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Municipal revenue over-budgeting: a dynamic analysis of its determinants

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ABSTRACT

This paper investigateswhich factors affect revenue over-budgeting in the local government,considering budgetary, political, and institutional determinants. It appliesdynamic panels analysis to data from Portuguese municipalities between 2005 and2017. Regarding budgetary arrangements, over-budgeting has implications forseveral years, taking up to three years to dissipate. The difference between budgetedrevenues and the ones collected in the previous year is a good predictor thatrevenue is overestimated. The ratio of own-source over total revenue isdirectly related with over-budgeting; however, this effect comes from the municipality'swealth. About political factors, municipal Executives with political majoritiesand in electoral years are more prone to over-budget; however, ideology does not seem to be important. Asfor institutional arrangements, participationin any debt restructuring program is inversely related to over-budgeting, whileexcessive debt does not seem to play any role. Overall, the only mechanismwhich reduces over-budgeting misbehavior is external control.

1. Introduction

Across many jurisdictions there has been decentralisation processes, reinforcing the public services to be provided by municipalities (Ebinger, Grohs, and Reiter 2011), implying more expenditure to satisfy local needs and hence requiring more revenue. However, these processes have not always been accompanied by the due transfer of resources, which leaves many municipalities without the financial capacity to handle the greater economic involvement that they have been burdened with (Lobo 2012). To counteract these limitations, one way for them to accomplish greater expenditure than their expected revenue is to over-budget for the latter (Benito, Guillamón, and

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Bastida 2015; Ríos et al. 2018). Poor financial condition of many entities, revenue estimation rules sometimes rather permissive, and flexible debt ceilings, tend to aggravate such behaviour (Carvalho et al. 2015).

Revenue over-budgeting, or the overestimation of collectable revenue, occurs when the municipal budget includes a revenue forecast that is greater than the amount expected to be actually collected (Goeminne, Geys, and Smolders 2008) and, consequently, allows municipalities to take on expenditure that exceeds collected revenue (Carvalho 1996; Dougherty, Klase, and Song 2003). As there cannot be expenditure without balancing revenue forecasts – balanced budget classic principle (Wildavsky 1984), estimating a certain total revenue amount in the budget creates the possibility of undertaking expenditures up to that amount (projected revenue), even if later the effective financial resources are not available to pay for them (Carvalho et al. 2015; Ríos et al. 2018). Subsequent budget imbalances may lead to the need to use debt, which must be repaid through the amortisation of loans and their interest. Indebtedness, namely if it reaches high amounts, reduces municipalities' capacity to operate in the future, in addition to constituting a burden that future generations will have to bear (Carvalho 1996; Benito, Bastida, and Muñoz 2010). Therefore, the degree of execution of estimated revenue is extremely important for municipalities, also revealing itself as an indicator that can measure the efficacy of local government financial planning and management (Forrester and Mullins 1992).

Over-budgeting, either by central or local governments, can considerably affect the financial condition of a country overall, leading to unsustainable debt levels, degrading public services provision and ultimately affecting citizens' wellbeing (Boukari and Veiga 2018).

However, budgeting and re-budgeting is not merely an exercise of estimating values for public expenditure and revenues by financial analysts, based on an economics rationale. As instruments of public policies, budgets aim for effectiveness in public service provision, but they also serve politicians' interests. This latter purpose seems even more evident in the local government setting. As locally elected leaders, politicians face the challenge of managing between what is 'politically acceptable' and 'administratively sustainable' (Nalbandian et al. 2013). Services have to be provided according to the local needs; but, as budget managers, politicians fell tempted to use budget manipulation, namely overestimating revenue, increasing the possibility of becoming more popular for re-election, by spending more without immediately increasing taxes (Brender and Drazen 2005; Ribeiro and Jorge 2015; Ríos et al. 2018). Also, they may resort to re-budgeting (Forrester and Mullins 1992) as manipulation to show they are able to balance the budgets and attain unbudgeted surpluses (Dougherty, Klase, and Song 2003). This opportunistic behaviour whereby politicians manipulate the budget seeking for maximising votes and (re)election (Musgrave and Musgrave 1989), fits

within the public choice theory (Mueller 1976), which therefore explains that political factors can be at the basis of budgetary policies, management and discretion.

In this context, this research aims to analyse the potential determinants of revenue over-budgeting in municipalities, taking stock of the Portuguese situation during the period of 2005–2014. The study goes further than the hypotheses proposed in the international literature, where the analysis of political determinant factors clearly prevail, by combining these with institutional and budgetary arrangements, which may also affect revenue estimations. Moreover, Portugal is an interesting case given that, with extended attributions and flexible debt ceilings, there was clearly over-budgeting in the local government, leading to unsustainable debt levels. Added to the financial crisis the country passed, which required external financial support from 2011, the situation forced many municipalities to embark in financial restructuring programmes (Carvalho et al. 2017).

This work represents an important contribution to the relevant literature, not only as an unprecedented first study of the topic in Portuguese municipalities, but also because it allows learning about measures to improve municipalities' practices regarding over-budgeting. Another important contribution relates to the sophistication of the methodology used – dynamic panels analysis.

The paper is structured as follows. Section 2 presents a summary review of the determinants of over-budgeting, categorised as in the literature, also referring to supporting theories. Section 3 briefly introduces the financial regime for Portuguese municipalities, following with a description of the evolution and main characteristics of municipalities' revenue and over-budgeting in the latter years. Section 4 addresses the methodology, explaining the specific research objectives, hypotheses and variables used in the final model. Section 5 presents and discusses the main findings, and Section 6 closes, summarising the main conclusions and identifying some limitations.

