
THE FISCAL RELEVANCE OF THE MEDIAN VOTER IN THE
PORTUGUESE POLITICAL SPECTRUM

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Abstract

This work studies the median voter theorem in the Portuguese context and, specifically, how his ideology can affect fiscal policy. For this purpose, the median voter ideology is calculated for all electoral moments from 1976 to 2019. Then, through a statistical analysis based on parametric and non-parametric tests, it is checked whether the inclination of this ideology towards one of the ends of the spectrum creates some trend in the value of fiscal aggregates. The results indicate that left-wing median voters tend to result in higher values of total revenue and primary expenditure. Subsequently, an econometric approach is conducted, consisting of a panel data model for the European context between 1995 and 2019. The results show that the more to the left is the ideology of a median voter, the lower will be the primary balance GDP ratio, and in contradiction with the results for the Portuguese economy, the lower will also be total revenue and primary expenditure ratios.

JEL codes: C12, C23, D72, D78, E62

Keywords: median voter; political ideology; electoral motivation; fiscal policy; panel data

Resumo

Este trabalho estuda o teorema do eleitor mediano no contexto português e, especificamente, de que modo a ideologia deste pode afetar a política orçamental. Para tal, a ideologia do eleitor mediano é calculada para os momentos eleitorais desde 1976 até 2019. Depois, através de uma análise estatística baseada em testes paramétricos e não-paramétricos, afere-se se a inclinação dessa ideologia para um dos extremos do espectro cria alguma tendência no valor dos agregados orçamentais. Os resultados indicam que eleitores medianos de esquerda tendem a resultar em valores mais altos dos rácios no PIB da receita total e da despesa primária. Após, é conduzida uma abordagem econométrica, consistindo num modelo de dados em painel para o contexto europeu entre 1995 e 2019. Os resultados evidenciam que, quanto à esquerda for a ideologia do eleitor mediano, menores serão os valores dos rácios do saldo primário e, contradizendo os resultados obtidos para a economia portuguesa, também da receita total e da despesa primária.

Códigos JEL: C12, C23, D72, D78, E62

Palavras-chave: eleitor mediano; ideologia política; motivação eleitoral; política orçamental; dados em painel

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Abbreviations and acronyms

AD	Aliança Democrática (Democratic Alliance)
APU	Aliança Popular Unida (United Popular Alliance)
BE	Bloco de Esquerda (Left Bloc)
CDS/PP	Centro Democrático e Social/Partido Popular (Social and Democratic Centre/Popular Party)
CDU	Coaligação Democrática Unitária (Unified Democratic Coalition)
CH	Chegal! (Enough!)
FRS	Frente Revolucionária Socialista (Revolutionary Socialist Front)
GDP	Gross Domestic Product
IL	Iniciativa Liberal (Liberal Initiative)
L	LIVRE (FREE)
OLS	Ordinary Least Squares
PàF	Portugal à Frente (Portugal Ahead)
PAN	Pessoas – Animais – Natureza (People-Animals-Nature)
PCP	Partido Comunista Português (Portuguese Communist Party)
PPD/PSD	Partido Popular Democrático/Partido Social Democrata (Democratic Popular Party/Social Democratic Party)
PPM	Partido Popular Monárquico (Popular Monarchist Party)
PRD	Partido Renovador Português (Democratic Renewal Party)
PS	Partido Socialista (Socialist Party)
PSN	Partido da Solidariedade Nacional (National Solidarity Party)
PREC	Processo Revolucionário em Curso (Ongoing Revolutionary Process)
UDP	União Democrática Popular (Popular Democratic Union)

1. Introduction

The world is facing one of the biggest health crises it ever faced. The Covid-19 pandemic is affecting almost all sectors of the economy and its effects are expected to last for a significant amount of time. Moreover, it thickened the already existing veil of uncertainty that hangs in the air lingering over every decision-making process. And even though governments are used to work with predictions and hypothetical scenarios, it is still important to reduce as much as possible this prevailing uncertainty veil with which policymakers must coexist. It is only through this, that policymakers can reduce the inherent risk of their predictive scenarios and promote more accurate policies to tackle the social-economic challenges. Since nowadays political scientists and economists have not yet reached a consensus concerning how the political framework can optimally operate with budgetary tools to achieve the desired economic outcomes, it is here where the focus of this dissertation lies on.

This research addresses a model which has been warming up debates in the current political-economic literature: the median voter theorem. With the maturing of democracies and the proliferation of universal suffrage, researchers observed that given a preference spectrum regarding a specific policy, the collective choice usually coincides with the intention of the voter with the median preference. This means that, as long as certain requirements are met, the voter with the median preference gets its most preferred policy (Black, 1948; Congleton, 2004). But does this mean that changes in the preferences of the median voter affect the policy chosen?

This work assesses the economic relevance of the median voter preferences over fiscal policy by using the Portuguese elections timeline from 1976 until 2019. Portugal was chosen as the spatial dimension for two main purposes: a historical one and an economic one. For a historical reason, since Portugal is a forty-five-year-old democracy after going through a forty-one-year dictatorship period. This is relevant as the maturing of the Portuguese democracy, that followed the prior autocratic regime, ensures more consistency and stability to the current political system. Therefore, the Portuguese political regime is less prone to suffer any significant changes in future, which reduces the risk and uncertainty within the policymakers' hypothetical scenarios. For an economic purpose, given that Portugal just faced a severe public accounts crisis and that, since the beginning of the democratic period, 1974, only in 2019 showed a public surplus which brings

relevance to the analysis on how public finances relate to the preferences of the median voter. More specifically, this work intends to show how the median voter's posture moved in the Portuguese ideological spectrum, and given the incessant uncertainty around an electoral context, if those changes affected policymakers' decisions and can explain the deterioration of the public accounts. Additionally, for a better assessment, it seems relevant to place the Portuguese case in the external relevant context – the European one. As it is further discussed, the current literature points out that the median voter can to some degree affect the fiscal policy. Given this, as far as my knowledge goes, no prior research has tackled measuring this effect for the Portuguese background, and therefore this dissertation will fill this gap left in the literature.

This dissertation is structured in the following way: the second chapter and the third chapter review the current state of the art. The second chapter comprises an exposition of the public choice theory and the seminal political-economic contributions regarding the preferences of decision-makers and voters. The third chapter includes a critical analysis of the median voter theorem, containing a historical contextualization of the theorem and covering the seminal contributions, its limitations and a summarized literature review regarding the relevance and impact of the median voter ideology on economic variables.

The fourth chapter covers the identification of the Portuguese median voter ideology, beginning with a historical contextualization of the evolution of Portugal's democratic framework. Then, this dissertation replicates Kim and Fording (2003)'s method to find the median voter ideology. This way, it is possible to create an ideological-political spectrum for the Portuguese political parties and find the median voter within every parliamentary election from 1974 till 2019, observing how the median voter's position has changed over the Portuguese democratic period. The fifth chapter comprises a set of statistical tests to assess the relationship between the Portuguese median voter ideology and the fiscal policy. Then, in the sixth chapter, an econometric approach is carried through the estimation of a panel data econometric model, allowing for a comparison of Portugal's median voter performance with the European context. The last chapter summarizes the main conclusions of this work, provides a critical assessment of the work and suggests some future developments for this line of research.

2. The public choice school

This chapter begins with a broad analysis of the public choice school, first tackling its emergence, its developments, and its goal of studying government failures. Then, within this framework, this chapter addresses the seminal contributions regarding political-economic models focussing on political business cycles – that is, how political factors, like ideological or electoral influences, may drive governments to manipulate economic variables, creating the so-called political business cycles.

2.1 From the economics of welfare to the public choice school

In the first half of the XX century, economic experts shaped their focus towards understanding how public decision-makers could promote social wellbeing. Pigou (1929) presented the seminal work concerning this economic line of research, where he explored the several dimensions through which government intervention could improve the overall welfare. Regarding an efficiency dimension, the so-called economics of welfare argued, that, given the limited availability of resources, individuals aim at increasing their own satisfaction, even if at the detriment of others. So, government's intervention is needed to mitigate the market's inefficient allocation of resources. Moreover, an equity dimension argues that individuals have a natural propensity to give more importance to the present than to the future. Thus, governments should promote redistribution programmes to increase individuals' savings and mitigate their community wealth gaps (Pigou, 1929).

The subsequent contributions invigorated the mathematician formalization for the maximization of social welfare. As an instance, Bergson (1938) formalized some guideline propositions that should be met to preserve the level of economic welfare. Hicks (1939) presented a set of terms that should be met to create the optimum government.

The public choice theory arises as a supplement or criticism towards this literary stream, covering both its dimensions. Regarding the efficiency dimension, it asserts that since sovereign States are managed by policymakers, these individuals are susceptible to not perform in accordance with the optimization of social welfare. Instead, they can act according to their own welfare due to, for example, re-election purposes, partisan loyalty, or lobbying issues. Therefore, the government is also prone to fail, leading to the so-called government failures, and so its direct intervention in resource allocation should be pondered (Black, 1958; Buchanan, 1962). Likewise, the public choice school also covers the

equity dimension tackled by the economics of welfare. One seminal work belongs to Garvey (1969), who studied patronal groups, their relationship with their proteges and their similarities with the government. In his analysis, Garvey (1969) found that, if any coercive status is maintained to ensure that all expenses are equitably divided by all individuals, it is impossible to hold a level of taxation that guarantees the optimization of social welfare. Grand (1991) completes this work by analysing other equity-related government interventions, arriving at several assertions. Firstly, the government provision of public goods is not necessarily equitable. Secondly, government subsidies and social benefits' distribution is paradoxical because evidence shows that individuals with higher income benefit the most, not promoting equity. If aiming only for the poorest, the people with the highest income lose encouragement to work harder to obtain higher incomes. Still, the author mentions that proper taxation might solve this paradox. Lastly, government regulation does not necessarily promote equity as it may create other problems.

The public choice school is an economic science in the sense that it uses economic methods to examine political science's affairs, like government failures and electoral procedures. Succinctly, these studies may adopt a positive analysis, which focuses on predicting how different behaviours, procedures and methodologies influence the outcome of collective choices (Pereira, 1997), or a normative analysis, which explores the multiplicity of State objectives, with a focus on how the government ought to function (Buchanan & Tullock, 1965; Mueller, 2003).

2.2 The political-economic models

One field of study which public choice economists have theorized regards political-economic models based on political business cycles. These economists attempt to depict in which way policymakers can influence economic variables, such as the output, inflation, and unemployment, in a way that does not necessarily meet the goal of maximizing social welfare but meets their own interests. These models can be classified considering the intentions behind the policymaker's decisions in opportunistic/electoral models, which consider that the incumbent government influences policy for electoral gains (Nordhaus, 1975; Rogoff, 1990; Rogoff & Sibert, 1988), or partisan/ideological, which consider that the policy is chosen for satisfying their ideological constituency (Alesina, 1987, 1988; Hibbs, 1977). But they can also be split considering the approach on how voters' expectations are formed: voters' expectations can be adaptive, meaning that

voters are backward-looking, or rational, meaning that voters are forward-looking.

The first model was developed by Nordhaus (1975). He assumed that voters had a decreasing memory over the past experiences which meant that voters would better remember the recent policies and forget the older ones. Also, voters would have a myopic vision of the future policies, meaning they would be more aware of the short-run rather than the long-run effects of a given economic policy. Additionally, voters would form their expectations based on their past experiences – adaptive expectation – and policymakers would take advantage of these voters' characteristics to promote policies that would increase their chances of re-election. Typically, in the first years of a mandate, a government promotes austerity-based programmes and as the election year comes near, he shifts policies to a more potlatch basis. This results in the sharp decline of unemployment in the period before elections and the rise afterwards. Inversely, the inflation rate increases before the election period and after that it decreases.

Hibbs (1977) proposed a model in which voters would still have adaptive expectations but under heterogeneous preferences. Given these assumptions, policymakers would promote policies that would meet their electorate interests. Left-wing regimes mainly consisted of labour-oriented and socialist parties, which favoured policies more averse to unemployment aiming at full employment and levelling the income distribution. Right-wing governments essentially comprised business-oriented and conservative parties, which would promote policies more averse to inflation, targeting price stability.

During the '80s, further models were developed after the rational expectations revolution. Now, it was assumed that citizens could depict the government's future policy and its outcomes. Therefore, the electorate could not be so easily manipulated by the government's pre-electoral policies. On the field of electoral models, Rogoff and Sibert (1988) and Rogoff (1990) considered that, even though voters have rational expectations, there is a temporary information asymmetry between voters and the government, as the latter knows his own level of competence. Hence, policymakers still could promote expansionary policies before elections periods in their attempt to signal competence to the electorate. In the field of partisan models, Alesina (1987, 1988) argued that parties aim at pleasing their constituency. Given the difference between constituencies, parties have distinct levels of sensitivity towards inflation and unemployment. Consequently, political parties have different optimal policies to please their different constituencies, that, however,

result in suboptimal levels for the economic output. Therefore, the largest is the gap between the political parties' guidelines, the largest the economic fluctuations would be. Hence, the changes in the output and inflation were not due to voters' misinformation but instead due to the difference between the points of view of both parties. However, they can commit to similar policies to reduce these costly fluctuations of economic variables.

