-to-face voting is implemented) there is a decrease in abstention compared with the non treated, a similar methodology to the study done by dos Santos et al. (2021).

To finalize this section, let us touch on the point regarding the Portuguese electoral landscape. Although not a two-party system, Portugal's parliament elections have been dominated by two parties, PS and PSD, particularly in recent years (see Figure (6)). Lately, there has also been the rise of new parties, such as IL, PAN, $Livre$, just to name a few. Studies have shown that in countries where political representation is shared and not based on major parties, voting participation tends to be higher (Blais, 2006; Cancela and Geys, 2016; Stockemer, 2017). But the question stands if these new parties can break the mould. Because although there have been new parties when comparing the vote count of other parties with PS and PSD the difference is night and day (see Appendix Table (XIV)). The creation of a more competitive landscape can make it less likely for a party to be re-elected given the high frequency of two to three mandates mitigating the NEE.

Only time will tell if there will be an impact on voter turnout, however, in the meantime, tests can be made in order to assert that in more competitive municipalities there is less abstention in the Portuguese parliament elections. Two studies can be made with the data used in this work.

One study can provide an in-depth analysis of the battleground municipalities and see if there is less abstention in these regions. Battleground municipalities will be classified based on the $Win\ Rate$ being below a certain threshold. Although the coefficient estimates significance result depends on the model (see Appendix Tables (VIII), (X) $\&$ (XII)), regardless, all the FE models showed a negative sign.

Alternatively, a study focusing on the most recently established political parties. For instance, parties like PAN (founded in 2009), $Livre$ (founded in 2014), and IL (founded in 2017), among others, represent relatively recent additions to the Portuguese political landscape. A work that identifies municipalities with the highest growth rates in votes towards these newer parties and assesses whether, municipalities where these new parties have gained the most traction, exhibit higher rates of voter turnout. Both studies could implement the methodology used in this thesis.

Non-face-to-face electronic voting, despite some concerns, holds promise in this regard, as shown in recent studies. Embracing electronic voting can modernize the electoral process and potentially reduce the frequency of re-elections. Moreover, the evolving political landscape with the emergence of new parties offers hope for increased competition and higher voter engagement, potentially making re-election harder.

8 CONCLUSION

This study started with the idea of testing the simple hypothesis that the municipalities that voted for the same party had more abstention than the ones that did not. It was proved that this is not necessarily the case and that when studying how re-election affects abstention, in a municipality, the problem is more complex.

Assessing the different stages of re-election and how they affected the abstention rate (see Figure (7)) two distinct effects were identified. One showed that when a municipality elects a new party, and then if the same party is elected in the following two elections, there is evidence of an increase in the abstention rate in these regions, this effect was referred to as the "Newly Elected" Effect (NEE). The other, "Longevity" Effect (LE), is the opposite. There was proof that if a party is re-elected for a fifth to eighth time then there was evidence of a decrease in abstention, however, the behaviour also showed an upward trend in abstention from then on.

As shown in the descriptive statistics (see Figure (2)) in Portugal there is a tendency for terms to last two to three elections. Meaning that the NEE is the most prevalent. Although no evidence was found that stated an increase in abstention in municipalities that re-elected a party from those that did not, this can be a cause of the two effects stated above counterweighting each other leading to the insignificance seen in the results in Table (IV) and in the case of the FEOLS having a positive sign.

Further on, it was concluded that the results could not be guided by any particular election. Although the FE-SEM (see Figure (8)) showed evidence of an increase in abstention in 2019, no other model showed this result. Given this, the result was deemed not robust enough to state that there was a significant change in the municipalities that re-elected a party in the 2019 election. Concluding that the abstention behaviour regarding the party outcome is a systemic issue and not one that can be pinpointed to a specific election.

In this work, strategies to combat the challenge of voter abstention were explored, in the context of Portuguese legislative elections, drawing insights from a comprehensive study by Cancela and Vicente (2019) on electoral patterns in Portugal. To combat this issue some topics in the author's work were highlighted, regarding non-face-to-face electronic voting which emerges as a promising solution. Despite some criticisms of this voting procedure other studies such as Vassil et al. (2016) have highlighted the potential benefits of internet voting. Additionally, the evolving political landscape with the emergence of new parties offers the potential to break the dominance of traditional parties. Additional studies were suggested to examine the validity of these proposals. These endeavours hold the potential to address the issue of NEE and bolster voter engagement.

This thesis encountered a few limitations, notably due to computational constraints,

SAC and Durbin models could not be estimated using ML. To ensure consistency between the presented results and those used for robust checks, only the SAR and SEM models were used in the spatial framework. There is a limitation in this work concerning census variables. Although it was feasible to obtain yearly information at the NUTS2/NUTS3 level, this would mean that some regressors would not be at the municipal level. To ensure this would not occur census data was used. Lastly, an essential limitation of this study lies in the fact that the conclusions drawn apply exclusively to Portuguese legislative elections.

REFERENCES

Arbia, G. (2014). A primer for spatial econometrics with applications in R.