2. Determinants of public revenue over-budgeting

The growing increase in public debt held not only by countries, but also by subnational levels of government, has raised awareness to understanding the root causes of budgetary deficits and consequent accumulation of debt. Over-budgeting may be one major cause.

The literature suggests that, sometimes, budgets are deliberately biased, in what can be characterised as an optimistic or pessimistic manner, when estimating revenue (Anessi-Pessina, Rota, and Sicilia 2015).

In the specific case of under-estimating tax revenue, this allows for the creation of a financial cushion to face unexpected expenditures or a lack of revenue; because of putting pressure on expenditures, unexpected revenue

is generated (Chatagny and Soguel 2012; Ríos et al. 2018). Furthermore, it can also be a way to, at the end of the year, give voters the impression that prudent management resulted in budget savings (Dougherty, Klase, and Song 2003; Anessi-Pessina, Rota, and Sicilia 2015).

The overestimation of revenue, on the other hand, increases the allowed expenditure limit and permits politically sensitive decisions to be delayed, such as cutting public goods and services and/or raising taxes (Anessi-Pessina, Rota, and Sicilia 2015; Boukari and Veiga 2018). Citizens cannot directly observe the competence of politicians, so this must be established through their capacity to provide a certain level of goods and services at low tax rates. However, according to the public choice theory, rooted in the agency theory, politicians (agents) adopt an opportunistic behaviour – while apparently providing services and reducing taxes in the citizens' (principal) best interest, politicians look in fact for their self-interest of being re-elected (Musgrave and Musgrave 1989). Thus, asymmetric information and a lack of transparency and control, create incentives to manipulate estimated revenue in the budget (Benito, Guillamón, and Bastida 2015; Ríos et al. 2018). Ríos et al. (2018) specifically addressed the entities' level of transparency, advocating that budget transparency may be a strategy to reduce the incentives for politicians to manipulate budget forecasts.

Municipal incumbents are responsible for creating and executing the municipal budget, which means that they are responsible for its content and correct application. Accordingly, they are also accountable for any budgetary biases. These biases incorporate forecast errors and execution errors that stand out, above all, because the former identify forecast quality issues, while the latter identify problems at the level of implementing previously mentioned policies (Martins 2012). Regarding forecast errors, two potential sources of revenue estimation errors can be identified: unintentional and intentional errors (Larkey and Smith 1989). While the former are the result of theoretical, methodological and technical tools inappropriate for interpreting past events or predicting the evolution of the economy, the latter are the result of deliberate choices by governors reflected in the intentional manipulation of estimations to achieve a certain goal (Dougherty, Klase, and Song 2003; Couture and Imbeau 2009; Benito, Guillamón, and Bastida 2015).

Often, governments want to present more revenue than that which would be expected, or, on the contrary, hide a likely increase in revenue and, therefore, revenue estimations can be more under-estimated or over-estimated than what could be justified as an imprecision (Dougherty, Klase, and Song 2003; Couture and Imbeau 2009). Furthermore, it can be easier to manipulate budgetary estimations than to actually raise taxes and/or reduce public spending (Couture and Imbeau 2009; Ríos et al. 2018).

Overall, these budget manipulations can be explained by two main branches of factors: one related to political behaviour and the other concerning institutional issues.

As explained above, according to the public choice theory (Musgrave and Musgrave 1989), with the expectation of being (re)elected, politicians tend to over-budget (non-tax) revenue apparently favouring the citizens, given that higher estimated revenue will allow for more expenditure in service provision, even if that will lead to future debt, after the electoral period. More spending governments, usually linked to less conservative left-wing parties, then will have higher propensity to over-budgeting, as this will provide higher limits for expenditure (Hibbs 1977; Alesina 1987). Also, institutionalised budget practices, such as incrementalism and revenue structure, and the consideration of preferences of certain (party) groups in comparison with those of the median voter, are referred to in the public choice literature as affecting budgeting practices (McNutt 1996).

On the other hand, across jurisdictions, budget managers have to deal with institutional arrangements, which include formal and informal rules that govern the budget process (Wildavsky 1961). Budget institutions shape and regulate policies and processes of allocating public resources, while governments carry out their functions (Dabla-Norris et al. 2010). Therefore, there are institutional practices and pressures that may affect politicians' behaviour regarding the budget, according to the coercive isomorphism of institutional theory (DiMaggio and Powell 1983). For example, often governments have to accomplish with debt limits and other regulations for re-establishing financial balance (Letelier 2011). In the local government, political parties usually put pressure on the municipality leaders associated with them, to proceed in the party interests (Ribeiro and Jorge 2015).

Within these theoretical frameworks, the literature has been empirically exploring possible factors affecting revenue estimation that, for this reason, might justify the excess of revenue estimated by municipalities. Those determinants can be generally grouped into three categories (Ribeiro and Jorge 2015): political, budgetary (linked to the budget components and practices), and institutional (mostly associated to budgetary rules). Table 1 presents these determinants, summarising a few studies where they have been identified and analysed.

There is an evident predominance of determinants of political nature, namely associated to opportunistic behaviours during electoral cycles. Institutional and budgetary determinants are clearly less studied. This study tries to contribute by further exploring budgetary and institutional factors that appear to deserve more attention.