Both models were empirically studied and tested in the public choice framework. Drazen (2000) gathers the main theoretical and empirical studies developed since the first formalization of the political-economic cycles to assess in which standards the state of the art was. Regarding electoral models, Alesina et al. (1997) and Faust and Irons (1999) were not able to find a significant increase in economic growth or employment in pre-election periods in OECD countries and USA, respectively. This means that empirical finding does not support the political business cycles theorized by Nordhaus (1975). However, Alesina et al. (1997) found strong evidence of an increase in inflation in the periods right after elections. Moreover, empirical studies point out the existence of expansionary monetary policies (Alesina et al., 1992) and increases in fiscal transfers (Alesina et al., 1992; Alesina et al., 1997) in the pre-electoral periods. Thus, the empirical evidence seems to point out existence of the political business cycles theorized by Rogoff and Sibert (1988) and Rogoff (1990). About partisan models, Frey and Schneider (1978) show empirical evidence that incumbent governments act according to their constituency likings but, only if their chances of being re-elected are high enough. Moreover, Faust and Irons (1999) found evidence of the ideological effect on the economic activity of the USA, as democrats tend to have higher real GDP than republicans. However, regarding inflation and monetary instruments, empirical studies are not able to reach consensual conclusions (Drazen, 2000).

Thus, the empirical evidence is more favourable to support the electoral business cycles than the partisan ones. Therefore, in the context of growing central bank's independence, the incumbent policymakers may manipulate the fiscal policy to increase their chances of re-election. Also, outside of the policymaking sphere, both the incumbent but also the other candidates may adjust their announced fiscal policies to attract as many votes as possible. One model that studies this maximization effect is the median voter theorem, which concludes that, in a pairwise election, both candidates will announce their policies as closely as possible to the one preferred by the median voter. The next chapter explores this model, highlighting its emergence, its assumptions, and its relevance.

3. The median voter theorem

This chapter is entirely focused on the median voter theorem. It starts with a historical analysis of its emergence and its formalization. Then, it focuses on its relevance through an analysis of further developments, displaying its criticism and extensions.

3.1 A historical contextualization

As seen before, the public choice school arose from the flaws and unanswered questions of the economics of welfare. Given that the latter assumes that a policymaker's goal is to maximize social welfare, economists and political scientists were not understanding why this could not be achieved. For example, there were still cases of dictatorship regimes where political and economic decisions were made by one individual disregarding the rest of the citizens' preferences. Other incidents involved situations where policymaking was made according to the will of a divine entity (Arrow, 1950). But still, in the more sophisticated societies where those regimes were not practised, social decisions were not matching the aggregation of individual preferences, and therefore the maximization of the social welfare was being put at risk. For this reason, public choice also studies how diverse social choice mechanisms may affect the outcome of any democratic decision, to reduce the discrepancies between the individual and the collective preferences.

In the early stages of this subject, Arrow (1950) studied which properties a voting rule should have to ensure the maximization of social welfare, perfectly expressing the aggregation of individual preferences. Originally, he established two axioms, being that *a*) every individual can rank its individual options according to its likings, and *b*) there is a transitivity property between the order of those preferences. According to Arrow (1950), a perfect voting rule would:

- (i) represent social choice as the aggregation of individual preferences;
- (ii) ensure that the changes in the individual preferences positively convert to the social ordering;
- (iii) guarantee the independence of irrelevant alternatives, meaning that if one of the options is no longer available, the order of the individual and collective preferences over the other options remains the same;
- (iv) have an unrestricted domain, meaning that it must include every individual possible ranking of preferences;

- (v) ensure non-dictatorship regimes, meaning that no individual alone can set the collective outcome.

In the same work, Arrow (1950) proved that it is impossible to ensure conditions (ii) and (iii), assuming axioms *a*) and *b*), without imposing some sort of dictatorship regime and therefore violating criterion (v). Thus, the author summarized that no voting rule could meet these criteria at the same time.

This brought some discouragement to the political-economic researchers until Downs (1957) presented an idea that could circumvent Arrows' dilemma. Downs adapted Hotelling (1929)'s spatial market model into a one-dimensional political spectrum, assuming that voters have single-peaked preferences and that political parties' ideologies can shift to increase the chances of re-election (electoral/opportunistic model). By spreading the voters homogenously through that spectrum, he noticed that in a two-party system the political parties will converge ideologically to the middle of the spectrum. This was fundamental for the school of public choice as it invigorated the predictions obtained when using a majority voting rule (Cho & Duggan, 2009; Tullock, 1979). Downs (1957) also noticed that the distribution of the electorate over the political spectrum influences this convergence, as some distributions incentivise the rise of new parties. In this panorama, parties instead of converging to the median voter position, typically maintain their ideological positions to distinguish themselves from the other parties. This was the first application of the median optimum idea to representative democracy.

Nonetheless, previously to Downs (1957), Black (1948) had already explored this median optimum concept. By analysing the reasoning behind a choice between two motions within a committee, Black (1948) assumed that voters would rank and vote for motions according to their likings and that they had single-peaked preferences. Given this, the collective optimum motion would correspond to the motion proposed by the median voter, as it was the only one that could always get a majority over the others. Therefore, Black (1948) asserted that the only acceptable resolution had to be the motion of the element with the median preference.

The median voter theorem or median voter model is one of the cleanest concepts that incorporates a decision-making process via a majority voting rule. Besides its simplicity, the median voter theorem also has an extensible nature as it can be applied from day-to-day decisions to a representative democratic election (Congleton, 2004). However,

formally, to obtain the convergence of the political parties' policies mentioned by Downs (1957), that is, the convergence towards the median voter's preferred one, several criteria must be met (Gruber, 2011):

- a) single-dimensional voting, meaning the electorate only considers one single variable when casting their vote;
- b) pairwise voting system, i.e., voters choose between only two candidates;
- c) candidates have no fixed ideology as their only objective is to be elected (opportunistic/electoral behaviour);
- d) all agents cast their vote intention, meaning there is no abstention or voting discrimination;
- e) homogenous electoral campaigns, i.e., politicians cannot influence their chances of being elected with a better advertisement or demagogic propaganda;
- f) full information available to all agents involved in the electoral process.

The assumption that candidates strive for being elected is what gives them the flexibility to adapt their policies towards the preferred by median voter. Therefore, candidates will choose the policy that is preferred by the median voter, as it will increase their chances of being re-elected. Logically, this lines up with the opportunistic models' framework (mentioned previously) and some authors even insert the median voter theorem within this framework (Alesina, 1988; Van Dalen & Swank, 1996).

3.2 Criticism and extensions

After Downs (1957)' insights into the power of the median voter preference, more extensions and criticism to the model emerged. Some authors focused their studies on strengthening the importance of the median voter preference in majoritarian electoral systems. Black (1958) showed that given the transitivity property and assuming citizens with single-peaked preferences, the median voter or median optimum is the only option that always obtains a simple majority. Therefore, it cannot be defeated in any pairwise voting scenario. More extensions were added reinforcing the median voter preference as an unbeatable electoral candidate (Davis et al., 1972; Enelow & Hinich, 1984; Mueller, 2003). Additionally, this means that this solution is unique and stable, as no other option can outvote it (Rowley, 1984). Therefore, economic variables, and specifically fiscal aggregates, such as the tax level, public expenditure or debt, should be in line with the preferences of

the median voter, since its preferences are the ones that best match the collective choice.

The adaptation of the median voter model to decide economic tools and outcomes was later explored in the public choice timeline. The criticism towards this is divided into several fields. One of them lies in the model pre-conditions. Given the rigorous assumptions previously mentioned, the realism of the theorem had been put in check during almost its entire lifetime. For example, voters do not consider only a single issue when opting for their preferred candidate/political party. Instead, they ponder on a set of political programmes, and therefore, it is not realistic to consider a single dimension spectrum (Davis et al., 1970). Another criticism lies in the single-peaked preferences, as many authors conclude that it is not reasonable to assume that all voters have single-peaked preferences. However, Coughlin and Hinich (1984) provided the requirements needed to guarantee that individuals do possess single-peaked preferences. Lastly, some empirical evidence refutes that candidates' motivation is to be elected. As mentioned before, one feature that splits political-economic models regarding political business cycles is the intentions behind the policymaker's decisions. As some argue, policymakers may promote policies to please their ideological constituency (Alesina, 1987, 1988; Hibbs, 1977) and not to be elected. Therefore, parties will not shift their policies towards the preference of the median voter. Several empirical studies have been made to observe the intentions of the candidates. More particularly, Wittman (1983) argued that their intentions may be mixed, presenting empirical support for his claims.

Another field of criticism explores the hypothesis of the observed variable not being the one preferred by the median voter. Supposedly, a bureaucrat, like an agenda-setter, has the power to influence electoral outcomes. For example, assuming a level of expenditure, which promotes a non-optimal level of social welfare, an agenda-setter may present a take-it-or-leave proposal of a new level of expenditure to the public. If this proposition is the same as the median voter, then it will certainly win. However, as the bureaucrat intends to maximize public expenditure, the proposed level may be higher than the median voter preference and still give greater utility to the community than the current level of public expenditure. Therefore, under these conditions, the chosen proposition is still non-optimal and will mismatch the desired by the median voter (Romer & Rosenthal, 1978, 1979; Rosenthal, 1990). This agenda-setting issue has been empirically tested by several researchers and the findings are ambiguous. Although some acknowledge the

agenda setter to have the influence to shift the electoral outcome away from the median voter preference (Romer & Rosenthal, 1982, 1983), others find no evidence (Fort, 1988; McEachern, 1978).

The last ground of criticism, and the most relevant for this dissertation, tackles the significance of the median voter position to affect the fiscal policy and the size of the government. Some studies estimated a null effect of the median voter on the fiscal outcomes. Boyne (1987) explored the local tax policy of UK subnational governments and observed that median voter interests do not seem to affect the local political systems and policy variations. Pecoraro (2014) also concludes that the median voter preference does not affect government expenditures. Nevertheless, other authors found the median voter to have a fundamental role in steering the fiscal policy. Tromborg (2014) could not understand why some indebted countries were not promoting preferable retrenchment policies. After considering the median voter preferences towards those policies, he found out that policymakers will only promote retrenchment policies if the median voter prefers them. This is presumably done so that the incumbent government would not jeopardize the chances of re-election.

One aspect about the median voter's relevance considers the individual's income to be the dimension measured in the spectrum. Therefore, fiscal policy will be decided considering the preferences of the voter with the median income. One extension of this states that, as income inequality grows, more redistribution policies are expected to be promoted. This is due to the preference of the median voter to reduce his pre-tax income bias towards wealthier individuals. Therefore, the largest this income gap is, the more redistributive policies will be endorsed (Dallinger, 2010). This evidence is supported by Milanovic (2000), who used data from 24 countries to show that nations with larger income gaps support greater redistributive programmes. However, not all empirical studies observe this. One empirical work analysed separately each of the essential redistributive policies usually promoted by a government and stressed that some public programmes are not influenced by the income gap. The authors also observed that the spending concerning unemployment or disability subsidies might increase in countries with relatively balanced income distributions (Moene & Wallerstein, 2003). Nonetheless, it is possible to conclude that the median voter affects in some way the fiscal programmes promoted by the government. A later work by Cologrossi et al. (2019) confirms this statement. By analysing

the perceptions from 126 regions of the European Union, the authors noticed that income inequality increases the demand for government action. This implies that the median voter has a fundamental influence in the setting of the fiscal policy, meaning that, as the work is entitled, “The median voter takes it all”!

4. The median voter in the Portuguese democracy

This chapter begins with a short remark concerning the historical-political context of the Portuguese democracy. Then, it comprises an arithmetic investigation of the ideology of the main political parties which ran for a legislative election and, consequently, the calculation of the median voter's ideology. Given that this empirical work is done separately for every single legislative electoral moment, this chapter provides a clear view of the evolution of the Portuguese median voter ideology, from 1976 until 2019.

4.1 The historical background of Portugal's democratization process

Portugal's timeline of existence begins on the 5th of October of 1143, the day where the Treaty of Zamora was signed, recognizing Portugal as an independent country. For the following years, Portugal was reigned by 33 kings and 2 queens, divided into four dynasties. This monarchist regime endured for 767 years until, on the 5th of October of 1910, the incumbent king resigned, due to republicans' uprisings and riots. Following that, a republican regime was established, being characterized by political instability, public chaos and economic crisis. This period was named *Primeira República* (First Republic). On the 28th of May of 1926, anti-liberal military forces took over the path of policymaking, forming a dictatorship regime, the *Estado Novo* (New State). On the 25th of April of 1974, this autocratic system was deposed, and the first Portuguese democracy was established (Lobo et al., 2016).

The transition from *Estado Novo* to the democratic regime was not immediate. The period between 1974 and 1976 was known as *Processo Revolucionário em Curso* (Ongoing Revolutionary Process – PREC) and was characterized by social tension and political disagreement on how this democratic regime should be shaped. On the 25th of April of 1976, a new constitution was established, and the first legislative elections were held. From then until 2020, fourteen more legislative elections were held. Table 1 summarizes the main results and candidate parties of all Portuguese legislative elections.

As the Portuguese constitution establishes, legislatures must have a maximum term length of four years (CPR, 2005). However, before 1987, no government was able to maintain its stance for the full duration of the allowed period.