Baltagi, B. H., Pirotte, A., & Yang, Z. (2021). Diagnostic tests for homoskedasticity in spatial cross-sectional or panel models. *Journal of Econometrics*, *224*(2), 245–270.

Basile, R., Durbán, M., Mınguez, R., Montero, J. M., & Mur, J. (2014). Modeling regional economic dynamics: Spatial dependence, spatial heterogeneity and nonlinearities. *Journal of Economic Dynamics and Control*, *48*, 229–245.

Bergé, L. (2018). Efficient estimation of maximum likelihood models with multiple fixed-effects: the R package FENmlm. *CREA Discussion Papers*, (13).

Birch, S., Cockshott, P., & Renaud, K. (2014). Putting electronic voting under the microscope. *The Political Quarterly*, *85*(2), 187–194.

Blais, A. (2006). What affects voter turnout? *Annu. Rev. Polit. Sci.*, *9*, 111–125.

Blais, A., & Dobrzynska, A. (2009). Turnout in electoral democracies revisited. In *Activating the citizen: Dilemmas of participation in europe and canada* (pp. 63–82). Springer.

Blais, A., Pilet, J.-B., Van der Straeten, K., Laslier, J.-F., & Héroux-Legault, M. (2014). To vote or to abstain? An experimental test of rational calculus in first past the post and PR elections. *Electoral studies*, *36*, 39–50.

Bourdin, S., & Tai1, J. (2022). Abstentionist voting–between disengagement and protestation in neglected areas: A spatial analysis of the Paris metropolis. *International Regional Science Review*, *45*(3), 263–292.

Cancela, J., & Geys, B. (2016). Explaining voter turnout: A meta-analysis of national and subnational elections. *Electoral studies*, *42*, 264–275.

Cancela, J., & Vicente, M. (2019). Abstenção e Participação Eleitoral em Portugal. http://hdl.handle.net/10362/92747

Carreras, M., & Castañeda-Angarita, N. (2019). Economic adversity and electoral participation of vulnerable socioeconomic groups. *Electoral Studies*, *57*, 110–120.

Córdova, A., & Rangel, G. (2017). Addressing the gender gap: The effect of compulsory voting on women's electoral engagement. *Comparative Political Studies*, *50*(2), 264–290.

Corrado, L., & Fingleton, B. (2012). Where is the economics in spatial econometrics? *Journal of Regional Science*, *52*(2), 210–239.

Dijkstra, L., Poelman, H., & Rodrıguez-Pose, A. (2020). The geography of EU discontent. *Regional Studies*, *54*(6), 737–753.

dos Santos, J. P., Tavares, J., & Vicente, P. C. (2021). Can ATMs get out the vote? Evidence from a nationwide field experiment. *European Economic Review*, *134*, 103691.

Ezrow, L., & Krause, W. (2023). Voter Turnout Decline and Party Responsiveness. *British Journal of Political Science*, *53*(1), 85–103.

Fornos, C. A., Power, T. J., & Garand, J. C. (2004). Explaining voter turnout in Latin America, 1980 to 2000. *Comparative political studies*, *37*(8), 909–940.

Fotheringham, A. S., & Rogerson, P. A. (2008). *The SAGE handbook of spatial analysis*. Sage.

Freire, A., & Magalhães, P. (2002). *A abstenção eleitoral em Portugal*. Imprensa de Ciências Sociais Lisbon.

Geys, B. (2006). Explaining voter turnout: A review of aggregate-level research. *Electoral studies*, *25*(4), 637–663.

Golder, M. (2016). Far right parties in Europe. *Annual review of political science*, *19*, 477–497.

Heath, O. (2018). Policy alienation, social alienation and working-class abstention in Britain, 1964–2010. *British Journal of Political Science*, *48*(4), 1053–1073.

Himmelroos, S., & von Schoultz, Å. (2023). The mobilizing effects of political media consumption among external voters. *European Political Science*, *22*(1), 44–62.

Kostelka, F. (2017). Does democratic consolidation lead to a decline in voter turnout? Global evidence since 1939. *American Political Science Review*, *111*(4), 653–667.

Lahtinen, H., Mattila, M., Wass, H., & Martikainen, P. (2017). Explaining social class inequality in voter turnout: the contribution of income and health. *Scandinavian Political Studies*, *40*(4), 388–410.

Lee, L.-f., & Yu, J. (2010). Estimation of spatial autoregressive panel data models with fixed effects. *Journal of econometrics*, *154*(2), 165–185.

LeSage, J. P., & Fischer, M. M. (2008). Spatial growth regressions: model specification, estimation and interpretation. *Spatial Economic Analysis*, *3*(3), 275–304.

Ley, S. (2018). To vote or not to vote: how criminal violence shapes electoral participation. *Journal of Conflict Resolution*, *62*(9), 1963–1990.

Lijphart, A. (2007). *Thinking about democracy: Power sharing and majority rule in theory and practice*. Routledge.

Los, B., McCann, P., Springford, J., & Thissen, M. (2017). The mismatch between local voting and the local economic consequences of Brexit. *Regional studies*, *51*(5), 786–799.