Table 1. Empirical studies on the determinant factors of over-budgeting.

Authors	Variables	Main conclusions
Boukari and Veiga (2018)	Political: political orientation/ideology of the Executive; political strength; electoral cycle Institutional: fiscal autonomy	Political ideology does not seem to robustly affect forecast errors of revenue components. Opportunistic management of budget forecasts is more likely to happen when it is easier for local governments to approve their budgets without much need of negotiation with opposition parties. Revenue forecasts are managed opportunistically (overestimated) in electoral and pre-electoral years, especially where incumbents play a more prominent role in the conduct of their local governments. More revenue autonomy may be positively linked with conservatism in revenue forecasts, especially for current revenue.
Martins and Correia (2015)	Political: political orientation/ideology of the Executive Institutional: budget procedures and rules Budgetary: budgetary imbalance; proportion of own-source revenue to total revenue	Own-source revenues are those that, from the outset, have a greater margin for bias. When a budgetary deficit exists while forecasts are being made, local governments are incentivised to positively distort their revenue predictions, own-source revenues being those, from the outset, have a greater margin for bias.
Anessi-Pessina, Rota, and Sicilia (2015)	Political: political orientation/ideology of the Executive; electoral cycle Institutional: budget procedures and rules Budgetary: logic used in drafting the budget; conservatism of the budget	Local governments tend to under-estimate tax revenue both at the beginning and end of an electoral cycle. The logic used to prepare the budget can also influence estimated revenue biases. The difference between the revenue amount included in the current year's budget and the amount of revenue collected in the previous year may be used as a measure of conservatism: the greater the difference, the less conservative the budget will be. The financial position of local municipalities and the consequent level of budgetary pressure they are subjected to, can incentivise an incorrect revenue estimate.

(Continued)

Table 1. (Continued).

Authors	Variables	Main conclusions
Benito, Guillamón, and Bastida (2015)	Political: political orientation/ideology of the Executive; political fragmentation; electoral cycle	Political ideology does not have a clear influence on budget deviations. A coalition of two parties tends to be more optimistic in revenue forecasts than a one-party government, but when a government is composed of at least three parties, it becomes less optimistic than a one-party government. Multi-party coalitions increase the odds of at least one of the parties being part of a future government, which limits the attractiveness of the strategic use of budgetary policies. The odds of re-election can be increased by underestimating revenue in pre-election years and overestimating revenue in the election year.
Ribeiro and Jorge (2015)	Political: electoral cycle; shared ideology between the Municipal Executive and the Council	There is a 'strategic debt cycle', which means that the municipal debt is greater in electoral years, possibly due to greater expenditures without compensatory revenue (increased taxation), to maximise chances of re-election or, even, of limiting the actions of an eventual successor. When the political ideologies of both bodies (executive and deliberative) of local government coincide, there may be a greater tendency towards excessive revenue estimation.
Chatagny and Soguel (2012)	Political: electoral cycle	In a context of under-estimating tax revenue, by putting pressure on expenses, as in election years, elected officials seek to generate unexpected revenue and thus reduce the deficit.
Anessi-Pessina, Sicilia, and Steccolini (2012)	Political: electoral cycle	As elections near, local governments have greater incentive to over-estimate revenue during the preparation and execution of the budget, so that they may increase expenditure and avoid the immediate increase in taxes and rates. This encourages greater deficits and discourages the implementation of budgetary reforms that, in turn, tend to occur after elections.
Lobo and Ramos (2011)	Institutional: financing procedures; budgetary institutions	When subnational governments have an implicit guarantee, they will benefit from the financial support of the central government in the event of financial rupture, they will mismanage public finances ('moral hazard' problem) because they expect the central government to assume part of the expenditure and excessive debt costs.

(Continued)

Table 1. (Continued).

Authors	Variables	Main conclusions
Van der Ploeg (2010)	Political: electoral cycle	The under-estimation of tax revenue allows for the creation of a 'financial cushion' that can be used as a preventive measure (to keep expenditures under control) against future shocks.
Couture and Imbeau (2009)	Political: political orientation/ideology of the Executive; electoral cycle Institutional: budgetary rules	Right-wing parties tend to under-estimate revenue to appease those who prefer lower taxes and less expenditure and a budget surplus, given that the under-estimation of revenue will have the effect of containing expenditure growth. In a municipality subject to greater budgetary restrictions, namely through more demanding rules regarding debt, the propensity to manipulate revenue estimates will be less and there will be a greater resistance to over-estimate revenue.
Goeminne, Geys, and Smolders (2008)	Political: Executive fragmentation	Fragmented governments tend to make more optimistic revenue estimates compared with majority governments, given that the difficulty of reaching agreements between various parties within a coalition is associated with a greater propensity for revenue over-budgeting, as it allows the fragmented government to delay decisions on budgetary consolidation.
Ter-Minassian (2007)	Institutional: budgetary rules	Budgetary restrictions may prevent over-budgeting, but they will not be effective if there is not an effective political commitment.
Bischoff and Gohout (2006)	Political: political orientation/ideology of the Executive; electoral cycle	The lower the popularity of the incumbents among the electorate, the greater the incentive to over-estimate. A government who over-estimates tax revenues in the budget can also include more expenditure, without explicitly having to increase the public debt.
Brück and Stephan (2006), Mink and Haan (2006)	Political: political orientation/ideology of the Executive; fragmentation of the Executive	Left-wing governments tend to be more optimistic in their forecasts, that is, in the over-budgeting of revenue, as they tend to undertake more public expenditure than right-wing parties, following a more expansionist budgetary policy.
Brender and Drazen (2005), Shi and Svensson (2002), Galli and Rossi (2002), Ríos et al. (2018)	Political: electoral cycle	Governing authorities engage in opportunistic behaviours to increase public spending and decrease tax collection in pre-election periods, to improve their popularity and the odds of re-election.
Buti and Van Den Noord (2004)	Political: electoral cycle	The under-estimation of tax revenue reduces public deficits or increases surpluses, due to pressure on expenditures, but politicians may manage this 'cushion' to subsequently increase expenditures for electoral purposes and not necessarily to avoid excessive deficit.