Table 1 – Results of the Portuguese legislative elections, 1976-2019

Year	Winner party (% of votes)	Other parties which obtained seats in the parliament (% of votes)			
1976	PS (34.88%)	PPD/PSD (24.35%)	CDS/PP (15.97%)	PCP (14.39%)	UDP (1.68%)
1979	AD (45.26%)	PS (27.33%)	APU (18.8%)		UDP (2.18%)
1980	AD (47.59%)	FRS (27.65%)	APU (16.75%)		UPD (1.38%)
1983	PS (36.12%)	PPD/PSD (27.24)	APU (18.07%)		CDS/PP (12.56%)
1985	PPD/PSD (29.87%)	PS (20.72%)	PRD (17.92%)	APU (15.49%)	CDS/PP (9.96%)
1987	PPD/PSD (50.22%)	PS (22.24%)	CDU (12.41%)	PRD (4.91%)	CDS/PP (4.44%)
1991	PPD/PSD (50.60%)	PS (29.13%)	CDU (8.80%)	CDS/PP (4.43%)	PSN (1.68%)
1995	PS (43.76%)	PPD/PSD (34.12%)	CDS/PP (9.05%)		CDU (8.57%)
1999	PS (44.00%)	PPD/PSD (32.32%)	CDU (9.02%)	CDS-PP (8.38%)	BE (2.46%)
2002	PPD/PSD (40.15%)	PS (37.84%)	CDS-PP (8.75%)	CDU (6.97%)	BE (2.75%)
2005	PS (45.05%)	PPD/PSD (28.70%)	CDU (7.56%)	CDS-PP (7.26%)	BE (6.38%)
2009	PS (36.55%)	PPD/PSD (29.11%)	CDS-PP (10.43%)	BE (9.82%)	CDU (7.86%)
2011	PPD/PSD (38.65%)	PS (28.06%)	CDS-PP (11.70%)	CDU (7.91%)	BE (5.17%)
2015	PàF (38.57%)	PS (32.31%)	BE (10.19%)	CDU (8.21%)	PAN (1.39%)
2019	PS (36.34%)	PPD/PSD (27.76%)	BE (9.52%)	CDU (6.33%)	CDS-PP (4.22%)
		PAN (3.32%)	CH (1.29%)	IL (1.29%)	L (1.09%)

Source: Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021).

Notes: PS – Partido Socialista (Socialist Party); PPD/PSD – Partido Popular Democrático/Partido Social Democrata (Democratic Popular Party/Social Democratic Party); CDS/PP – Centro Democrático e Social/Partido Popular (Social and Democratic Centre/Popular Party); PCP – Partido Comunista Português (Portuguese Communist Party); UDP – União Democrática Popular (Popular Democratic Union); AD – Aliança Democrática (Democratic Alliance); APU – Aliança Popular Unida (United Popular Alliance); FRS – Frente Revolucionária Socialista (Revolutionary Socialist Front); PRD – Partido Renovador Português (Democratic Renewal Party); CDU – Coaligação Democrática Unitária (Unified Democratic Coalition); PSN – Partido da Solidariedade Nacional (National Solidarity Party); BE – Bloco de Esquerda (Left Bloc); PàF – Portugal à Frente (Portugal Ahead); PAN – Pessoas–Animais–Natureza (People–Animals–Nature); CH – Chega! (Enough!); IL – Iniciativa Liberal (Liberal Initiative); L – LIVRE (FREE).

The first democratic government was elected in 1976 and headed by PS. Yet, it only lasted until 1978, due to a parliamentary rejection of a vote of confidence in the government. Following this, PS obtained the support of CDS/PP to establish a new government. Still, this government did not last long as the ideological differences would

mean its dissolution. Following these parliamentary disagreements, the president decided to establish the government. The head of State tried three times to form the government, but the parliament would hardly cooperate with the imposed prime minister. Consequently, this obliged the president to dissolve the parliament and set early elections in 1979. This time the AD coalition, formed by PPD/PSD, CDS/PP and PPM, won the election and formed the government.

In accordance with the constitution signed in 1976, new legislative elections were held in 1980, four years after the first. These were won, once again, by the AD coalition. However, this government only prevailed until 1981, following the sudden and tragic death of the prime minister. The next government was formed in 1981 and, once again, constituted by AD. Nonetheless, this new government lasted less than a year, as the new prime minister would resign. However, he established a new government that would last until 1983, the year in which he would anew abdicate, forcing the president to appoint early elections. These legislative elections were won by PS, which headed a government constituted by them and the runner-up party, PPD/PSD. Yet, this coalition, denominated as *Bloco Central* (Central Bloc), did not hold its legislature for the full allowed period. Consequently, in 1985, new elections were held, which ended with a victory of PPD/PSD, which formed a government with parliamentary support by CDS/PP and PRD. However, in 1987, PRD withdrew its support to this government and, with the assistance of PS and APU, passed a motion of censure to dissolve it. As a result, this forced the president to appoint early elections.

In 1987, the first majority government was formed by PSD which, due to its absolute parliamentary majority, was able to govern Portugal for the following four years. In the next legislative elections, in 1991, PSD was once again able to obtain more than fifty per cent of the parliamentary seats and form the government which governed Portugal for the following four years. These were the only two times when a political party obtained an absolute majority of votes on the Portuguese legislative elections' timeline. In 1995, PS formed a government that would last for the following four years. In 1999, even though PS won the legislative elections and constituted the government, it did not endure the four years as the incumbent prime minister resigned in 2002.

Table 2 – Government composition of the Portuguese democracy, 1976-2019

Legislative elections results		Government composition				
Year	Winner party (% of votes)	Number	Period	Prime-minister's party	Other parties which formed government	
1976	PS (34.88%)	I	1976-1978	PS	-	
		II	1978	PS	CDS/PP	
		III	1978		a)	
		IV	1978-1979		a)	
		V	1979-1980		a)	
1979	AD (45.26%)	VI	1980-1981	PPD/PSD	CDS/PP	PPM
1980	AD (47.59%)	VII	1981	PPD/PSD	CDS/PP	PPM
		VIII	1981-1983	PPD/PSD	CDS/PP	PPM
1983	PS (36.12%)	IX	1983-1985	PS	PPD/PSD	
1985	PPD/PSD (29.87%)	X	1985-1987	PPD/PSD	-	
1987	PPD/PSD (50.22%)	XI	1987-1991	PPD/PSD	-	
1991	PPD/PSD (50.60%)	XII	1991-1995	PPD/PSD	-	
1995	PS (43.76%)	XIII	1995-1999	PS	-	
1999	PS (44.00%)	XIV	1999-2002	PS	-	
2002	PPD/PSD (40.15%)	XV	2002-2004	PPD/PSD	CDS/PP	
		XVI	2004-2005	PPD/PSD	CDS/PP	
2005	PS (45.05%)	XVII	2005-2009	PS	-	
2009	PS (36.55%)	XVIII	2009-2011	PS	-	
2011	PPD/PSD (38.65%)	XIX	2011-2015	PPD/PSD	CDS/PP	
2015	PàF (38.57%)	XX	2015	PPD/PSD	CDS/PP	
		XXI	2015-2019	PS	-	
2019	PS (36.34%)	XXII	2019-present	PS	-	

Source: Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021) and Portal do Governo (Portuguese Government Official Website) at <https://www.portugal.gov.pt/pt/gc21/governo/governos-anteriores> (retrieved on 5 March 2021).

Notes: PS – Partido Socialista (Socialist Party); CDS/PP – Centro Democrático e Social/Partido Popular (Social and Democratic Centre/Popular Party); AD – Aliança Democrática (Democratic Alliance); PPD/PSD – Partido Popular Democrático/Partido Social Democrata (Democratic Popular Party/Social Democratic Party); PPM – Partido Popular Monárquico (Popular Monarchist Party); PàF – Portugal à Frente (Portugal Ahead); BE – Bloco de Esquerda (Left Bloc); CDU – Coaligação Democrática Unitária (Unified Democratic Coalition); a) Government appointed by presidential initiative.

PPD/PSD won the next legislative elections in 2002 and formed a government with CDS/PP. However, the elected legislature would end in 2005, following the resignation of the prime minister, in 2004, and the dismissal of the interim prime minister by the president, in the year after. In 2005, PS constituted the following four-year government, and, in 2009, won once again the subsequent legislative elections and formed the government. However, this legislature only lasted three years, as the prime minister resigned due to the lack of parliamentary support of his programmes to deal with the

Portuguese sovereign debt and financial crisis. This forced the president to appoint early polls. PPD/PSD won the 2011 legislative elections and formed a government with CDS/PP, which lasted the full allowed four years. In 2015, they ran as a coalition and once again won the elections and formed a government. However, all the other parliamentary parties – PS, BE, CDU, and PAN – joined forces, creating an absolute parliamentary majority to approve a rejection motion to this government and deposing it. This way, the parliament dismissed the government, and the president invited PS, the second-largest voted political party, to form a government. This government was then supported by BE and CDU in the parliament and lasted the four-year allowed time. In 2019, PS won the legislative elections and formed the government, which has been ruling Portugal since then. Table 2 summarizes all the above information regarding the composition of the Portuguese democratic governments.

4.2 The evolution of the Portuguese median voter ideology

As previously asserted, the median voter ideology may have a decisive role in driving the fiscal policy. However, the existing economic literature studies diverge on the scale of this decisiveness. Furthermore, as far as my knowledge goes, this influence has not yet been tested for the Portuguese case. The only application of the median voter theorem to the Portuguese democratic case was done by Goulart and Veiga (2016). In their article, they analysed the Portuguese 2015 legislative elections and used the median voter theorem to justify how the non-winning political party was able to constitute the government.

To assess this influence in the Portuguese context, first, it is necessary to quantify the ideology of the median voter over the legislative electoral moments. For it, this dissertation resorts to Kim and Fording (2003)'s methodology to assess the political ideology of the main parties who ran for legislative elections. Kim and Fording (2003)'s methodology consists of three steps. First, it uses parties' manifestos data to gather the political parties' position and opinions regarding twenty-six categories. The value for each category represents the number of times that political parties mention that specific category on their party manifestos as a fraction of all mentioned categories. Thirteen of the categories regard right-wing policies and the other thirteen categories regard left-wing policies. Then, it develops two summations to separately assess the political party's position towards right-wing policies and towards left-wing policies. For each political party at a given year, the IDRight and the IDLeft scores correspond to the summations of the political

policies supported by that political party, within the right-wing categories and the left-wing categories, respectively.

Following this, the party ideology (IDParty) is computed through a mathematical formula, which is expressed in equation (4.1).

$$\text{IDParty} = \frac{\text{IDLeft} - \text{IDRight}}{\text{IDLeft} + \text{IDRight}} \quad (4.1)$$

As this formula ranges from -1 to 1, it is then rescaled to go from 0 to 100, where the closer to 100 a party is, the larger supporter of left-wing policies he is.

This dissertation assumes that the electorate cast their vote consonant the ideological position of the parties. Therefore, the next step of Kim and Fording (2003)'s methodology is to create an ideological spectrum for every legislative election moment held between 1976 and 2019. Then, for each party, the interval where its supporters are located is tabulated by locating the midpoints between the ideologically neighbouring parties. Later, the electoral results for each party at every election are matched to produce the percentage of the electorate that is grouped into each ideological interval. By observing the cumulative frequency of vote share, it is possible to assess the political party in which the median voter cast his vote. Finally, for every legislative election year, the median voter ideology is calculated using the statistical formula expressed in equation (4.2).

$$M = L + \left\{ \frac{(50-C)}{F} \right\} \times W \quad (4.2)$$

Where:

M – median voter ideological score;

L – lower end (ideological score) of the interval containing the median;

C – cumulative frequency of the vote share up to, but excluding, the interval containing the median;

F – frequency (vote share) in the interval containing the median;

W – width of the interval containing the median.

Other existing methodologies could provide consistent results in the formulation of the political party's ideology. Given that Kim and Fording's methodology is based on the work developed by Laver and Budge (1992), this could also have been a viable option. However, Kim and Fording (2003)'s approach was the one selected for two main reasons.

The first reason is that the political parties' ideology calculation is done through a ratio, better expressing the relation between the left-right policy preferences. Instead, Laver and Budge (1992) resort to a summation. The second reason is that Kim and Fording (2003)' methodology also includes the calculation of the median voter ideology, which makes it a more complete methodology for the purposes of this dissertation.

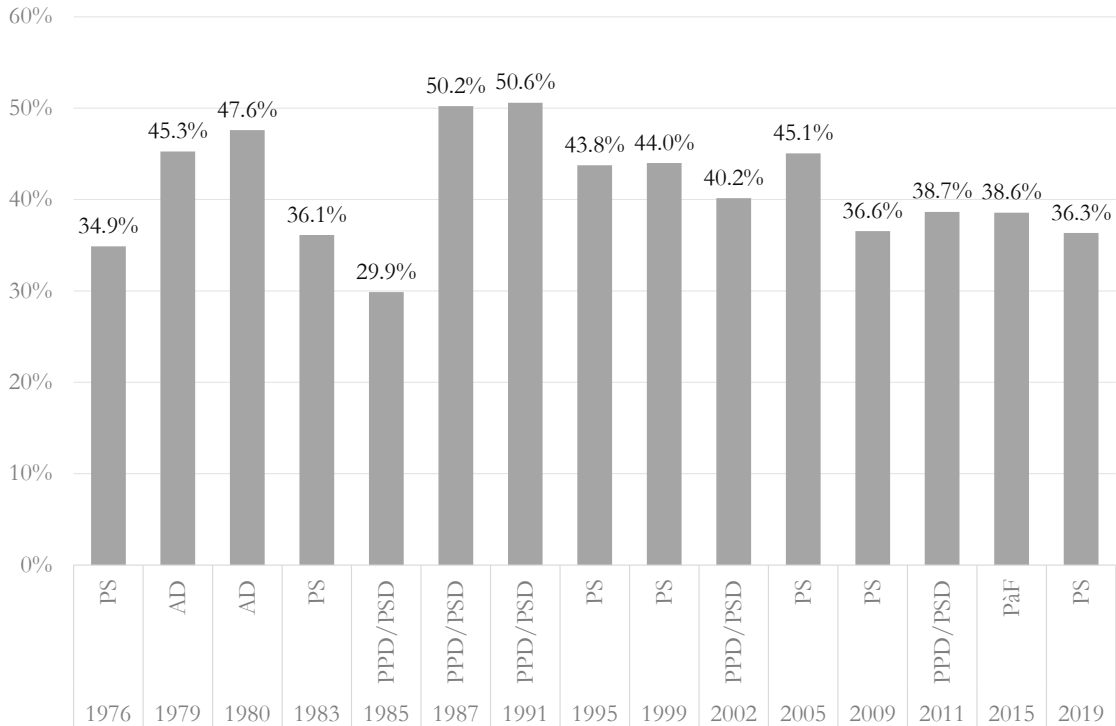
For collecting the data to assess the party ideology, this dissertation uses the parties' manifestos dataset "The Manifesto Data Collection. Manifesto Project" (Volkens et al., 2020). This dataset was chosen over other viable options for two main reasons. First, data for the Portuguese case includes 2019, making it the most updated one. This way, it contains the ideological inclinations of all the parties which gained a seat in the parliament in the 2019 legislative elections. For instance, the Greifswald Comparative Politics' dataset (Jahn et al., 2020) only covers data up to the 2015 legislative election. Second, although the chosen dataset contains gaps and omits political parties, the Greifswald Comparative Politics' dataset (Jahn et al., 2020) does not fill in these gaps. This way, this dissertation only resorts to the "The Manifesto Data Collection. Manifesto Project" dataset (Volkens et al., 2020) for the calculation of the ideological score of the Portuguese political parties.