Manoel, L., Costa, A. C., & Cabral, P. (2022). Voter turnout in Portugal: A geographical perspective. *Papers in Applied Geography*, *8*(1), 88–111.

Martins, R., & Veiga, F. J. (2013). Economic performance and turnout at national and local elections. *Public Choice*, *157*, 429–448.

McCann, P. (2020). Perceptions of regional inequality and the geography of discontent: Insights from the UK. *Regional Studies*, *54*(2), 256–267.

Millo, G., Piras, G., et al. (2012). splm: Spatial panel data models in R. *Journal of statistical software*, *47*(1), 1–38.

Mınguez, R., Basile, R., & Durbán, M. (2020). An alternative semiparametric model for spatial panel data. *Statistical Methods & Applications*, *29*(4), 669–708.

Muñoz, L. A. G. (2009). El sistema de votación español a la luz de la Constitución. *Revista española de derecho constitucional*, *29*(87), 71–108.

Norris, P. (2004). *Electoral engineering: Voting rules and political behavior*. Cambridge university press.

R Core Team. (2022). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing. Vienna, Austria. https://www.R-project.org/

Rastogi, A., & Jones-Correa, M. (2023). Not Just White Soccer Moms: Voting in Suburbia in the 2016 and 2020 Elections. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, *9*(2), 184–203.

Ren, T., Long, Z., Zhang, R., & Chen, Q. (2014). Moran's I test of spatial panel data model—Based on bootstrap method. *Economic Modelling*, *41*, 9–14.

Rodrıguez-Pose, A. (2018). The revenge of the places that don't matter (and what to do about it). *Cambridge journal of regions, economy and society*, *11*(1), 189–209.

Rodrıguez-Pose, A. (2022). The rise of populism and the revenge of the places that don't matter. *Origins and Alternative Policy Responses*, *79*.

Saib, M. (2017). Spatial autocorrelation in voting turnout. *Journal of Biometrics & Biostatistics*, *8*(5).

Soininen, M., & Bäck, H. (1993). Electoral participation among immigrants in Sweden: integration, culture and participation. *Journal of Ethnic and Migration Studies*, *20*(1), 111–130.

Stockemer, D. (2017). What affects voter turnout? A review article/meta-analysis of aggregate research. *Government and Opposition*, *52*(4), 698–722.

Vassil, K., Solvak, M., Vinkel, P., Trechsel, A. H., & Alvarez, R. M. (2016). The diffusion of internet voting. Usage patterns of internet voting in Estonia between 2005 and 2015. *Government Information Quarterly*, *33*(3), 453–459.

Vintila, D., Pamies, C., & Paradés, M. (2023). Electoral (non) alignment between resident and non-resident voters: evidence from Spain. *European Political Science*, *22*(1), 63–82.

Wickham, H. (2016). *ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York. https://ggplot2.tidyverse.org

A APPENDIX

Data set

	Description
$Abstention\ Rate$	$\%$ abstention votes
$Same\ Party$	One if the party most voted in the municipality is the same as in the previous election, zero otherwise
$Re\text{-}elect$	Number of times the party with the majority of the votes is the same as in the previous election since 1975 (once a new party has the majority of votes then $Re\text{-}elect = 0$, if the same party has the most votes in the next election then $Re\text{-}elect = 1$, and so on) [$Re\text{-}elect(i)$ represents a dummy variable for each re-election stage, $i = 0, 1, ..., 15$]
$Young$	$\%$ of people in the municipality with age between 20 to 24
$Elder$	$\%$ of people in the municipality with age over 65
$Fem.$	$\%$ of female population in the municipality
$Unemp.\ Rate$†	Unemployment rate in the municipality
$Higher$†	$\%$ of people in the municipality with a higher education diploma
GVA	Gross Value Added of non financial companies (sectors: Financial and Insurance Activities; and Public Administration and Defense not included) in the municipality in thousands of euros
$Pop.\ Den.$	Population density in the municipality
$Immigrant$	Immigrant population in the municipality
$Sector$	$\%$ of non-financial companies and societies in the municipality in the specific activity sector (see Table (VI) for more detailed description of each sector)
$Party\,i$	Party/Coalition most voted (Dummy variable for each party/coalition, $i = PS$, PSD, $PS\ \&\ PSD$, $P\grave{a}F$, $AD\ \&\ CDU$)
$Gov.\ Party$	One if the party most voted is the same as the previous government, zero otherwise
$Win\ Rate$	(1 - #votes of second most voted party/#votes of most voted party)$\%$

† Data from the Census.