(Continued)

Table 1. (Continued).

Authors	Variables	Main conclusions
Allers et al. (2001)	Political: government fragmentation	Government coalitions have lower taxation levels (tax revenue), which can stimulate over-budgeting.
Carvalho (1996)	Budgetary: budget imbalance	When municipalities cannot sustain themselves (not even with the additional transfers from the State), over-budgeting and using debt may be the only solution.
Tabellini and Alesina (1990), Persson and Svensson (1989)	Political: electoral cycle; Executive fragmentation	Uncertainty regarding the future government can give way to strategic behaviour on the part of the current incumbents, adopting policies that worsen the deficit and debt, such as over-budgeting.
		In the case re-election is unlikely, the idea is that the incumbents will still have incentive to overestimate tax revenue for the election year, so that their successor will have limited ability to increase expenditures, given that they will have to bear the burden of repaying the interest left by their predecessor, let alone the borrowed capital.
		The current government, in an attempt to condition the political options of the successor, may adopt budgetary policies that give rise to deficits and the consequent accumulation of debt.

3. Revenue in Portuguese municipalities

This section contextualises the municipal revenue in Portugal, helping to shed some light on signs of over-budgeting and instigating the empirical study. There are 308 municipalities in Portugal: 185 small (below 20,000 inhabitants), 99 medium-sized (between 20,000 and 100,000 inhabitants), and 24 large (above 100,000 inhabitants) (Carvalho et al. 2017).

3.1. Municipalities' financial regime

Nowadays, municipalities follow a financial regime established by Law 73/2013 (revised by Law 51/2018), passed in the aftermath of the financial crisis and the Financial Assistance Program of 2011. Accordingly, the distribution of resources between central government and municipalities corresponds to: a) a general grant from the Financial Equilibrium Fund, gathering amounts from personal income tax, company income tax, and value-added tax; b) a specific grant from the Municipal Social Fund; and c) a variable share of 5% in the personal income tax collected within each municipality territory. These funds constitute one of the main components of municipal revenue – the transfers from the State Budget that, together with other EU subsidies and transfers, and own-source revenue (namely, local taxes and revenue from the sale of current goods and services), constitute the main sources of municipal revenue.

This new financial regime sought to fundamentally intervene in the control and prevention of municipal financial imbalances, which several municipalities were passing though. Among other issues, it brought more restricted ceilings to municipal total debt (embracing that of municipal-owned business companies) – it could not surpass, on 31 December of each year, 1.5 times the average current net revenue collected by the municipality in the three previous years. It also introduced mechanisms to the early warning of deviations signalled by financial indicators and the possibility to resort to financial restructuring and recovering programmes.

In addition, the Commitments and Arrears Law (Law 8/2012 and complementary legislation) introduced the guiding principle that budgetary execution should not lead to the accumulation of arrears, given that municipalities could only take on expenditure if they would assure funds available within 90 days to ensure its payment.

These two laws pushed municipalities to tighten the gap between estimated and collected revenues, decisively contributing towards a behavioural change in the estimation of municipal revenue by local policy makers. After these, municipal revenue over-budgeting took on a decidedly negative trend, as evidenced in the next section.

Before these laws, the combination of, on the one hand, a permissive legal framework for municipal debt with, on the other, a strong dependence on transfers from the Central Government (particularly small municipalities, due to their reduced capacity to raise own-source revenue), led to the deterioration of the financial situation of Portuguese municipalities (Carvalho et al. 2015). This might be said to have been aggravated by the fact that municipalities could over-estimate revenues to balance their budgets, knowing that there was no serious control of debt limits to cover expenditures.

3.2. Revenue recent evolution and over-budgeting

The inscription of municipal revenue in the budget and in the budgetary accounting and reporting system, follows a legally established classifier (Decree-Law 26/2002), being grouped according to its economic nature, into current, capital and other revenues. «Current revenues» include: direct and indirect taxes; fees, fines and other penalties; property income; current transfers; sales of current goods and services; and other current revenue. «Capital revenues» include: sales of investment goods; capital transfers; proceeds of financial assets and of financial liabilities; and other capital revenues. «Other revenues» is a residual heading that notably includes the cash balance from the previous year's administration.

A municipality is considered to have financial independence when its own-source revenue represents at least 50% of total revenue (Carvalho et al. 2015). A municipality's own-source revenue corresponds to its total revenue deducted from transfers and from proceeds of financial liabilities (i.e., debt).[1] An analysis for the period between 2006 and 2016, of the weight of own-source revenue in the total revenue of all Portuguese municipalities, considering their sizes (small, medium and large), shows it is relatively greater in large municipalities (greater financial independence) with an average value above 60% (67% in 2016), far above the global average (about 35%). In medium-sized municipalities, transfers from the State and own-source revenue contributed almost equally to the total revenue, with an average weight of 48% and 46%, respectively. Small municipalities demonstrated considerable dependence on State transfers, which represented on average about 70% of their total revenue, while own-source revenue represented only around 25%, meaning that only around ¼ of the totality of financial resources available to small municipalities are generated by themselves, which represents a very diminished financial independence (Carvalho et al. 2017). Therefore, it can be noted that financial independence generally grows with the size of the municipality.