Additionally, this work also uses the results of the legislative elections from all the fifteen electoral moments, to find the median voter's party and quantify, this way, the median voter's ideology. Figure 1 shows the evolution of the vote share of all the Portuguese fifteen legislative elections winning parties/coalitions.

As previously mentioned, there were only two legislative electoral moments that resulted in a parliamentary majority for one party. These two moments were registered both by PPD/PSD in 1987 and 1991. However, there were other times when the government obtained a parliamentary majority due to the transposing of the number of votes to the number of representatives, or due to post-election parties' arrangements. In 1978, due to a coalition of PS and CDS/PP, the government gathered 149 seats out of the 263 available. The 1979's and 1980's legislative elections conferred, respectively, 128 and 134 deputies to PPD/PSD, out of the 250 available seats. In 1983, the *Bloco Central* joined 176 deputies in this coalition, from a total of 250 seats. In 1999, PS obtained exactly 115 out of 230 seats. After the 2002 legislative elections, PPD/PSD and CDS/PP came together, totalling 119 out of 230 representatives. In 2005, PS singly obtained 121 seats, from the 230 totals. In 2011, PPD/PSD and CDS/PP coalited again, this time totalling 121

out of the 230 available seats.

Figure 1 – Vote share of legislative election’s winning party/coalition, 1976-2019



Source: Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021) and “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and own calculations.

By resorting to the “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and through the application of Kim and Fording (2003)’ methodology, it is possible to observe and order the diverse political parties’ ideologies for each election year. As the database does not contain the ideological preferences of all the political parties which ran for legislative elections, these parties were omitted from the sample. However, for each case, the omitted political party was not able to obtain a significant vote share that would grant a seat at the parliament. Therefore, it is considered that the used data is representative of the Portuguese electorate for every legislative year, even though it does not include all political parties. Regarding coalitions’ ideologies, these were calculated based on the discrimination made by the database. This is, given that the database does not treat all coalitions’ manifestos equally, these were calculated considering either as a unique political party with one ideology if the database treated the coalition as such or as made up by different political parties with different ideologies.

Then, by crossing the diverse legislative election-based spectrums with the respective political parties' vote share, it is also possible to observe which political party had attracted the preference of the median voter and, consequently, calculate the ideology of this median voter. As the above-mentioned omission of political parties would make the sum of the included parties' vote share smaller than one hundred per cent, all the votes' shares were readjusted so that, for each year, the sum equals one hundred per cent. Regarding coalitions, which were treated as political parties with different ideologies, the vote shares were divided between the political parties, considering the number of representatives that they elected for the parliament.

Table 3 highlights the median voter's ideology for each legislative elections, including the variables used in the last step of Kim and Fording (2003)'s methodology.

Table 3 – Median voter's political ideology for the legislative election moments, 1976-2019

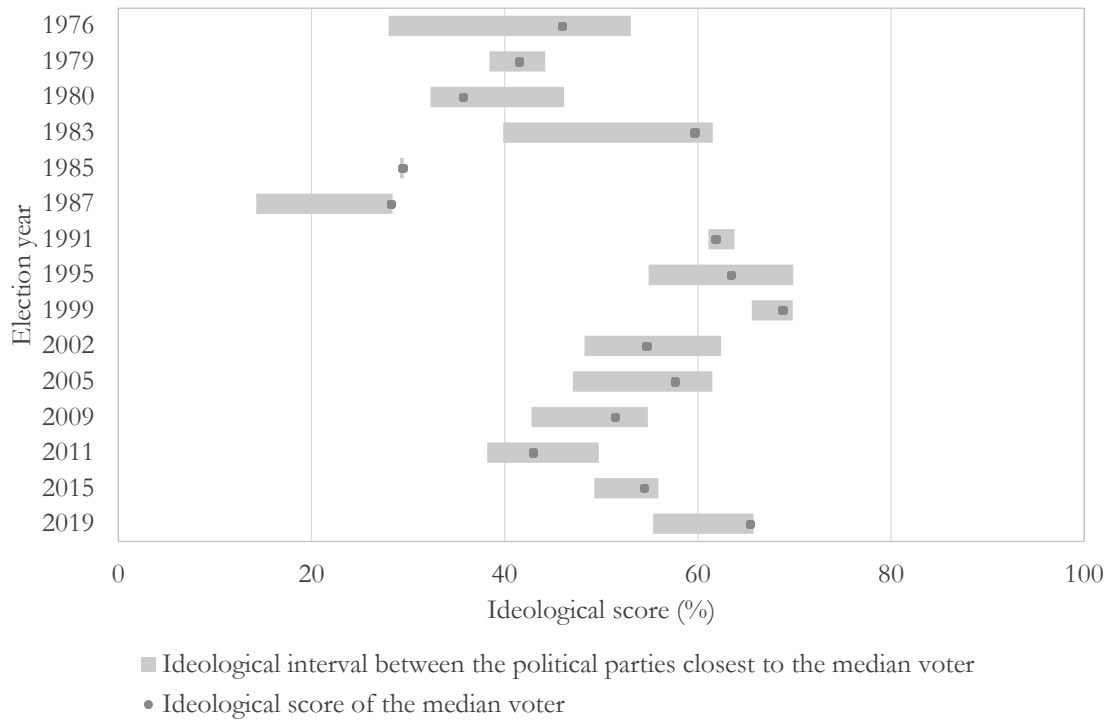
Year	Median voter's party	L	C	F	W	M
1976	PPD/PSD	40.53	39%	27%	12.55	<u>45.92</u>
1979	PS	41.32	48%	29%	3.51	<u>41.51</u>
1980	AD	29.54	18%	51%	9.70	<u>35.65</u>
1983	PS	50.69	33%	38%	20.40	<u>59.66</u>
1985	CDS/PP	29.36	49%	10%	0.57	<u>29.44</u>
1987	PPD/PSD	21.34	1%	53%	7.44	<u>28.27</u>
1991	PPD/PSD	56.12	2%	53%	6.33	<u>61.83</u>
1995	PS	62.39	45%	46%	10.40	<u>63.43</u>
1999	PS	67.70	42%	46%	6.30	<u>68.76</u>
2002	PPD/PSD	41.24	10%	42%	14.10	<u>54.67</u>
2005	PS	54.29	38%	48%	13.79	<u>57.62</u>
2009	PS	48.80	42%	39%	13.04	<u>51.42</u>
2011	PPD/PSD	35.53	13%	42%	8.44	<u>42.96</u>
2015	PS	52.60	43%	36%	9.47	<u>54.40</u>
2019	PS	60.56	38%	40%	10.14	<u>63.65</u>

Source: Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021) and "The Manifesto Data Collection. Manifesto Project" (Volkens et al., 2020).

Notes: PPD/PSD – Partido Popular Democrático/Partido Social Democrata (Democratic Popular Party/Social Democratic Party); PS – Partido Socialista (Socialist Party); AD – Aliança Democrática (Democratic Alliance); CDS/PP – Centro Democrático e Social/Partido Popular (Social and Democratic Centre/Popular Party); L – lower end (ideological score) of the interval containing the median; C – cumulative frequency of the vote share up to but not including the interval containing the median; F – frequency (vote share) in the interval containing the median; W – width of the interval containing the median; – Median voter ideological score.

Figure 2 shows the evolution of the median voter ideology through the legislative electoral moments, within the political parties closest to his ideology.

Figure 2 – Median voter’s ideology withing the two closest ideological political parties, 1976-2019



Source: Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021) and “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and own calculations.

The main intuition that can be drawn from Figure 2 is that in most of the legislative elections, the median voter ideological score is not close to the value of its nearest political parties. This might hint that political parties do not go into large efforts to close the gap between their ideology and the median voter’s one. This follows the reasoning of Downs (1957) which argues that for elections with more than two candidates, like the Portuguese example, political parties will not be drawn to the median voter ideology, as they would prefer to reinforce their own ideologies to distinguish themselves from the other political parties.

5. The influence of the median voter ideology on the Portuguese fiscal policy

This chapter provides a statistical assessment of the effect of the median voter ideology in the Portuguese fiscal aggregates. It begins with an exposition and explanation of the data used. Then, it addresses a statistical analysis, which is divided into three segments. The first segment includes a graphical analysis of the relevant fiscal variables. The second segment reports correlation tests regarding the median voter ideological score and fiscal aggregates. The last segment includes a parametric and non-parametric analysis of the relationship between the median voter ideological score and the fiscal aggregates.

5.1 Data and methodology

The fiscal variables considered in this analysis are the total revenue, the primary expenditure, and the primary balance. All variables are expressed as a percentage of the current GDP and cover all years between 1976, the year in which the first legislative elections were held, and 2019, the year for which it was possible to retrieve the most updated data. These three indicators were chosen as they are the better ones, within the available data, to represent the policymakers' use of the fiscal policy.

The data series were retrieved from “Séries longas para a economia portuguesa - pós II Guerra Mundial” (Pinheiro et al., 2000), which covers the 1976-1994 period, and from “AMECO database”, which includes data for the period between 1995 and 2019. These two datasets were merged to create the mentioned variables. A median voter ideology is attributed to each year, considering the score calculated for the respective previous legislative elections. This data series also takes into consideration the dates when the legislative elections occurred, so that if they were held in the second semester of the year, then the median voter ideological score assigned to that year is the previous legislative elections' one. Table 4 helps to clarify this distribution.

As the ideology of the median voter can only be estimated in each of the legislative moments, this dissertation considers that the median voter ideology remains the same, from one legislative election to the next, since it is the one known to policymakers in office during that political term.

For all the statistical analysis of this chapter regarding correlation, normality, parametric, and non-parametric tests, the software IBM SPSS Statistics is used.

Table 4 – Time distribution of the ideological score of the median voter, 1976-2019

Year of the legislative election	Date of the legislative election	% of the legislative year covered by the previous legislative mandate	Ideological score of the median voter	Years covered by this legislative mandate
1976	25-Apr	31%	45.92	1976-1979
1979	02-Dec	92%	41.51	1980
1980	05-Oct	76%	35.65	1981-1982
1983	25-Apr	31%	59.66	1983-1985
1985	06-Oct	76%	29.44	1986-1987
1987	19-Jul	55%	28.27	1988-1991
1991	06-Oct	76%	61.83	1992-1995
1995	01-Oct	75%	63.43	1996-1999
1999	10-Oct	77%	68.76	2000-2001
2002	17-Mar	21%	54.67	2002-2004
2005	20-Feb	14%	57.62	2005-2009
2009	27-Sep	74%	51.42	2010
2011	05-Jun	42%	42.96	2011-2015
2015	04-Oct	76%	54.40	2016-2019

Source: Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021), “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and own calculations.

5.2 A graphical and descriptive analysis

Before jumping into the statistical tests, it is important to be acquainted with the data series used. This is the purpose of this section, which comprises a descriptive analysis of all the data used. Additionally, it also displays the relevant graphical representations for the empirical analysis of the next segments.

As previously mentioned, the next segments consider three variables: total revenue, primary expenditure, and primary balance, all calculated in percentage of the GDP. This way it is possible to better compare the evolution of these variables, over the period under analysis. Additionally, it also nulls the issue regarding the Portuguese currency change, from *Escudo* to the Euro, in 2001. Table 5 portrays the relevant descriptive statistics. As it is observable, the primary balance is, on average, negative. Additionally, it is less volatile than the total revenue and the primary expenditure, given that its coefficient of variation (mean/standard variation) is smaller than the one of the other two variables. Given that the three variables are negatively skewed, this might hint that the three variables have been increasing since 1976 until 2019.