TABLE V: Variable Description

$Sector$	Description
$Agriculture$	Agriculture, animal husbandry, hunting, forestry, and fishing
$Extractive$	Extractive industries
$Manuf.$	Manufacturing industries
$Energy$	Electricity, gas, steam, hot and cold water, and cold air
$Water \& Waste$	Water supply, sanitation, waste management, and pollution control
$Construction$	Construction
$Whsle. \& Auto.$	Wholesale and retail trade; repair of motor vehicles and motorcycles
$Trns. \& Stg.$	Transport & Storage
$Hospit. \& Food$	Accommodation, food service, and similar activities
$Comm.$	Information and communication activities
$Real\ Estate$	Real estate activities
$Consultancy$	Consulting, scientific, technical, and similar activities
$Admin.$	Administrative and support services activities
$Education$	Education
$Health$	Human health and social care activities
Art	Artistic, entertainment, sports and recreational activities

TABLE VI: $Sector$ Covariates Description

	$\widehat{\sigma}^2_{within}$
$Same\ Party$	0.18
$Young$	0.16
$Elder$	4.78
$Fem.$	0.08
$Unemp.\ Rate$†	7.56
$Higher$†	5.58
GVA	15220917677.31
$Pop.\ Den.$	674.39
$Immigrant$	2855205.43
$Agriculture$	46.04
$Extractive$	0.02
$Manufacturing$	0.68
$Energy$	0.05
$Water\ \&\ Waste$	0.01
$Construction$	3.42
$Whsle\ \&\ Auto.$	7.95
$Trns.\ \&\ Stg.$	0.43
$Hospit.\ \&\ Food$	2.07
$Comm.$	0.06
$Real\ Estate$	0.36
$Consultancy$	0.41
$Admin.$	1.13
$Education$	0.43
$Health$	0.45
Art	0.11
$Win\ Rate$	79.74
$Gov.\ Party$	0.21
PS	0.15
$PS\ \&\ PSD$	0.00
PSD	0.16
$PàF$	0.11
AD	0.00

† Data from the Census.

TABLE VII: Within Variation Of Each Regressor

P-Spline Models

$$\begin{gathered} Abstention\,Rate_{mt} = \lambda \sum_{j=1;j\neq m}^{308}(w_{mj}Abstention\,Rate_{jt}) + \\ \alpha Same\,Party_{mt} + X_{mt}^{1}\boldsymbol{\beta} + f(X_{mt}^{2}) + \delta_m + \zeta_t + u_{mt}, \\ where\,u_{mt} = \rho \sum_{j=1;j\neq m}^{308}(w_{mj}u_{jt}) + \varepsilon_{mt} \end{gathered} \tag{7}$$

$$\begin{gathered} Abstention\,Rate_{mt} = \lambda \sum_{j=1;j\neq m}^{308}(w_{mj}Abstention\,Rate_{jt}) + \\ \sum_{i=1}^{15}(\alpha_i Re\text{-}elect(i)_{mt}) + X_{mt}^{1}\boldsymbol{\beta} + f(X_{mt}^{2}) + \delta_m + \zeta_t + u_{mt}, \\ where\,u_{mt} = \rho \sum_{j=1;j\neq m}^{308}(w_{mj}u_{jt}) + \varepsilon_{mt} \end{gathered} \tag{8}$$

$$\begin{gathered} Abstention\,Rate_{mt} = \lambda \sum_{j=1;j\neq m}^{308}(w_{mj}Abstention\,Rate_{jt}) + \\ \alpha_1 Same\,Party_{mt} + \alpha_2 Same\,Party(2015)_{mt} + \\ \alpha_3 Same\,Party(2019)_{mt} + \alpha_4 Same\,Party(2022)_{mt} + \\ X_{mt}^{1}\boldsymbol{\beta} + f(X_{mt}^{2}) + \delta_m + \zeta_t + u_{mt}, \\ where\,u_{mt} = \rho \sum_{j=1;j\neq m}^{308}(w_{mj}u_{jt}) + \varepsilon_{mt} \end{gathered} \tag{9}$$

Where:

- $f(.)$ represents the P-Spline function.
- X_{mt}^{1} represents all the binary control variables.
- X_{mt}^{2} represents all the non binary control variables.