Considering the same period of analysis, the decrease in the overall municipal estimated revenue is noticeable, particularly after 2009, the year with the highest estimated global revenue (around 13 billion euros), and in

2015, the year with the lowest estimated global revenue (less than 8.8 billion euros), for a total decrease of around 4.2 billion euros in the amount of global estimated revenue for that time frame. The global revenue collected by the municipalities generally remained between 7 and 8 billion euros during the 2006–2016 period (Carvalho et al. 2017).

The greatest difference between global estimated revenue and global collected revenue is seen in 2010, with a differential of around 5 billion euros, and the lowest differential is seen in 2016 at around 1 billion euros. It is a drastically smaller difference that reveals the adjustment efforts between estimated and collected revenue, but that still urges a continuing effort to adjust to the real revenue-collecting capacities of Portuguese municipalities. Additionally, the degree of execution of collected revenue,[2] for all municipalities, increases considerably from 2013, reaching above 70%, with a maximum of 87.9% in 2016. Accordingly, the weight of excess budgeted revenue on raised revenue was, in 2016, only 13.7%, compared to an excess of 65.4% in 2010, for example (Carvalho et al. 2017).

Figure 1 provides a more direct view of the description above, clearly showing the discrepancy between estimated revenue and collected revenue for the whole of Portuguese municipalities between 2006 and 2016, as well as the adjustment effort that has taken place particularly in the most recent years. These distinctions are clear indicators of municipal revenue over-budgeting (with highest levels, in absolute terms, between 2009 and 2011),[3] an effect that seems to have been disciplined by legal measures, among which the above-mentioned new financial regime approved in 2013.

Regarding the revenue categories that most contributed towards the excess of estimated municipal revenue over the respective collected revenue, Carvalho et al. (2015) explained that, between 2005 and 2015, in all years and in all revenue categories, the amount of estimated revenue was superior to collected revenue; however, there were categories that presented a reduced
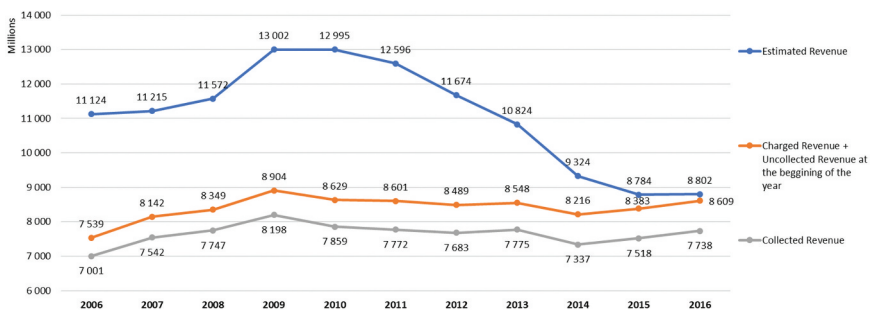
Figure 1. Evolution of municipal revenues in Portugal over the last decade. Source: Carvalho et al. (2017, 45), translated by the authors.

excess of estimated revenue, while other categories displayed significant levels of excess. Especially for the period of 2011–2014, the authors showed that over-budgeting was more evident in capital revenues, and within these, especially in 'sales of investment goods' and in 'capital transfers' – on average, around 60% of the overall estimated revenue excess of Portuguese municipalities was due to over-estimates in these two categories of capital revenue, despite the considerable reduction of the differences in absolute values. 'Proceeds of financial liabilities' (debt) are also significant for explaining the excess of estimated revenue and, once again, although the difference to collected revenue has diminished throughout time, in terms of proportion, they are among the most over-budgeted categories – between 9% and 17% of excess of estimated over collected revenue. However, since in this case over-budgeting involves revenue that was estimated by way of loans that were ultimately not approved, it is not necessarily a negative issue.

Overall, capital revenues are those that present some of the most over-budgeted categories (or with the lowest degrees of execution) and, despite the efforts that municipalities have made to match estimates to the revenue execution values, thereby considerably diminishing the amount of estimated excesses, there is the need to continue this path of adjustment (Carvalho et al. 2015, 2017; Veiga et al. 2015). Considering the revenue structure – own-source revenues, transfers, and debt (proceeds of financial liabilities) – the own-source revenues showed the greatest difference between estimated and collected revenue (Carvalho et al. 2017). This information is relevant, given that municipalities have the most discretion over own-source revenues.

The above analysis underlines the importance of understanding the causes of this municipal revenue overestimation, namely by proceeding to study its possible determinants.

4. Methodology

4.1. Objective and data

Considering the need to comply with the balanced-budget principle *ex-ante*, as well as the imperative for municipalities to continue adjusting estimates to real revenue collection capacities, this research overall aims to investigate revenue over-budgeting, using as reference the local government context in Portugal in the last few years. Starting by evidencing the existence of over-budgeting in Portuguese municipalities, especially during the period 2006–2016, it specifically analyses its determinants. The research question one seeks to answer is:

> For the period of 2005–2017, which factors determined the over-budgeting of municipal revenue in Portuguese municipalities and how?