Figure 3 shows that total revenue and primary expenditure have been increasing since 1976, confirming the hinted by the negative skewness. Regarding the primary balance, Portugal is a nation with a traditionally negative primary balance. However, this tendency

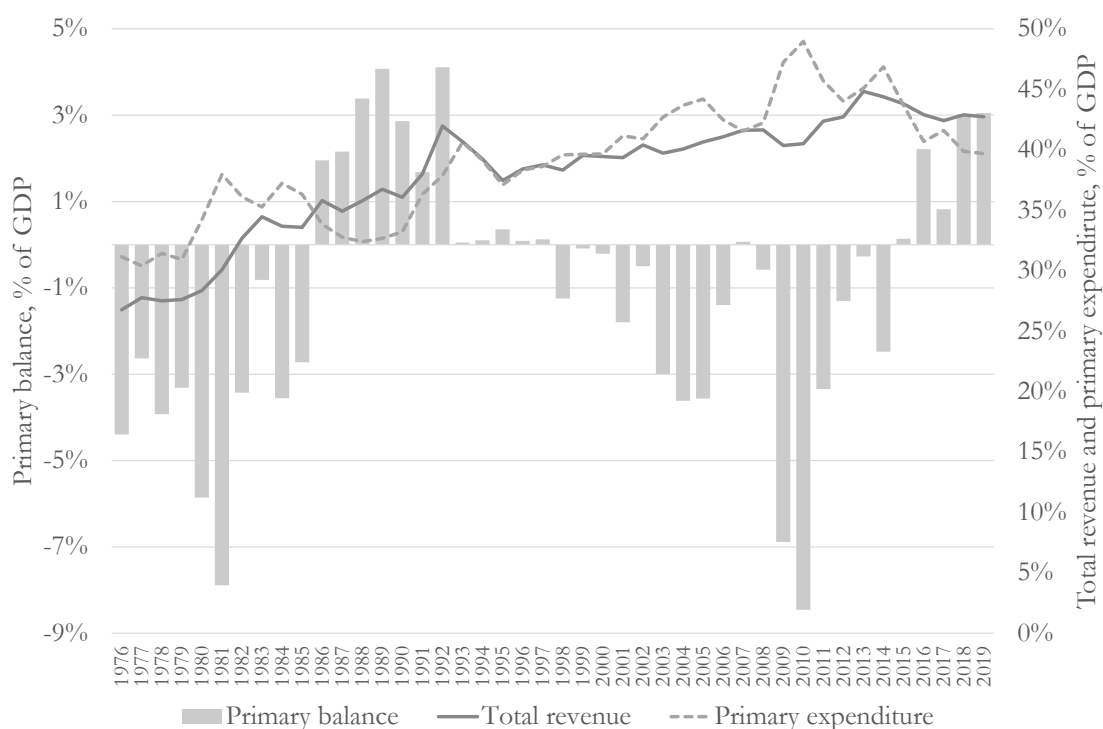
has been inverted in the more recent years. This might have resulted in the negative skewness suggested by our descriptive analysis.

Table 5 – Descriptive statistics, 1976-2019

Variables	No. obs.	Minimum	Maximum	Mean	Std. deviation	Skewness	Kurtosis
Total revenue, % current GDP	44	26.8	44.8	37.9	4.96	-0.919	-0.042
Primary expenditure, % current GDP	44	30.4	49.0	39	4.78	-0.033	-0.705
Primary balance, % current GDP	44	-8.5	4.1	-1.1	3.10	-0.420	-0.056

Source: “Séries longas para a economia portuguesa - pós II Guerra Mundial” (Pinheiro et al., 2000) and AMECO Database, available at https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en (retrieved on 30 March 2021), using IBM SPSS Statistics.

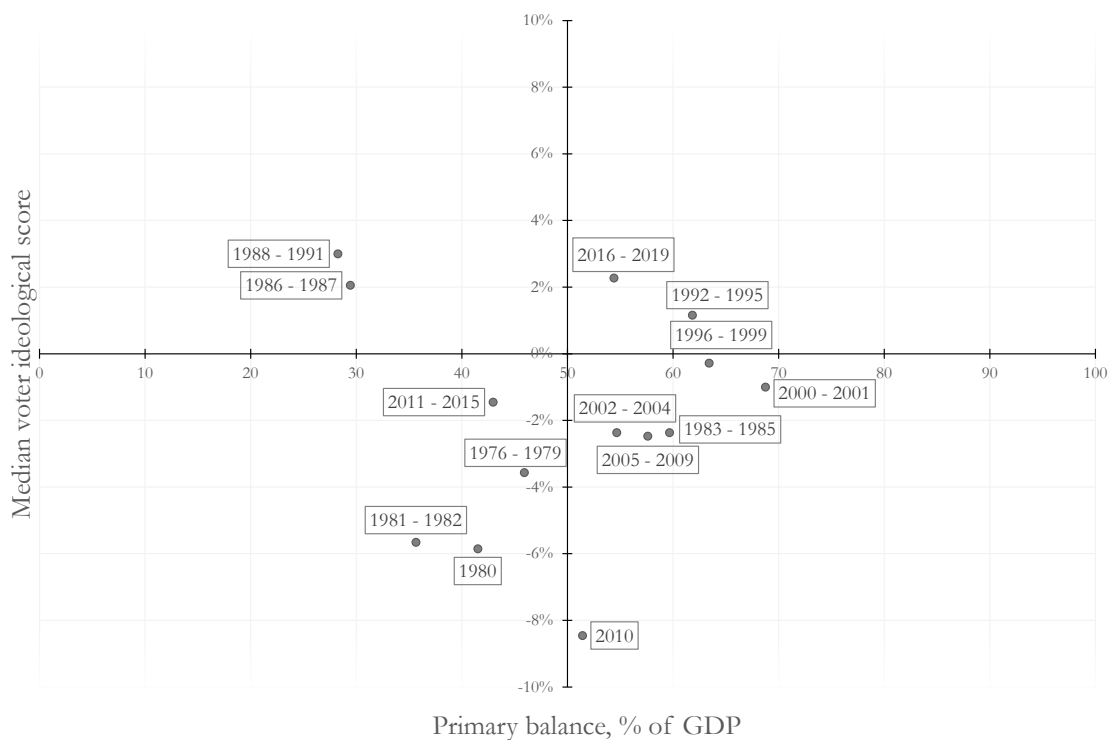
Figure 3 – Portuguese selected fiscal variables, 1976-2019



Source: “Séries longas para a economia portuguesa - pós II Guerra Mundial” (Pinheiro et al., 2000) and AMECO Database, available at https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en (retrieved on 30 March 2021).

Figure 4 contains a scatter graph with the location of the combinations of the average primary balance and the median voter ideological score for all the legislative mandates. As it is possible to observe, most of the observations are at the centre of the ideological spectrum. The highest value for the primary balance coincides with the median voter with the smallest ideological score, that is, the median voter which supports the most right-wing policies (1988-1991 term). The smallest primary balance value regards the year 2010, in which the median voter had a slight tendency towards the left-wing policies. However, it is not possible to achieve any relevant conclusions through this scatter plot as there is no clear tendency over the relations between the primary balance and the median voter ideological score. Therefore, the next segment explores the possible correlation between the median voter ideology and the three variables.

Figure 4 – Portuguese averaged primary balance and Portuguese median voter ideological score within every legislative mandate, 1976-2019



Source: “Séries longas para a economia portuguesa - pós II Guerra Mundial” (Pinheiro et al., 2000), AMECO Database, available at https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en (retrieved on 30 March 2021), Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021), “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and own calculations.

5.3 A correlation analysis

As this dissertation aims to assert, it is important to analyse whether there is any sort of influence of the median voter’s ideology on fiscal policy. This dissertation considers the total revenue, the primary expenditure, and the primary balance as good variables to observe whether policymakers manipulate fiscal policy, according to the likings of the median voter, with the aim of being re-elected.

In this segment, it is assumed that our observations correspond to the legislative mandates for which the averages of the fiscal variables of that mandate were calculated. Table 6 clarifies this distribution, including the years covered by each legislative mandate and the respective average values of the selected fiscal variables, in accordance with Table 4.

Table 6 – Matching of the selected fiscal variables with the years covered by each legislative mandate, 1976-2019

Year of the legislative election	Years covered by the legislative mandate	Ideological score of the median voter	Total revenue, % of GDP, averaged per legislative mandate	Primary expenditure, % of GDP, averaged per legislative mandate	Primary balance, % of GDP, averaged per legislative mandate
1976	1976-1979	45.92	27.41	30.97	-3.56
1979	1980	41.51	28.35	34.20	-5.85
1980	1981-1982	35.65	31.38	37.04	-5.66
1983	1983-1985	59.66	33.91	36.27	-2.36
1985	1986-1987	29.44	35.35	33.30	2.05
1987	1988-1991	28.27	36.65	33.65	3.00
1991	1992-1995	61.83	39.83	38.67	1.16
1995	1996-1999	63.43	38.76	39.03	-0.27
1999	2000-2001	68.76	39.39	40.40	-1.01
2002	2002-2004	54.67	40.05	42.42	-2.37
2005	2005-2009	57.62	41.06	43.53	-2.47
2009	2010	51.42	40.50	48.96	-8.46
2011	2011-2015	42.96	43.61	45.07	-1.46
2015	2016-2019	54.40	42.74	40.46	2.28

Source: “Séries longas para a economia portuguesa - pós II Guerra Mundial” (Pinheiro et al., 2000) and AMECO Database, available at https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en (retrieved on 30 March 2021), Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021), “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and own calculations.

To assess the influence of the median voter in fiscal policy, the correlation between the median voter ideological score and the fiscal variables is analysed. The family

of correlation tests mainly consists of the Pearson’s correlation test and the Spearman’s correlation test. As the first one tests for normal distribution and the second one for ordinal distribution (Corder & Foreman, 2009), the Shapiro-Wilk normality test is conducted to assess whether the four data series follow a normal distribution. In this dissertation’s case, the Shapiro-Wilk normality test is preferred over the Kolmogorov-Smirnov normality test, as the first one works better for series smaller than 30 observations, and our sample contains only 14 units. The Shapiro-Wilk normality test considers the null hypothesis to be that the sample follows a normal distribution. For all four variables, the p-value is larger than 0.05, and the null hypothesis is not rejected. So, it is possible to conclude that the Shapiro-Wilk normality test does not show a significant departure from normality, for the four variables. Consequently, Pearson’s normal correlation test is conducted to assess if any of the variables correlates with the median voter ideological score. The null hypothesis of the correlation test considers the two variables not to be correlated. Table 7 includes the two statistical tests conducted and the main results.

Table 7 – Normality and Pearson’s correlation tests, 1976-2019

Variables	Tests of normality (Shapiro-Wilk)			Pearson's correlation with median voter ideological score		
	W	df	p-value	ρ	p-value*	N
Ideological score of the median voter	0.953	14	0.601			
Total revenue, % of GDP, averaged per legislative mandate	0.913	14	0.177	0.396	0.161	14
Primary expenditure % of GDP, averaged per legislative mandate	0.979	14	0.971	0.430	0.125	14
Primary balance, % of GDP, averaged per legislative mandate	0.961	14	0.745	-0.042	0.886	14

Source: “Séries longas para a economia portuguesa - pós II Guerra Mundial” (Pinheiro et al., 2000) and AMECO Database, available at https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en (retrieved on 30 March 2021), Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021), “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and own calculations, using IBM SPSS Statistics.

Note: * two tailed distribution.

As it is possible to observe, none of the three tests achieves a significance level lower than 0.05. Therefore, for every case, the null hypothesis is not rejected meaning that neither the total revenue, the primary expenditure or the primary balance have a significant

correlation with the ideological score of the median voter. Thus, there is no evidence that the median voter ideological score influences fiscal policy.

Despite the results, the conclusions drawn should be looked at with care. The statistical test conducted does have a few flaws, for example, the usage of a data series with few observations. Even so, the next section of this chapter addresses a parametric and non-parametric analysis, to assess the similarities, within the fiscal policy, between different scenarios of the median voter ideological score.

5.4 A parametric and non-parametric analysis

To understand if the ideological score of the median voter can influence the relevant fiscal aggregates, this section assumes different scenarios, each with a different partition of our data series, according to the median voter ideology. The purpose is to check if the allocation of the observations to specific subgroups, based on the median voter ideological score, affects the value of the fiscal aggregates.

In the first scenario, the data series is divided into two subgroups: “right” and “left”. All observations with a median voter ideological score smaller than 50 are labelled as “right” and all observations which recorded a score larger than 50 as “left”. The second scenario divides the data series into two subgroups: “centre” and “non-centre”. The “centre” subgroup represents all years that have the median voter ideological score located between 40 and 60. The “non-centre” subgroup represents all the cases in which the median voter had an ideological score above 60 or below 40. The third scenario divides the data series into three subgroups. One represents all years in which the median voter had an ideological score smaller than 45, another subgroup represents the cases with a score between 45 and 55 and the other subgroup all entries with a score larger than 55. These three subgroups are denominated as “right”, “centre” and “left”, respectively. Table 8 shows the partitions made based on these scenarios.

The intention of defining different intervals for the “centre” subgroup in the second and third scenarios regards the purpose of this subgroup within the respective scenario. On one hand, a wider interval was considered for the second scenario because this one aims at analysing the effect of the highly partisan median voters, disregarding the tendency of their ideology. On the other hand, the third scenario considers the “centre” subgroup to capture all the median voters without a clear tendency towards one of the

edges of the political spectrum and consequently considers a narrower interval.

Table 8 – Data series arrangement considering the median voter ideology-based scenarios, 1976-2019

Legislative years covered	Median voter ideological score	Right – Left scenario	Centre – Non-centre scenario	Right – Centre – Left scenario
1976-1979	45.92	Right	Centre	Centre
1980	41.51	Right	Centre	Right
1981-1982	35.65	Right	Non-centre	Right
1983-1985	59.66	Left	Centre	Left
1986-1987	29.44	Right	Non-centre	Right
1988-1991	28.27	Right	Non-centre	Right
1992-1995	61.83	Left	Non-centre	Left
1996-1999	63.43	Left	Non-centre	Left
2000-2001	68.76	Left	Non-centre	Left
2002-2004	54.67	Left	Centre	Centre
2005-2009	57.62	Left	Centre	Left
2010	51.42	Left	Centre	Centre
2011-2015	42.96	Right	Centre	Right
2016-2019	54.40	Left	Centre	Centre

Source: Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021), “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and own calculations.