Estimates

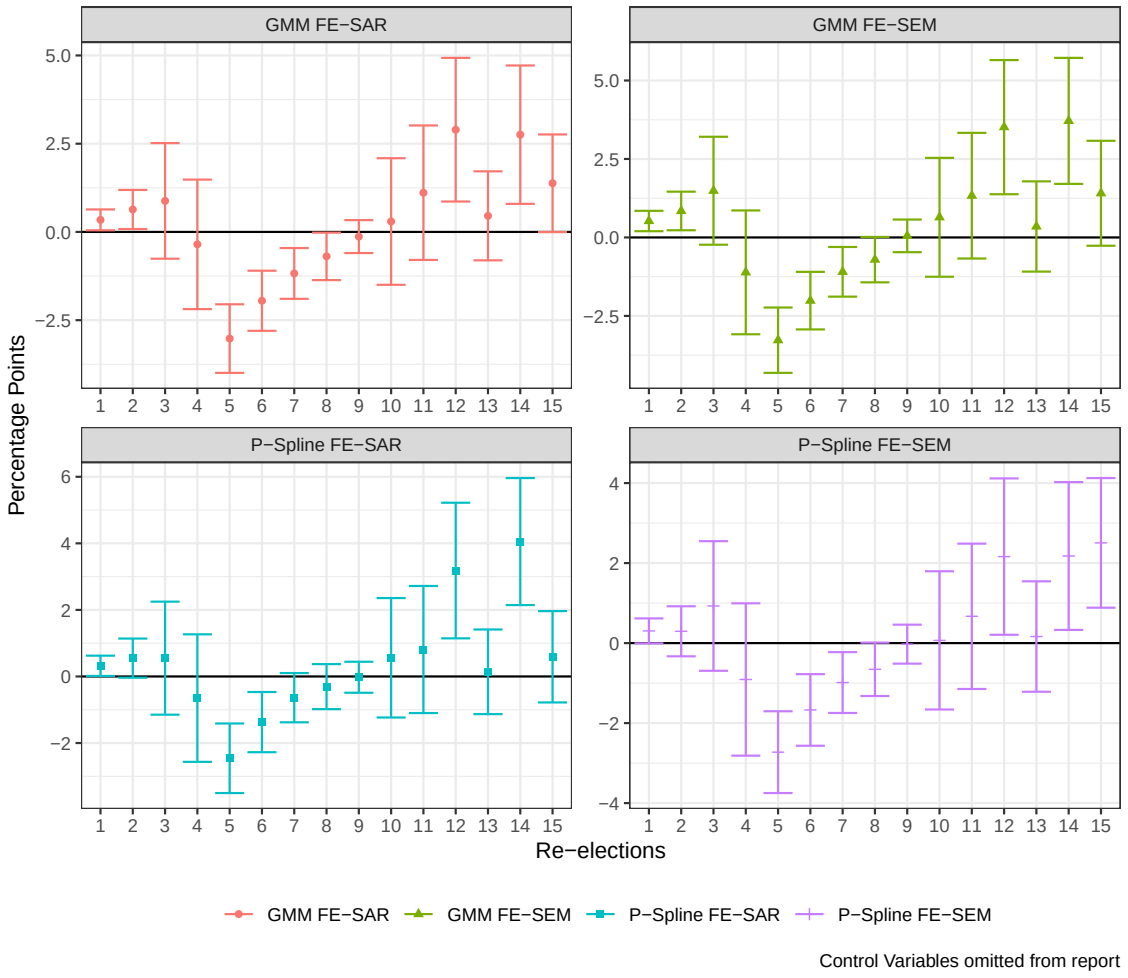

FIGURE 9: Estimates & 95% Confidence Bands Of The Coefficients Of $Re\text{-}elect(i)$, $i = 1, ..., 15$, Obtained Using GMM & The Method By Basile et al. (2014)