The chosen time frame (2005–2017) relates to a particularly substantive period in terms of facts susceptible to affecting the estimation of municipal revenue, namely: the existence of four local government elections (in 2005, 2009, 2013 and 2017), the entry into force of a new Local Finance Law in 2007, later substituted by a new local financial regime in 2013, and various municipal debt restructuring programmes.

The methodology used is panel data analysis, which simultaneously allows for investigating about inter-municipalities variations (sectional dimension) and across time (temporal dimension), leading towards the construction of a regression model.

Data were obtained from the Financial Yearbook of Portuguese Municipalities (FY),[4] the National Electoral Commission (CNE),[5] the National Institute of Statistics (INE)[6] and the Local Government Portal (DGAL).[7]

4.2. *Hypotheses and variables*

Considering the studies,[8] namely of Benito, Guillamón, and Bastida (2015), Chatagny and Soguel (2012), Couture and Imbeau (2009), and Brück and Stephan (2006), over-budgeting as the dependent variable will be calculated as follows:

$$\text{Over} - \text{budgeting}_{it} = \frac{\text{Total estimated revenue}_{it} - \text{Total collected revenue}_{it}}{\text{Total estimated revenue}_{it}}$$

Where, i corresponds to one of the 308 Portuguese municipalities, and t corresponds to a period of time between 2005–2017.

The dependent variable ('*Overbud*') represents the excess of estimated revenue. Its value corresponds to the percentage of exceeding estimated revenue, i.e., that did not materialise in collected revenue. This variable will be calculated for each municipality in function of the respective estimated and collected amounts. Despite the diversity of sizes of Portuguese municipalities, it will be possible to compare the results, as the variable is considered in relative terms.

The literature review in Section 2 allowed for the identification of a set of possible determinants for municipal revenue over-budgeting. As explain, these determinants overall relate to political behaviour and political factors, and to budgetary and institutional arrangements. Subsequently, based on the framework of the public choice and institutional theories, the following overall hypotheses may be assumed:

H1 – Over-budgeting is affected by budgetary arrangements prevailing in the jurisdictions, such as incrementalism and revenue structure.

H2 – Over-budgeting is affected by political factors, such as politicians' expectation of (re)election, party ideology and political governance issues.

H3 – Over-budgeting is affected by institutional arrangements, such as those established in regulations framing budgeting procedures.

In addition, as also presented in Section 2, several variables have been considered as empirically representing political, budgetary and institutional issues within municipalities. Following this literature, such types of variables are adapted and used in this study as independent variables, considering specificities of the Portuguese municipalities' context. They are grouped into three categories of budgetary, political, and institutional factors possible to determine revenue over-budgeting. Moreover, other variables were added to control for municipality dimension (population) and wealth.

Table 2 summarises the independent variables, their calculation formula and the expected relationship with the dependent variable.

As to budgetary factors, it is expected that prevalent budgetary arrangements affect budget estimations (*H1*). For example, incrementalism practices often used while preparing the budget, may extend to future periods the effects of over-budgeting in one period. Moreover, revenue over-estimation has been presented as a tool for budget manipulation by budget managers, namely local politicians, so they can increase expenditure to satisfy local needs without increasing taxes, especially in electoral years (e.g., Bischoff and Gohout 2006; Anessi-Pessina, Sicilia, and Steccolini 2012; Benito, Guillamón, and Bastida 2015; Ribeiro and Jorge 2015; Ríos et al. 2018); or restrict the action of the successors as there is a past commitment to repay the debt consequence of revenue over-estimation (e.g., Tabellini and Alesina 1990). Therefore, the effects of over-estimated budgets are expected to surpass the short run, lasting for some years, namely considering the electoral cycle. In other words, it is expected that over-budgeting in 1 year will impact positively in over-budgeting in the following years. Another issue possibly affecting revenue overestimation concerns the logic of elaborating the budget, more or less conservative (Anessi-Pessina, Rota, and Sicilia 2015); subsequently, if over-budgeting effects are expected to last beyond the year revenue over-estimation is intended, then the larger the difference between estimated revenue for this year and collected revenue in the previous year, the larger expected over-budgeting in the current year will be. Finally, the revenue structure is another important matter, considering the composition between external and own-source revenues. Own-source revenues, either current or capital, are those which budget managers have more discretion over (Martins and Correia 2015), so it is expected over-budgeting to grow as their weight in total revenue increases.

As becomes clear from Section 2, political determinants (*H2*) are those more empirically explored in the literature, being evident the positive effect of the electoral cycle in over-budgeting; this study aims at confirming this evidence of opportunistic behaviour in the Portuguese local government.

Table 2. Independent variables, calculation formula and expected relationship with the dependent variable.