For the statistical analysis, this subsection provides parametric and non-parametric tests to assess if the different data series’ subgroups result in significant differences in the means of the analysed fiscal variables. For the scenarios with only two subgroups, the parametric test applied is the T-student test of equality of means for two independent samples. As this test requires the compared samples to have a normal distribution, the Shapiro-Wilk test is used to test the normality of the subgroups. Additionally, Levene’s equality of variances test is conducted to test whether the subgroups have equal variances, i.e., if they are homogenous (Sheskin, 2004). In the cases in which at least one of the data series’ subgroups does not follow a normal distribution, the Mann-Whitney U test, a non-parametric test, is conducted. The parametric analysis is preferable over the non-parametric analysis (Corder & Foreman, 2009), as the parametric tests have more statistical power. However, both tests are conducted whenever is possible to add robustness to the results (Sheskin, 2004).

Regarding the T-student test for equality of means for independent samples, there are two distinct variations of this test: one for samples with different variances and another one for samples with equal variances. Moreover, this parametric analysis is preferable if the

sample has more than 30 observations (Sheskin, 2004). Nonetheless, even if the sample has less than 30 observations, the parametric test is conducted as long as the sample follows a normal distribution.

As for the Mann-Whitney U test, it again tests for a central tendency between two subgroups. Although this test does not require the data series to follow a normal distribution, it still has a relevant implication regarding the shape of the data series. If they have different shapes, the Mann-Whitney U test assesses for different distributions, comparing the rank means of both data series. If they have similar shapes, it tests if the data series have equal medians (Sheskin, 2004). To test the similarity between data series' shapes, Levene's test of equality of variances can be used. If the data series have equal variances, then it can be assumed that they have similar shapes, and therefore the Mann-Whitney U tests if their medians are equal.

For the analysis with three subgroups, the Shapiro-Wilk normality test is conducted to assess whether a parametric or a non-parametric analysis should be followed. Given that every fiscal aggregate data series contains at least one subgroup which does not follow a normal distribution, the Kruskal Wallis test (Sheskin, 2004), a non-parametric approach, is conducted for the three fiscal variables. Given that the interpretation of the results of the Kruskal Wallis test also varies with the similarity between the data series' shapes, Levene's test of equality of means was again conducted to test for shapes' homogeneity.

Table 9, Table 10 and Table 11 evidence the main results of the statistical tests conducted for the different scenarios.

Regarding the Right – Left scenario, it is possible to observe that the parametric test can only be applied to the primary balance aggregate. Since its p-value ($p=0.74$) is larger than the adopted significance level, the null hypothesis is not rejected. Therefore, there is no significant difference between the means of the two subgroups ($t_{42}=-0.334$, $p=0.74$). This conclusion is sustained by the non-parametric Mann-Whitney test ($U=217$, $p=0.685$). Regarding the other fiscal aggregates, the Mann-Whitney test indicates that there is a significant difference between the two subgroups. Lavene's test confirms for the total revenue ($F=18.266$, $p<0.001$) and for the primary expenditure ($F=11.854$, $p=0.001$) that their subgroup shapes are not similar. Given this, the Mann-Whitney U test indicates that left spectrum ideological median voters result in significantly higher values for the total

revenue (U=142, p=0.028) and the primary expenditure (U=388, p=0.009).

Table 9 – Results of the statistical tests, regarding the Right – Left scenario, 1976-2019

		Total revenue, % of GDP		Primary expenditure, % of GDP		Primary balance, % of GDP	
		Right	Left	Right	Left	Right	Left
Ideological spectrum		Right	Left	Right	Left	Right	Left
Mean		35.3	39.7	36.6	40.6	-1.3	-0.9
Standard deviation		6.4	2.6	5.8	3.1	3.4	2.8
Median		35.8	40.2	34	40.2	-1.9	-0.4
Test of normality (Shapiro-Wilk)	Statistic	0.91	0.88	0.84	0.95	0.96	0.94
	df	18	26	18	26	18	26
	p-value	0.071	0.006	0.006	0.257	0.569	0.104
Levene's test for equality of variances	F	18.266		11.854		2.206	
	p-value	0*		0.001		0.145	
T-test for equality of means** (parametric test)	T	Not applied		Not applied		-0.334	
	df					42	
	p-value					0.74	
Mann-Whitney test (non- parametric test)	Mann-Whitney U	142		125		217	
	Wilcoxon W	313		296		388	
	Z	-2.196		-2.602		-0.406	
	p-value**	0.028		0.009		0.685	
	Mean rank	17.39	26.04	16.44	26.69	21.56	23.15

Source: “Séries longas para a economia portuguesa - pós II Guerra Mundial” (Pinheiro et al., 2000) and AMECO Database, available at https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en (retrieved on 30 March 2021), Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021), “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and own calculations, using IBM SPSS Statistics.

Notes: * p-value < 0.001; ** two tailed distribution.

Concerning the Centre – Non-centre scenario, the parametric tests conclude that there is a significant difference between centre and non-centre ideological median voters, in terms of primary expenditure ($t_{40,107}=2.586$, p=0.013), and in terms of primary balance ($t_{42}=-2.755$, p=0.009). The non-parametric Mann-Whitney U test also confirms this discrepancy (U=126, p=0.01 and U=113, p=0.004, respectively). Regarding the primary expenditure, this seems to be higher in the centre subgroup, due to its larger mean and mean rank values, given its different shapes. Concerning the primary balance, this seems to be higher in the non-centre group, in the light of its higher mean and median values, given its similar shapes. As for the total revenue, the parametric test cannot be performed because one of the subgroups follows an abnormal distribution. Therefore, the Mann-

Whitney U test is conducted, indicating that there are no significant differences between the two subgroups.

Table 10 – Results of the statistical tests, regarding the Centre – Non-centre scenario, 1976-2019

Ideological spectrum		Total revenue, % of GDP		Total expenditure, excluding interest, % of GDP		Primary balance, % of GDP	
		Centre	Non-centre	Centre	Non-centre	Centre	Non-centre
Mean		38.3	37.4	40.3	37.0	-2.0	0.3
Standard deviation		6.0	2.9	5.4	2.9	2.8	2.9
Median		40.6	38.2	41.6	37.9	-2.6	-0.1
Test of normality (Shapiro-Wilk)	Statistic	0.804	0.937	0.932	0.904	0.974	0.893
	Df	26	18	26	18	26	18
	p-value	0*	0.261	0.088	0.068	0.732	0.043
Levene's test for equality of variances	F	13.165		6.022		0.214	
	p-value	0.001		0.018		0.646	
T-test for equality of means** (parametric test)	T	Not applied		2.586		-2.755	
	Df			40.107		42	
	p-value			0.013		0.009	
Mann-Whitney test (non-parametric test)	Mann-Whitney U	153		126		113	
	Wilcoxon W	324		297		464	
	Z	-1.934		-2.578		-2.888	
	p-value**	0.053		0.01		0.004	
Mean rank		25.62	18	26.65	16.5	17.85	29.22

Source: “Séries longas para a economia portuguesa - pós II Guerra Mundial” (Pinheiro et al., 2000) and AMECO Database, available at https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en (retrieved on 30 March 2021), Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021), “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and own calculations, using IBM SPSS Statistics.

Note: * p-value < 0.001; ** two tailed distribution.

Regarding the last considered scenario, the parametric tests cannot be performed for the three fiscal aggregates, given that in each one there is at least one subgroup that does not follow a normal distribution. Therefore, the Kruskal Wallis test is conducted, indicating that there is no significant difference between the three subgroups for the three fiscal aggregates.

Overall, the descriptive analysis indicates that right-wing median voters might be associated with more favourable fiscal aggregates than left-wing median voters. However, this was not confirmed by the correlation analysis, which indicates that there might be no relationship between the ideology of the median voter and the three fiscal aggregates.

Nonetheless, the parametric and non-parametric analysis hints that median voters with an ideological tendency towards the left-wing result in higher values for the total revenue and the primary expenditure, and so, in more government intervention in the economy. Additionally, median voters located far away from the centre of the political spectrum originate higher values for the primary balances and lower values for the primary expenditure.

Nonetheless, this statistical approach has its limitations. Although it indicates that left-wing median voters seem to be associated with a larger public revenue and expenditure, as a percentage of the GDP, it does not explain how much the magnitude of the median voter's ideological tendency affects the size of these fiscal aggregates. Additionally, this study can be further expanded to capture a larger spatial dimension. Therefore, the next chapter provides a panel data econometrical regression to study the degree of the effect of the median voter ideological score within the European framework.

Table 11 – Results of the statistical tests, regarding the Right – Centre – Left scenario, 1976-2019

	Total revenue, % of GDP			Primary expenditure, % of GDP			Primary balance, % of GDP			
	Right	Centre	Left	Right	Centre	Left	Right	Centre	Left	
Ideological spectrum										
Mean	37.6	36.8	38.9	38.2	38.5	39.9	-0.6	-1.7	-1.0	
Standard deviation	5.3	7	2.6	05.6	6.1	02.9	3.6	3.5	2.3	
Median	36.4	40.2	39.4	36.2	40.3	39.6	-0.1	-2.8	-0.4	
Test of normality (Shapiro-Wilk)	Statistic	0.931	0.734	0.866	0.837	0.88	0.962	0.943	0.929	0.886
	Df	14	12	18	14	12	18	14	12	18
	p-value	0.31	0.00	0.02	0*	0*	0.64	0.46	0.37	0.03
Levene's test for equality of variances	F	3.318			3.047			2.288		
	p-value	0.054			0.062			0.115		
Kruskal Wallis Test (non- parametric test)	Kruskal-Wallis H	0.091			0.739			1.149		
	df	2			2			2		
	p-value	0.955			0.691			0.563		
	Rank Means	21.64	22.92	22.89	20.43	22.17	24.33	25.00	19.58	22.50

Source: “Séries longas para a economia portuguesa - pós II Guerra Mundial” (Pinheiro et al., 2000) and AMECO Database, available at https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en (retrieved on 30 March 2021), Comissão Nacional de Eleições (National Election Commission), available at <http://www.cne.pt/content/eleicoes-referendos> (retrieved on 5 March 2021), “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and own calculations, using IBM SPSS Statistics.

Note: * p-value < 0.001; ** two tailed distribution.

6. A panel data study within the European framework

The previous empirical approach has suggested that left-wing median voters tend to result in larger primary expenditures and larger total revenue, and, therefore, in a larger government. This chapter extends the analysis of the impact of the median voter ideological score on fiscal aggregates to the European level. The first subchapter includes the justification for the methodology implemented and the chosen variables. The second subchapter describes the econometric specifications and the estimation strategy adopted. The last subchapter presents the main results of this econometric approach.

6.1 The implemented methodology

The economic relevance of the median voter is not restricted only to the Portuguese case. Wherever there are legislative elections, there might be a chance for the median voter to influence decision-makers on their fiscal policy management. The spatial dimension considered can be expanded to include all countries which belonged to the European Union in 2019 (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, France, Finland, Germany, Greece, Hungary, Italy, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom), which brings two main advantages. On the one hand, it permits for a more comprehensive analysis of the impact of the ideology of the median voter on fiscal aggregates. On the other hand, it allows the confrontation between the findings of chapter 5, about the Portuguese case, and the results achieved in this chapter for the European context.

The strategy adopted implies the construction of an econometric model to assess the influence of the median voter ideology across countries and through time. Regarding the temporal dimension, it starts in 1995, the year since which there is an internationally compatible accounting framework according to the European System of Accounts, and goes up to 2019 as, although there is preliminary data for 2020, the effect of the Covid-19 pandemic could distort the results. The data arrangement of different countries and different years conforms with the definition of panel data. This data type analysis, which can also be designated as longitudinal analysis, brings several benefits against other data types like cross-sectional or time-series analyses. The main one is that it allows for the control of the individual heterogeneity among countries and through time. Additionally, it

includes more data and provides more degrees of freedom and less collinearity among the variables (Baltagi, 2005).

The purpose of this econometric approach is to assess to which degree the median voter ideological score can affect the relevant fiscal aggregates. Therefore, we use three baseline equations to evaluate that influence on the primary balance, on the total revenue and on the primary expenditure. Also, for the baseline equations, the Ordinary Least Square (OLS) estimation was considered. The specifications are as follows:

$$\begin{aligned} P_Balance_{i,t} = & \alpha_1 + \alpha_2 Growth_{i,t} + \alpha_3 Debt_{i,t-1} + \alpha_4 DSPB_{i,t} + \\ & + \alpha_5 Savings_{i,t} + \alpha_6 Inflat_{i,t} + \alpha_7 MV_IS_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (6.1)$$

$$\begin{aligned} Revenue_{i,t} = & \alpha_1 + \alpha_2 Growth_{i,t} + \alpha_3 Debt_{i,t-1} + \alpha_4 DSPB_{i,t} + \\ & + \alpha_5 Savings_{i,t} + \alpha_6 Inflat_{i,t} + \alpha_7 MV_IS_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (6.2)$$

$$\begin{aligned} P_Expend_{i,t} = & \alpha_1 + \alpha_2 Growth_{i,t} + \alpha_3 Debt_{i,t-1} + \alpha_4 DSPB_{i,t} + \\ & + \alpha_5 Savings_{i,t} + \alpha_6 Inflat_{i,t} + \alpha_7 MV_IS_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (6.3)$$

Where, i denotes the country ($N=28$) and t denotes the time ($T=25$).