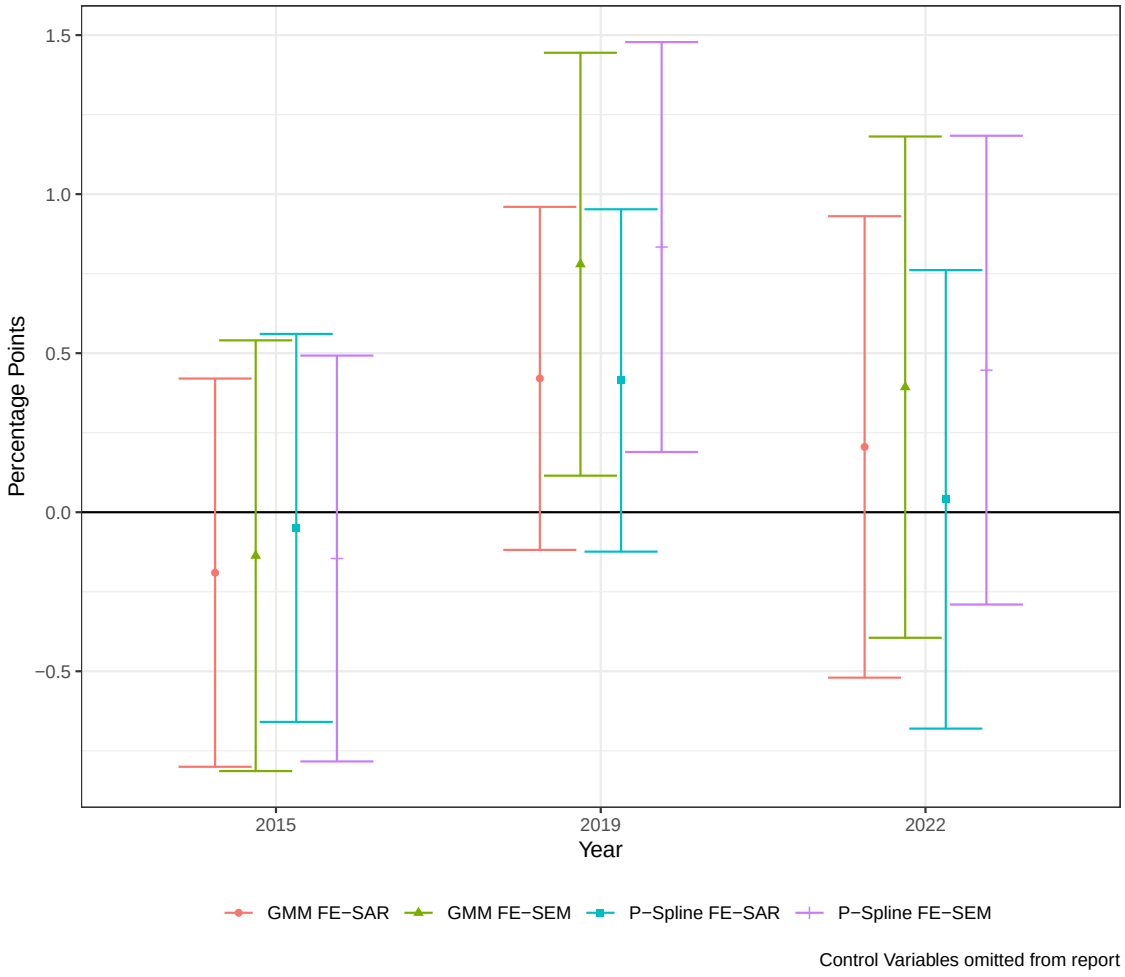

FIGURE 10: Estimates & 95% Confidence Bands Of The Coefficients Of $Same\ Party(t)$, $t = 2015, 2019$ & 2022, Obtained Using GMM & The Method By Basile et al. (2014)

	POLS	FEOLS	FE-SAR	FE-SEM
$Same\,Party$	-1.161***	0.075	-0.051	-0.054
$Young$	1.131**	0.14	0.078	-0.048
$Elder$	-0.223**	-0.035	0.051	0.067
$Fem.$	0.658*	0.044	-0.229*	-0.301**
$Unemp.\,Rate$†	-0.517*	0.007	0.061	0.209**
$Unemp.\,Rate$†^{2}	0.01	-0.002	-0.004	-0.009***
$Higher$†	0.054	-0.207	-0.22***	-0.272***
GVA	-7.376e-08	7.1e-07	5.343e-07	5.687-07
$Pop.\,Den.$	-0.001**	-0.001	4.902-04	0.001
$Immigrant$	4.721e-05	-7.58e-05	-4.568e-05	-3.336e-05
$Agriculture$	0.127	-0.287**	-0.243***	-0.282***
$Extractive$	0.674*	0.656	0.699***	0.619***
$Manuf.$	-0.54***	-0.223	-0.278***	-0.392***
$Energy$	0.407	-0.719**	-0.542***	-0.532**
$Water\,\&\,Waste$	-2.246*	-0.253	0.035	0.192
$Construction$	0.118	-0.351***	-0.237***	-0.237***
$Whsle.\,\&\,Auto.$	0.093	-0.452***	-0.354***	-0.349***
$Trns.\,\&\,Stg.$	-0.038	-0.088	-0.155*	-0.279***
$Hospit.\,\&\,Food$	0.262*	-0.054	-0.097*	-0.11*
$Comm.$	-0.722	-0.62*	-0.527***	-0.556***
$Real\,Estate$	-0.712**	-0.378*	-0.206**	-0.245**
$Consultancy$	-0.349	-0.278	-0.256**	-0.276***
$Admin.$	0.103	-0.224	-0.185***	-0.239***
$Education$	-0.017	-0.296*	-0.327***	-0.424***
$Health$	-0.109	-0.336*	-0.22**	-0.154*
Art	0.224	-0.033	0.016	-0.058
$Win\,Rate$	0.004	-0.01	-0.006	-0.01**
$Gov.\,Party$	2.121***	1.155***	0.665***	0.532***
PS	4.308**	-1.351**	-0.976**	-1.068**
$PS\,\&\,PSD$	-3.151	2.371**	2.503*	2.425*
PSD	5.925***	-0.633	-0.432	-0.551
$PàF$	4.42**	0.056	-0.362	-0.416
AD	9.685***	1.439*	-0.414	-1.487
$\widehat{\lambda}$			0.576***	
$\widehat{\rho}$				0.636***
Fixed Effects				
Municipality	No	Yes	Yes	Yes
Year	No	Yes	Yes	Yes
N	1232	1232	1232	1232
Municipality	308	308	308	308
Years	4	4	4	4

† Data from the Census. SE reported for the POLS and FEOLS are cluster robust on municipality. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

TABLE VIII: Estimates Of The Coefficients Of $Same\ Party$, Spatial Parameters & Control Covariates Obtained Using OLS & ML