Determinant factors	Variables	Method of Calculation	Expected Relationship		Data source
Budgetary Arrangements (H1)	Dependent lagged variable (*L.Overbud*)	Revenue over-budgeting $_{t-1}$	Revenue over-budgeting is positively influenced by over-budgeting in the previous year(s).	+	FY
	Difference to previous year's collected revenue (*DifRev_1*)	$\frac{\text{Total estimated revenue}_t - \text{Total collected revenue}_t}{\text{Total estimated revenue}_t}$	Revenue over-budgeting is positively influenced by the difference between the estimated revenue for the year and the previous year's collected revenue.	+	FY
	Proportion of own-source revenue (*RatioORev*)	$\frac{\text{Collected own} - \text{source revenue}_t}{\text{Total collected revenue}_t}$	Revenue over-budgeting is positively influenced by the municipality's proportion of own-source revenue.	+	FY
Political factors (H2)	Ideology of the executive party (*Right/Left/Indep*)	Value 1 when the acting Executive is ideologically right-wing/left-wing/independent; Value 0 otherwise.	Revenue over-budgeting is influenced by political ideology.	-/+/?	CNE
	Electoral cycle (*ElectYear*)	Value 1 when it is a local election year; Value 0 otherwise.	Revenue over-budgeting is positively influenced by the electoral cycle.	+	CNE
	Government fragmentation (*Coalition/Majority/NoMajority*)	Value 1 when the acting Executive consists of: coalition of parties / one party with majority / one party without majority; Value 0 otherwise.	Revenue over-budgeting is influenced by fragmentation of the Executive in power.	?	CNE
	Shared ideology in most of the ME and the MC (*SharedIdeol*)	Value 1 when most of the Municipal Executive (ME) and the Municipal Council (MC) belong to the same political ideology; Value 0 otherwise.	Revenue over-budgeting is positively influenced by a shared ideology between the ME and the MC.	+	CNE
Institutional Arrangements (H3)	Net debt excess (*ExcessDebt*)[a]	$\frac{\text{Total Net debt} - \text{Limit to indebtedness}}{\text{Limit to indebtedness}}$	Revenue over-budgeting is negatively influenced by excessive debt.	-	DGAL
	Municipality participated in a restructuring programme (*Prog*)	Value 1 if the municipality has participated in at least one debt restructuring programme; Value 0 otherwise.	Revenue over-budgeting is negatively influenced by municipal participation in a debt restructuring programme.	-	DGAL and FY

[a]For each year of the period under analysis (2005–2017), the debt limit in force in the respective local finance law will be used, or else the value that complies with the State Budget Laws.

Furthermore, other political factors are taken as influencing over-budgeting: the political ideology of the Executive, the political competition within the local government (more or less fragmentation), and a common political ideology between the Executive and the Deliberative body (council).

Evidence in the literature (e.g., Brück and Stephan 2006; Couture and Imbeau 2009) shows that left-wing parties tend to spend more, so it is expected left-wing governments to be more prone to revenue over-budgeting, to assure expenditure cover, at least in estimated terms. These findings are consistent with the early partisan theory developed by Hibbs (1977) and the rational partisan theory supported by Alesina (1987) that left-wing parties implement policies to support the working class and their well-being, while right-wing (conservative) parties adopt policies to control inflation and promote growth. Therefore, government ideology could affect the level of expenditures and therefore left-wing governments might be more prone to over-budgeting practices. In the same line, more fragmented governments (where there is more political competition) may also favour over-budgeting, because agreements with other parties may be difficult to reach, pressuring for expenditure (Allers et al. 2001; Goeminne, Geys, and Smolders 2008), as is advocated by the consensus approach sustained by Lijphart (1999). However, less fragmented governments may also be more opportunistic and prone to over-budgeting, as they approve their budgets with less or no need to negotiate with opposing parties (Boukari and Veiga 2018). This is consistent with the veto theory (Tsebelis 1995, 2002), which advocates that less institutional constraints make easier to endure in over-budgeting practices. Therefore, the sign of the relationship between the political fragmentation and revenue over-budgeting in municipalities is to be determined. The coincidence of political parties between the Executive and the Council may create a scenario with great propensity to revenue over-budgeting (Ribeiro and Jorge 2015). As the Municipal Council is the major body of political control in the municipality, it is assumed that it may be more difficult for the Executive to approve a budget with overestimated revenues when the Council does not belong to the same political ideology. On the other hand, when the majorities are coincident, a positive relationship is expected.

Institutional arrangements, such as budget restrictions and other regulations are expected to determine revenue over-budgeting too (*H3*). When budgetary rules are more restrict, namely regarding debt ceilings, there is less propensity for revenue over-budgeting (Couture and Imbeau 2009). A negative relationship is expected because a municipality exceeding its allowed debt limit will probably have to impose more budgetary rigour, in order to revert the situation of non-compliance with the imposed rules, under penalty of sanctions. Hence, a lower propensity to overestimate revenues is expected. Additionally, municipalities may be pushed to supporting programmes in order to re-establish financial balance. Between 2005 and 2017

there were several debt restructuring programmes to which many Portuguese municipalities had to resort. The financial discipline and monitoring process resulting from these programmes (Ter-Minassian 2007), leads to expect a negative effect on over-budgeting, because a municipality subject to a debt restructuring programme will have, at the outset, greater budgetary constraints and less flexibility to overestimate its revenues.

4.3. Econometric model

To estimate the impact of the different variables on total municipal revenue over-budgeting for all time periods and municipalities in the dataset, the following dynamic panel data specification was considered:

$$OverBud_{it} = \alpha + \sum_{k=1}^{p} \rho_k OverBud_{it-k} + \beta X_{it} + v_i + u_{it}$$

where, i = 1,2,, ...,308; t = 2005, 2006, ..., 2017, ρ_k measures the persistence over p periods; X_{it} is a subset of the explanatory variables described in Table 2 and control variables, the v_i is the individual effect of each municipality, and the u_{it} error term.