The $P_Balance$, the $Revenue$ and the P_Expend variables correspond to the primary balance, the total revenue, and the primary expenditure, respectively. These three variables were chosen as dependent variables as they are the main fiscal aggregates. In particular, the primary balance sheds some light on the nature of the fiscal policy. The total revenue and the primary expenditure are included to complement any findings and explore the magnitude of the primary balance. All fiscal variables are measured in percentage of the current GDP.

To track the median voter partisan affiliation, an independent variable was computed through Kim and Fording (2003)'s methodology: the median voter ideological score (MV_IS). This variable ranges from 0 to 100 and, the larger the value, the more supporter of left policies the median voter is.

Additionally, based on the conclusions of Zeng (2014), on his study regarding the main determinants of the primary fiscal balance, the following explanatory variables were considered as control variables: real GDP growth ($Growth$); general government consolidated gross debt ($Debt$); debt-stabilizing primary fiscal balance ($DSPB$); private

savings (Savings); inflation rate (Inflat).

The real GDP growth represents the economic growth of a country, and there are several ways in how it can influence the dependent variables. On the one hand, if low, it politically constraints a government's ability to run a large primary fiscal balance. On the other hand, it affects the trigger of the automatic stabilizers, which directly affect the primary fiscal balances. Additionally, economic growth also directly affects the denominator of the fiscal ratios under analysis. According to Zeng (2014), the real GDP growth is expected to have a positive impact on the primary balance ratio.

The lagged general government consolidated gross debt and the debt-stabilizing primary fiscal balance complement each other in capturing the pressure of the debt stock in a governments' management of its fiscal policy. Specifically, the DSPB represents the level of primary fiscal balance needed to stabilize a governments' debt. It corresponds to the product of the public debt with the difference between the nominal interest rate and the nominal GDP growth. Both variables are expected to positively increase the primary balance (Zeng, 2014).

The private savings influence the primary fiscal balance through the financial channels as "higher private savings give the government more room for financing its deficits, and thus could lead to a lower level of primary fiscal balance" (Zeng, 2014, p. 73). This was sustained by the author's findings.

The power of the inflation rate to affect the primary balance is more ambiguous. On the one hand, there might be a negative relationship between the inflation rate and the real government expenditure (Patinkin, 1993), which increases the primary fiscal balance. On the other hand, higher inflation rates reduce the cost of debt service, reducing the need for a government to run a large primary balance surplus. Overall, in its study, Zeng (2014) found evidence of a positive and significant effect on the primary fiscal balance.

The descriptive statistics of the variables are displayed in Table 12. Almost all data was retrieved from the AMECO database, to bring consistency to the data collecting process. This includes almost all variables used, either directly in the panel data model or for intermediary calculations. The only exceptions are the data on the inflation rate and the data on the parties' manifestos. The correlation matrix is included in Annex 1.

Table 12 – Descriptive statistics of the variables of the baseline equation

Code	Units of measurement	No. obs.	Minimum	Maximum	Average	Source
P_Balance	Percentage of GDP	700	-29.20 (Ireland, 2010)	9.60 (Finland, 2000)	0.06	AMECO
Revenue	Percentage of GDP	700	25.10 (Ireland, 2019)	57.90 (Sweden, 1996)	42.28	AMECO
P_Expend	Percentage of GDP	700	21.10 (Ireland, 2010)	62.30 (Bulgaria, 1996)	42.22	AMECO
Growth	Percentage	699	-14.85 (Lithuania, 2009)	25.17 (Ireland, 2015)	2.72	AMECO
Debt	Percentage of GDP	685	3.80 (Estonia, 2007)	186.20 (Greece, 2018)	56.64	AMECO
DSPB	Percentage of GDP	668	-32.66 (Ireland, 2015)	20.65 (Greece, 2011)	0.10	AMECO
Savings	Percentage of GDP	700	-10.57 (Cyprus, 2007)	35.33 (Latvia, 2009)	19.93	AMECO
Inflat	Percentage (consumer prices)	700	-4.48 (Ireland, 2009)	1 058.37 (Bulgaria, 1997)	5.34	World Bank
MV_IS	Units of ideological score in [0; 100]	697	14.90 (Spain, 1995)	78.20 (Austria, 1996-1999)	51.18	The Manifesto Data Collection

Source: AMECO Database, available at https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en (retrieved on 30 May 2021), World Bank Database, available at <https://data.worldbank.org/> (retrieved on 30 May 2021), “The Manifesto Data Collection. Manifesto Project” (Volkens et al., 2020) and own calculations.

6.2 The strategy of estimation

A longitudinal analysis can be done considering a one-way error component or a two-way error component. The one-way error component regression model includes a residual component that is divided in a country-specific or a period-specific effect, which is not observable, and in the rest of the residual disturbance. For example, if a cross-sectional one-way error approach is adopted, it means that the country-specific effect is time-invariant. With the two-way error model, both country-specific and period-specific effects are considered (Baltagi, 2005).

As regards the dimension-specific component, there are two approaches to be

considered: the fixed-effects (FE) and the random-effects (RE) models. The first one assumes this dimension-specific component, or components, to be fixed and the remainder disturbance to be random. The second one considers all to be random, offering more degrees of freedom (Baltagi, 2005). The Hausman test allows us to test which of the two approaches should be used. If the null hypothesis is not rejected, both RE and FE estimators are consistent but the RE estimator is more efficient. If the null hypothesis is rejected, the RE estimator is no longer consistent and therefore the FE approach should be used. Table 13 displays the results of the Hausman test, for equations (6.1), (6.2) and (6.3), testing the three specifications for the cross-section effects and for the period effects.

Table 13 – Hausman test with Least Squares method

Model	Cross-section effect			Period effect		
	(6.1)	(6.2)	(6.3)	(6.1)	(6.2)	(6.3)
χ^2	19.873	44.306	32.592	44.683	35.449	10.258
p-value	0.003	0.000	0.000	0.000	0.000*	0.114*

Source: Hausman tests performed with EViews 10.

Note: * estimated period random effects variance is zero.

As it is observable, regarding cross-section effects, the FE model is always preferable (p -value < 0.05). Concerning the time effects, the FE model is also preferable for specifications (6.1) and (6.2). For specification (6.3), the preferable estimation is the RE model. Nonetheless, the message “estimated period random effects variance is zero” means that there are no RE for the temporal dimension for equation (6.2) and (6.3), respectively. Therefore, FE estimators are adopted for all the estimations.

Moreover, there is another possibility for the estimation of these models: the pooled OLS model. This model assumes that the observations between countries and through time are homogenous, meaning that the cross-section and period fixed effects are irrelevant. To assess this hypothesis, the redundant test for fixed effects can be applied. In this case, if the null hypothesis is rejected, it means that the fixed effects are not redundant and therefore the FE model is preferable to the pooled OLS one. If not rejected, the pooled OLS model is preferable, as there is redundancy within the FE estimators. Furthermore, *White Diagonal* estimators are employed to control any existing cross-section and period heteroskedasticity, which invigorates the robustness to the estimation, and cross-sections or period weights are considered. Table 14 displays the Redundant Test for

Fixed Effects results considering, for each of the equations, two FE models: the one-way error cross-section FE model and the one-way error period FE model.

Table 14 – Results of the redundant test for fixed effects, for cross-section effects and for period effects

Model	Cross-section effect			Period effect		
	(6.1) P_Balance	(6.2) Revenue	(6.3) P_Expend	(6.1) P_Balance	(6.2) Revenue	(6.3) P_Expend
F -Statistic	16.107	443.811	98.229	5.496	1.943	1.039
p-value	0.000	0.000	0.000	0.000	0.005	0.412

Source: Redundant Test for Fixed Effect performed with EViews 10.

The results show that cross-section FE are not redundant (p-value smaller than 0.05 for all cases). Therefore, there is heterogeneity between countries, and the pooled OLS estimation should not be adopted. Regarding the period FE, the results are not so clear as for equation (6.3) there is a certain homogeneity between years. Therefore, for this case, a one-way error FE model, considering only cross-section effects, should be adopted. However, for equations (6.1) and (6.2), there are three options that can be adopted: a one-way error cross-section FE model, a one-way error period FE model, and a two-way FE model, which includes both effects. The redundant test for fixed effects helps to clarify which of these might be the better option. As for equation (6.3), the same tests are applied to assess if a two-way error FE model is also preferable to the one-way error cross-section FE model, given that the one-way error period FE model is rejected.

Table 15 displays the redundant test for fixed effects considering a two-way FE model, once again employing a *White Diagonal* estimator. Whenever the null hypothesis is rejected, it means that the two-way FE model regression is preferable to the compared option. The “cross-section F” and the “cross-section χ^2 ” tests examine the redundancy of the cross-section fixed effects, by comparing the unrestricted two-way error model with a restricted one with period fixed effects. As the null hypothesis is rejected for all equations (p-value < 0.05), this means that the two-way error model is preferable. The second set of tests, the “period F” and the “period χ^2 ”, compares the unrestricted two-way error model with a restricted one with cross-country fixed effects. This way, it tests if the period fixed effects are redundant. The null hypothesis is again rejected for all equations, meaning that the two-way error model is preferable. The last set of tests, the “Cross-section and period

F” and the “Cross-section and period χ^2 ”, assesses for the redundancy of joint fixed effects. Once again, the null hypothesis is rejected, meaning that it is preferable to consider fixed cross-section and period effects.

Table 15 – Results of the redundant tests for two-way fixed effect model

Model		(6.1) P_Balance	(6.2) Revenue	(6.3) P_Expnd
Cross-section F	Statistic	11.153	279.147	73.205
	p-value	0.000	0.000	0.000
Cross-section χ^2	Statistic	267.996	1729.838	964.395
	p-value	0.000	0.000	0.000
Period F	Statistic	6.417	2.241	4.532
	p-value	0.000	0.001	0.000
Period χ^2	Statistic	150.379	56.448	109.604
	p-value	0.000	0.000	0.000
Cross-section and period F	Statistic	9.777	157.155	40.620
	p-value	0.000	0.000	0.000
Cross-section and period χ^2	Statistic	398.978	1767.867	988.485
	p-value	0.000	0.000	0.000

Source: Redundant Tests for Two-Way Fixed Effect performed with EViews 10.

Overall, it is possible to conclude that the better option for the estimation of the three econometric specifications is the two-way error FE models, with both the cross-section and the period effects, and employing *White Diagonal* robustness estimators. Nonetheless, for each of the specifications, one more regression is considered: a one-way error regression model with cross-section FE, the one adopted by Zeng (2014). On this econometric study, this cross-section FE model, also employs *White Diagonal* robustness estimators and, additionally, considers cross-section weights.

6.3 The results

As previously mentioned, for the three selected model specifications, two regression models are considered:

- a) a two-way error regression model with cross-section and period fixed effects;
- b) a one-way error regression model with only cross-section fixed effects.

The estimation results are displayed in **Error! Not a valid bookmark self-reference.** It is possible to verify that the coefficient estimates for the control variables are in line with the findings of Zeng (2014). The real GDP growth has a negative impact on the ratios of the total revenue and the primary expenditure. However, as the impact on the latter is larger, it results in a positive increase of the primary balance ratio.

An increase in the lagged general government consolidated gross debt results in an increase of the primary balance ratio, via a larger positive impact on the ratio of the total revenue than on the ratio of the primary expenditure. Concerning the debt-stabilizing primary fiscal balance, no conclusion can be arrived regarding its impact on the primary balance ratio, since its coefficient is not significant. Nonetheless, it can be concluded that this control variable has a positive impact on the ratio of the total revenue.

Error! Not a valid bookmark self-reference. also shows that higher values of private savings reduce, as expected, the value of the primary balance. This is due to the larger negative impact of the private savings on the ratio of the total revenue than on the ratio of the primary expenditure. Concerning the inflation rate, it has a positive impact on the ratio of the primary balance, through the smaller negative impact on the ratio of the total revenue than on the primary expenditure ratio.

Nonetheless, the larger focus of this work is the evaluation of the influence of the median voter in the relevant fiscal aggregates. Concerning the primary balance, specification (6.1a) arrives at no statistically significant conclusion. However, specification (6.1b) indicates a negative impact of the median voter ideological score in the primary balance. So, the higher the median voter ideological score (the closer to the left), the smaller the primary balance. This is due to the larger negative impact of the median voter ideological score on the total revenue when compared to the primary expenditure.

The estimation results also point out that the larger the value of the median voter ideological score is, the less will be the weight of the government on the economy. As shown in specifications (6.2a), (6.2b), (6.3a) and (6.3b), as the ideology of the median voter moves to the left of the political spectrum, both the ratios of the total revenue the primary expenditure diminish. This differs from chapter 5's findings for the Portuguese case, which suggested that left-wing governments tend to result in larger values for the total revenue and the primary expenditure.