	POLS	FEOLS	FE-SAR	FE-SEM
$Re\text{-}elect(1)$	0.014	0.711***	0.467***	0.412***
	(0.353)	(0.243)	(0.152)	(0.155)
$Re\text{-}elect(2)$	-1.329*	1.255**	0.846***	0.638**
	(0.743)	(0.526)	(0.286)	(0.296)
$Re\text{-}elect(3)$	0.32	1.502	1.09	1.52*
	(2.583)	(1.531)	(0.853)	(0.799)
$Re\text{-}elect(4)$	-5.072***	-1.263	-0.661	-1.003
	(1.595)	(1.458)	(0.955)	(0.926)
$Re\text{-}elect(5)$	-5.264***	-3.312***	-3.12***	-3.239***
	(1.055)	(0.956)	(0.506)	(0.487)
$Re\text{-}elect(6)$	-2.452***	-1.806**	-1.901***	-2.075***
	(0.873)	(0.752)	(0.444)	(0.429)
$Re\text{-}elect(7)$	-1.069	-0.561	-0.967***	-1.322***
	(0.775)	(0.632)	(0.373)	(0.374)
$Re\text{-}elect(8)$	-2.815***	-0.215	-0.53	-0.917***
	(0.856)	(0.532)	(0.349)	(0.338)
$Re\text{-}elect(9)$	-1.202	0.199	-0.02	-0.021
	(0.78)	(0.345)	(0.242)	(0.248)
$Re\text{-}elect(10)$	-1.576	1.347	0.652	0.197
	(2.063)	(1.016)	(0.933)	(0.883)
$Re\text{-}elect(11)$	-0.586	1.705*	1.313	1.088
	(1.534)	(0.887)	(0.993)	(0.927)
$Re\text{-}elect(12)$	-0.548	5.119***	3.65***	2.577***
	(1.687)	(1.739)	(1.052)	(0.993)
$Re\text{-}elect(13)$	-4.536**	0.717	0.544	0.329
	(1.867)	(1.853)	(0.657)	(0.694)
$Re\text{-}elect(14)$	-5.716***	7.008**	4.198***	2.135**
	(1.843)	(3.36)	(0.987)	(0.937)
$Re\text{-}elect(15)$	-2.627	-0.223	0.836	2.91***
	(2.362)	(1.555)	(0.714)	(0.824)
$\widehat{\lambda}$			0.552***	
$\widehat{\rho}$				0.655***
Fixed Effects				
Municipality	No	Yes	Yes	Yes
Year	No	Yes	Yes	Yes
R^2	0.421	0.957	0.419	0.948
AIC	7635.338	5046.786	4129.985	9411.009
$AICc$	7639.15	5050.6	4133.96	9414.98
BIC	7880.92	6878.45	4375.57	9656.6
N	1232	1232	1232	1232
Municipality	308	308	308	308
Years	4	4	4	4

SE reported for the POLS and FEOLS are cluster robust on municipality. Control Variables coefficients estimates omitted. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

TABLE IX: Estimates Of The Coefficients Of $Re\text{-}elect(i)$, $i = 1, ..., 15$, & Spatial Parameters Obtained Using OLS & ML

	POLS	FEOLS	FE-SAR	FE-SEM
$Young$	1.101**	0.283	0.213	0.068
$Elder$	-0.255***	-0.02	0.058	0.06
$Fem.$	0.755	0.148	-0.105	-0.175
$Unemp.\ Rate$†	-0.373	0.039	0.061	0.202*
$Unemp.\ Rate$†^{2}	0.009	-0.002	-0.003	-0.009**
$Higher$†	-0.001	-0.263*	-0.253***	-0.274***
GVA	-8.45e-08	5.8e-07	4.49e-07	5.44e-07
$Pop.\ Den.$	-0.001*	-0.0004	0.001	0.001
$Immigrant$	5.1e-05	-6.7e-05	-4e-05	-3.15e-05
$Agriculture$	0.15	-0.277***	-0.222***	-0.236***
$Extractive$	0.569	0.562	0.711***	0.78***
$Manuf.$	-0.505***	-0.205	-0.243**	-0.338***
$Energy$	0.414	-0.722**	-0.548**	-0.514**
$Water\ \&\ Waste$	-1.654	0.267	0.428	0.573
$Construction$	0.105	-0.31***	-0.198***	-0.188**
$Whsle.\ \&\ Auto.$	0.108	-0.454***	-0.345***	-0.312***
$Trns.\ \&\ Stg.$	0.095	-0.075	-0.124	-0.204**
$Hospit.\ \&\ Food$	0.297	-0.034	-0.073	-0.075
$Comm.$	-0.61	-0.49	-0.43**	-0.447**
$Real\ Estate$	-0.834***	-0.355*	-0.19	-0.186
$Consultancy$	-0.235	-0.246	-0.227**	-0.207**
$Admin.$	0.139	-0.203	-0.156**	-0.183***
$Education$	-0.003	-0.312*	-0.319***	-0.366***
$Health$	-0.173	-0.455***	-0.282**	-0.145
Art	0.243	-0.043	0.032	0.001
$Win\ Rate$	0.007	-0.042***	-0.032***	-0.032***
$Gov.\ Party$	2.959***	-0.484	-0.325	0.151
PS	4.982***	1.378	0.948*	0.321
$PS\ \&\ PSD$	-2.106	1.927**	2.113	2.098
PSD	6.838***	-0.433	-0.271	-0.311
$PàF$	4.194**	4.027***	2.287***	1.039
AD	11.193***	3.352***	1.271	-1.015

† Data from the Census. SE reported for the POLS and FEOLS are cluster robust on municipality. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

TABLE X: Table (IX) $Cont.$ Estimates Of The Coefficients Of The Control Covariates Of The $Re\text{-}elect(i)$, $i = 1, ..., 15$, Models Obtained Using OLS & ML

	POLS	FEOLS	FE-SAR	FE-SEM
$Same\ Party(2015)$	-3.175***	0.084	-0.096	-0.189
	(1.022)	(0.461)	(0.314)	(0.33)
$Same\ Party(2019)$	-0.724	0.539	0.461*	0.782**
	(0.928)	(0.407)	(0.278)	(0.334)
$Same\ Party(2022)$	-2.169	-0.093	0.103	0.401
	(1.334)	(0.681)	(0.373)	(0.382)
$\widehat{\lambda}$			0.576***	
$\widehat{\rho}$				0.636***
Fixed Effects				
Municipality	No	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
R^2	0.443	0.953	0.403	0.947
AIC	7572.144	5130.843	4175.521	9446.825
$AICc$	7574.762	5133.072	4177.877	9449.18
BIC	7776.8	6906.232	4364.828	9636.131
N	1232	1232	1232	1232
Municipality	308	308	308	308
Years	4	4	4	4

SE reported for the POLS and FEOLS are cluster robust on municipality. Time dummies for the POLS model and Control Variables coefficients estimates omitted. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

TABLE XI: Estimates Of The Coefficients Of $Same\ Party(t)$, $t = 2015, 2019\ \&\ 2022$, & Spatial Parameters Obtained Using OLS & ML

	POLS	FEOLS	FE-SAR	FE-SEM
Same Party	0.534	-0.109	-0.217	-0.29
Young	1.382**	0.169	0.103	-0.05
Elder	-0.193**	-0.036	0.053	0.067
Fem.	0.329	0.07	-0.216	-0.309**
Unemp. Rate†	0.05	-0.002	0.054	0.195*
Unemp. Rate†^{2}	-0.004	-0.002	-0.003	-0.008**
Higher†	-0.159	-0.204	-0.213**	-0.254***
GVA	-7.74e-09	6.45e-07	4.84e-07	6.08e-07
Pop. Den.	-0.001***	-0.001	4.95e-04	0.001
Immigrant	7.31e-05	-7.05e-05	-4.22e-05	-3.69e-05
Agriculture	0.043	-0.293**	-0.252***	-0.3***
Extractive	0.46	0.665	0.691**	0.586**
Manuf.	-0.635***	-0.225	-0.281***	-0.406***
Energy	-0.275	-0.739**	-0.571***	-0.578**
Water & Waste	-2.619*	-0.312	0.019	0.215
Construction	0.059	-0.361***	-0.247***	-0.256***
Whsle. & Auto.	0.039	-0.463***	-0.369***	-0.369***
Trns. & Stg.	-0.044	-0.081	-0.159	-0.298***
Hospit. & Food	0.139	-0.06	-0.106	-0.129*
Comm.	-0.373	-0.623*	-0.534***	-0.577***
Real Estate	-0.946***	-0.385**	-0.214*	-0.257**
Consultancy	-0.107	-0.274	-0.26**	-0.289***
Admin.	0.01	-0.235	-0.199***	-0.26***
Education	0.134	-0.298*	-0.333***	-0.433***
Health	-0.329	-0.346*	-0.232**	-0.181
Art	0.177	-0.037	0.008	-0.08
Win Rate	0.002	-0.01	-0.006	-0.013**
Gov. Party	1.485***	1.166***	0.668***	0.583***
PS	3.712*	-1.413**	-1.032**	-1.099**
PS & PSD	-0.962	2.256**	2.42	2.365
PSD	6.59***	-0.691	-0.502	-0.633
PàF	4.565**	-0.173	-0.617	-0.814
AD	9.635***	1.233	-0.444	-1.267

† Data from the Census. SE reported for the POLS and FEOLS are cluster robust on municipality. Time dummies for the POLS model omitted. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

TABLE XII: Table (XI) *Cont.* Estimates Of The Coefficients Of The Control Covariates Of The $Same\ Party(t)$, $t = 2015, 2019\ \&\ 2022$, Models Obtained Using OLS & ML

	GMM		P-Spline	
	FE-SAR	FE-SEM	FE-SAR	FE-SEM
Same Party	-0.108	-0.023	-0.112	-0.117
Fixed Effects				
Municipality	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Controls	33	33	32	32
N	1232	1232	1232	1232
Municipality	308	308	308	308
Years	4	4	4	4

For the GMM models Time FE where incorporated using dummy variables for the years (2015, 2019 and 2022). Control variables omitted from report. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

TABLE XIII: Estimate Of The Coefficient Of $Same\ Party$ Obtained Using GMM & The Method By Basile et al. (2014)

Miscellaneous

	2022		2019
PS	41.4%	PS	36.3%
PSD	27.7%	PSD	27.8%
$Chega$	7.2%	BE	9.5%
	2015		2011
$PàF$	36.9%	PSD	38.7%
PS	32.3%	PS	28.06%
BE	10.2%	CDS	11.7%

In accordance with data retrieved from the official Portuguese election website ($www.eleicoes.mai.gov.pt$)

TABLE XIV: Parties With The Highest Voting Share In Portugal's Legislative Election From 2011 To 2022