Table 16 – Estimation results

	(6.1a) P_Balance	(6.1b) P_Balance	(6.2a) Revenue	(6.2b) Revenue	(6.3a) P_Expnd	(6.3b) P_Expnd
Intercept	-0.0020 (0.009)	0.0124* (0.001)	0.4888*** (0.009)	0.4689*** (0.005)	0.4905*** (0.012)	0.4463*** (0.009)
Growth	0.2265*** (0.045)	0.2909*** (0.036)	-0.1257*** (0.040)	-0.0587** (0.0124)	-0.3529*** (0.047)	-0.3758*** (0.032)
Debt	0.0265*** (0.006)	0.0248*** (0.005)	0.0350*** (0.006)	0.0478*** (0.002)	0.0086 (0.007)	0.0280*** (0.006)
DSPB	0.0059 (0.047)	-0.0363 (0.036)	0.0781** (0.031)	0.0557** (0.024)	0.0726 (0.052)	0.0890** (0.043)
Savings	-0.0754** (0.031)	-0.1400*** (0.026)	-0.3080*** (0.028)	-0.2814*** (0.021)	-0.2317*** (0.042)	-0.0876*** (0.029)
Inflat	0.0203** (0.010)	0.0396*** (0.008)	-0.0367*** (0.008)	-0.0253*** (0.006)	-0.0571*** (0.011)	-0.0661*** (0.012)
MV_IS	-0.0001 (0.000)	-0.0001* (0.000)	-0.0004*** (0.000)	-0.0003*** (0.000)	-0.0003*** (0.000)	-0.0002** (0.000)
N.	667	667	667	667	667	667
R ²	0.519	0.490	0.943	0.962	0.836	0.868
p-value (F)	0.000	0.000	0.000	0.000	0.000	0.000

Source: Estimations outputs performed with EViews 10 (included in Annex 2).

Notes: Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Overall, two main conclusions can be retrieved from this econometric approach. The first one is that the ideology of the median voter can at some degree influence the conduction of the fiscal policy. The second retrieved conclusion is that the more leftist the median voter's ideology is, the smaller the primary balance will be. But unexpectedly, this is achieved based on reductions in both the revenue and the primary expenditure ratios. Even though the regression coefficients are small, meaning that this impact is minor, they are statistically significant and, therefore, the median voter ideology must not be disregarded.

Conclusion

The emergence and maturation of democratization processes in European countries brought some new doubts and uncertainty to the economic framework. Either if the electorate is more heterogeneous or homogeneous, it is important to know if it can be manipulated by policymakers for re-election purposes. The median voter theorem gains relevance within this affair, as political candidates can advertise fiscal policies to please the liking of this median voter, and this should guarantee them the electoral victory. Therefore, it is important to understand the strength of this theorem both in the Portuguese framework and among the European countries.

This dissertation begins by introducing the public choice school. This branch of the economic literature has been gaining relevance since its emergence, and it is in it that the median voter theorem is placed. Additionally, the main economic models regarding political business cycles are reviewed, to shed some light on the intentions behind a policymaker decision on fiscal and monetary, when applicable, policy. Then, a more in-depth review of the median voter theorem follows, highlighting its emergence and evolution, the required assumptions and, most importantly, its criticism and relevance within the public choice school. As the literature points out, the median voter can at some degree affect the fiscal policy, but so far, no clear conclusion has been retrieved on its effect within the Portuguese framework.

To study the influence of the Portuguese median voter on fiscal aggregates, Kim and Fording (2003)'s method is replicated to find the median voter ideology for each legislative election moment. Then, a set of statistical tests is conducted to assess the relationship between the median voter ideology and three fiscal aggregates: the primary balance, the total revenue and the primary expenditure. Correlation tests conclude that there is no correlation between the median voter ideology and any of the fiscal aggregates. Nonetheless, a parametric and non-parametric analysis concludes that left-wing median voters result in larger values for the total revenue and primary expenditure ratios.

Next, an econometric approach is carried out to assess the influence of the median voter ideology on the same fiscal aggregates, among the European countries. The chosen econometric model consists of a panel data analysis, as it controls for the heterogeneity among countries, from 1995 until 2019, with three econometric specifications, one for each fiscal aggregate. The three specifications consider the same

independent variables: a set of control independent variables based on Zeng (2014)'s study, and the median voter ideological score, which is our variable of study and is again calculated using Kim and Fording (2003)'s methodology. The results showed a significant influence of the median voter ideological score on the three fiscal aggregates. Particularly, a negative impact of the median voter ideological score, which increases with the support of left-wing policies, on the ratios of the primary balance, the total revenue and the primary expenditure.

Overall, this study reinvigorates the strength of the median voter theorem and its ability to steer fiscal policy. Nonetheless, there are a few caveats that restrict this work's conclusions. The first one lies in the set of the statistical tests used, as they are not completely robust and imply specific assumptions that were overlooked to conduct these tests. Nonetheless, the parametric and non-parametric tests complement each other, bringing some robustness to these results. A second caveat concerns that no conclusion has been reached regarding the intentions behind the policymaker. Even though it is concluded that the median voter ideology can at some degree influence the fiscal aggregates, it is not clear whether this influence is due to re-election purposes or the result of other underlying. The last caveat regards the conclusions concerning the differences between the Portuguese case and the European context. As two different quantitative approaches are carried out, any comparison must be looked at with care.

This work opens some doors in the study of the Portuguese median voter and its influence on the fiscal aggregates. And even though there are a few limitations of its results, these represent an opportunity for future research within this subject. Therefore, future studies can explore the econometric model to include an electoral variable, to try to capture the intentions of the policymaker. Additionally, a dynamic panel data model can be employed and the use of instrumental variables, to correct any case of endogeneity, should also be considered. Furthermore, the statistical approach can be applied to other countries, which have more developments of the impact of the median voter, or countries that are yet to be studied. This way, this dissertation work as a launching pad for bolstering the public choice school and reduce that uncertainty veil that hangs in the air lingering over every decision-making process.

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Annexes

Annex 1 – Correlation matrix of the variables used in the econometric approach

	Growth	Debt	DSPB	Savings	Inflat	MV_IS
P_Balance	0.26	0.02	-0.18	-0.04	-0.10	-0.07
Revenue	-0.23	0.31	0.21	0.20	-0.12	-0.07
P_Expend	-0.37	0.31	0.31	0.23	-0.17	-0.03
Growth	1.00	-0.31	-0.63	-0.08	-0.18	-0.01
Debt	-	1.00	0.28	0.03	-0.00	0.01
DSPB	-	-	1.00	-0.01	0.08	0.01
Savings	-	-	-	1.00	-0.06	0.07
Inflat	-	-	-	-	1.00	-0.09
MV_IS	-	-	-	-	-	1.00

Notes: Correlations values calculated using Microsoft Excel. Correlations between the dependent variables are not included.

Annex 2 – Estimation outputs of chapter 6

Specification 6.1a – Two-way error regression model for primary balance

Dependent Variable: P_BALANCE

Method: Panel Least Squares

Date: 06/07/21 Time: 14:02

Sample (adjusted): 1995 2019

Periods included: 25

Cross-sections included: 28

Total panel (unbalanced) observations: 667

White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002002	0.008959	-0.223490	0.8232
GROWTH	0.226549	0.045491	4.980052	0.0000
DEBT(-1)	0.026469	0.006252	4.233497	0.0000
DSPB	0.005911	0.047475	0.124497	0.9010
SAVINGS	-0.075467	0.030578	-2.468026	0.0139
INFLAT	0.020321	0.009571	2.123148	0.0341
MV_IS	-8.36E-05	9.30E-05	-0.898866	0.3691

Effects Specification

Cross-section fixed (dummy variables)

Period fixed (dummy variables)

R-squared	0.518612	Mean dependent var	0.000388
Adjusted R-squared	0.473556	S.D. dependent var	0.031935
S.E. of regression	0.023171	Akaike info criterion	-4.608870
Sum squared resid	0.326975	Schwarz criterion	-4.217323
Log likelihood	1595.058	Hannan-Quinn criter.	-4.457178
F-statistic	11.51038	Durbin-Watson stat	0.829561
Prob(F-statistic)	0.000000		

Specification 6.1b – One-way error regression model for primary balance

Dependent Variable: P_BALANCE

Method: Panel EGLS (Cross-section weights)

Date: 06/07/21 Time: 14:02

Sample (adjusted): 1995 2019

Periods included: 25

Cross-sections included: 28

Total panel (unbalanced) observations: 667

Linear estimation after one-step weighting matrix

White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.012418	0.007154	1.735698	0.0831
GROWTH	0.290873	0.036129	8.051069	0.0000
DEBT(-1)	0.024774	0.005222	4.744024	0.0000
DSPB	-0.036265	0.035813	-1.012610	0.3116
SAVINGS	-0.139524	0.025871	-5.393082	0.0000
INFLAT	0.039560	0.007891	5.013378	0.0000
MV_IS	-0.000143	7.64E-05	-1.866785	0.0624

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.489815	Mean dependent var	0.001560
Adjusted R-squared	0.463217	S.D. dependent var	0.034560
S.E. of regression	0.025280	Sum squared resid	0.404531
F-statistic	18.41592	Durbin-Watson stat	0.837753
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.392135	Mean dependent var	0.000388
Sum squared resid	0.412883	Durbin-Watson stat	0.819975

Specification 6.2a – Two-way error regression model for total revenue

Dependent Variable: REVENUE
 Method: Panel Least Squares
 Date: 06/07/21 Time: 14:03
 Sample (adjusted): 1995 2019
 Periods included: 25
 Cross-sections included: 28
 Total panel (unbalanced) observations: 667
 White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.488764	0.009050	54.00468	0.0000
GROWTH	-0.125666	0.040119	-3.132345	0.0018
DEBT(-1)	0.035015	0.005500	6.366024	0.0000
DSPB	0.078102	0.030511	2.559815	0.0107
SAVINGS	-0.307957	0.028051	-10.97845	0.0000
INFLAT	-0.036724	0.008153	-4.504105	0.0000
MV_IS	-0.000392	8.53E-05	-4.590239	0.0000

Effects Specification

Cross-section fixed (dummy variables)
 Period fixed (dummy variables)

R-squared	0.943422	Mean dependent var	0.422520
Adjusted R-squared	0.938126	S.D. dependent var	0.063902
S.E. of regression	0.015895	Akaike info criterion	-5.362636
Sum squared resid	0.153872	Schwarz criterion	-4.971089
Log likelihood	1846.439	Hannan-Quinn criter.	-5.210944
F-statistic	178.1550	Durbin-Watson stat	0.576174
Prob(F-statistic)	0.000000		

Specification 6.2b – One-way error regression model for total revenue

Dependent Variable: REVENUE
 Method: Panel EGLS (Cross-section weights)
 Date: 06/07/21 Time: 14:03
 Sample (adjusted): 1995 2019
 Periods included: 25
 Cross-sections included: 28
 Total panel (unbalanced) observations: 667
 Linear estimation after one-step weighting matrix
 White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.468904	0.005321	88.12330	0.0000
GROWTH	-0.058735	0.023931	-2.454347	0.0144
DEBT(-1)	0.047823	0.002700	17.71487	0.0000
DSPB	0.055734	0.024395	2.284603	0.0227
SAVINGS	-0.281432	0.020931	-13.44564	0.0000
INFLAT	-0.025278	0.005933	-4.260626	0.0000
MV_IS	-0.000291	5.17E-05	-5.625009	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics			
R-squared	0.962239	Mean dependent var	0.545517
Adjusted R-squared	0.960270	S.D. dependent var	0.261262
S.E. of regression	0.016111	Sum squared resid	0.164312
F-statistic	488.7923	Durbin-Watson stat	0.647722
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.937823	Mean dependent var	0.422520
Sum squared resid	0.169097	Durbin-Watson stat	0.544641

Specification 6.3a – Two-way error regression model for primary expenditure

Dependent Variable: P_EXPEND
 Method: Panel Least Squares
 Date: 06/07/21 Time: 14:02
 Sample (adjusted): 1995 2019
 Periods included: 25
 Cross-sections included: 28
 Total panel (unbalanced) observations: 667
 White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.490470	0.011910	41.18100	0.0000
GROWTH	-0.352856	0.046768	-7.544901	0.0000
DEBT(-1)	0.008528	0.007093	1.202237	0.2297
DSPB	0.072571	0.052111	1.392618	0.1642
SAVINGS	-0.231736	0.041763	-5.548867	0.0000
INFLAT	-0.057132	0.010910	-5.236491	0.0000
MV_IS	-0.000305	0.000117	-2.603711	0.0094

Effects Specification

Cross-section fixed (dummy variables)
 Period fixed (dummy variables)

R-squared	0.836417	Mean dependent var	0.422123
Adjusted R-squared	0.821106	S.D. dependent var	0.061314
S.E. of regression	0.025933	Akaike info criterion	-4.383648
Sum squared resid	0.409570	Schwarz criterion	-3.992101
Log likelihood	1519.947	Hannan-Quinn criter.	-4.231956
F-statistic	54.62944	Durbin-Watson stat	0.821994
Prob(F-statistic)	0.000000		

Specification 6.3b – One-way error regression model for primary expenditure

Dependent Variable: P_EXPEND
 Method: Panel EGLS (Cross-section weights)
 Date: 06/07/21 Time: 14:02
 Sample (adjusted): 1995 2019
 Periods included: 25
 Cross-sections included: 28
 Total panel (unbalanced) observations: 667
 Linear estimation after one-step weighting matrix
 White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.446342	0.008518	52.40065	0.0000
GROWTH	-0.375750	0.032047	-11.72499	0.0000
DEBT(-1)	0.028026	0.005832	4.805721	0.0000
DSPB	0.089048	0.043028	2.069543	0.0389
SAVINGS	-0.087693	0.028622	-3.063848	0.0023
INFLAT	-0.066123	0.011892	-5.560175	0.0000
MV_IS	-0.000201	0.000102	-1.966100	0.0497

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics			
R-squared	0.868180	Mean dependent var	0.535198
Adjusted R-squared	0.861308	S.D. dependent var	0.213792
S.E. of regression	0.027369	Sum squared resid	0.474162
F-statistic	126.3331	Durbin-Watson stat	0.815743
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.804722	Mean dependent var	0.422123
Sum squared resid	0.488926	Durbin-Watson stat	0.788272