Considering the heterogeneity across individuals given by the individual effect, the model could be estimated by fixed or random effects. However, given the presence of lagged values of the dependent variable, the study uses dynamic panel data, where, as shown by Nickell (1981), either in the fixed effect or in the random effect model, the lagged dependent variable is correlated with the error term (even if this is not autocorrelated) creating a bias in the estimate of its coefficient, which does not disappear when N increases.[9] Furthermore, if the remaining regressors are also correlated with the lagged dependent variable, their coefficients will, also, be biased and inconsistent. To overcome this problem, the original equation is first differenced, which sweeps out the individual fixed effects, and use previous lags of the dependent variable (either in levels or in first differences) as instruments. However, Arellano and Bond (1991) argue that this approach does not take into consideration all information and orthogonality conditions available in the sample. They suggest, using a GMM estimator, to use the lagged levels of the dependent and explanatory variables as instruments of the differenced equation, and therefore this estimator also controls for the potential endogeneity of other co-variables. This estimator is known as the difference-GMM estimator (hereafter, *GMM-dif*).

A potential weakness of the previous estimator was uncovered by Arellano and Bover (1995) and Blundell and Bond (1998): the lagged levels of the variables are often poor instruments of the differenced variables, mainly if they are close to a random walk. To overcome this weakness, they suggested the use of additional moment conditions by combining the moments of the model in first differences and those of the model in levels (differences are used as instruments for the level equations). This estimator is known as the system-GMM estimator (hereafter, *GMM-sys*), which not only reduces the finite sample bias, but also can include time-invariant regressors, which would disappear in difference GMM. Asymptotically, this does not affect the coefficient estimates for other regressors because all instruments for the levels equation are assumed to be orthogonal to all time-invariant variables.

Furthermore, all models control for time effects to remove universal time-related shocks from the errors, as the autocorrelation test and the robust estimates of the coefficient standard errors assume that the idiosyncratic disturbances are not cross correlated. Time *dummies* make this assumption more likely to hold.

Both estimators have a one-step and two-step variants, where the latter uses the estimated residuals to construct a consistent variance-covariance matrix of the moment conditions. In the one-step models robust errors were used, which makes standard error estimates consistent in the presence of any pattern of heteroskedasticity and autocorrelation within panels. The two-step estimator is asymptotically more efficient and relaxes the assumption of homoscedasticity and uses the Windmeijer (2005) correction to adjust for the downward bias of the estimated standard errors in finite samples.

Finally, one should take note of when the *log(PPM)* is used as explanatory variable, this variable has a biennial frequency (once every 2 years). Without a proper transformation, annual first differencing will lead to no data, so two solutions were followed: 1) as it continues to be a regular frequency, we opted to use the every two-years' database (2005, 2007, 2009, 2011, 2013, 2015, 2017) and first differencing, which now gives a two-year differencing; and 2) we used a common transformation, called 'forward orthogonal deviations' or 'orthogonal deviations' (Arellano and Bover 1995). This last solution, instead of subtracting the previous observation from the contemporaneous one, subtracts the average of all future available observations of a variable. No matter how many gaps, it is computable for all observations except the last, so it minimises data loss. And because lagged observations do not enter the formula, they are valid as instruments. Then we proceed exactly as in the GMM-Sys. We will call this estimator the orthogonal system-GMM (hereafter *GMM-Orth*).

5. Empirical findings

Tables 3 and 4 present the results using the two-step system, the difference and the orthogonal GMM estimators for over-budgeting determinants. The tests performed reveal that the model performs well. So, beyond fulfiling the necessary requirements to be statistically suitable, this model also allows for the corroboration of some of the previously expected relationships between the variables,[10] ultimately allowing for corroborating the hypotheses.

Across all models the coefficients relating to the lag of the dependent variable are always positive and significant, with the coefficients of the first two lags being highly significant. These values demonstrate the importance of a potential municipal revenue overestimation in previous years for a potential overestimation of municipal revenue in the present. In other words, the results show that a municipality that overestimates its revenue each year will impact the following years, since the effect of that municipal revenue overestimation takes a few years to dissipate. In view of this, one may conclude that municipalities' behaviour in past years regarding budgetary revenue estimate, will have consequences on the budgeted revenue in the following years, even if in a declining manner.[11]

Perhaps as a consequence of the above, and linking to prevailing incrementalistic practices, the positive effect on revenue over-budgeting of the difference between the estimated revenue for the year and the previous year's collected revenue, is confirmed too, as the coefficient of the variable *DifRev_1* is robustly significant across all the models. Such finding meets that of Anessi-Pessina, Rota, and Sicilia (2015). Therefore, it seems that the optimism of municipalities in forecasting their revenues is a predictor of the revenue over-budgeting observed.

The *RatioORev* variable has a positive and highly significant coefficient robust across models (1) to (11), evidencing that revenue over-budgeting is positively influenced by the municipality's proportion of own-source revenue. Therefore, the greater the financial independence of (Portuguese) municipalities, the greater their predisposition to over-estimate revenue and, in fact, own-source revenue is the most susceptible to be influenced. This conclusion is in line with that of Martins and Correia (2015). However, one issue can be put at discussion about this financial independence: whether it comes from higher municipal tax rates, licence fees and service provision, or from the overall wealth of a given municipality. Due to the multitude of municipal taxes, licence fees and service prices, is almost impossible to have a good measure of how they evolve. For instance, a municipality can decrease the property tax rate, leading to an idea of decreasing the tax burden, but it can compensate by increasing other licence fees. So, in order to distinguish the effects of both, we used proxies for the municipality's wealth, and checked how they affect the sign of the coefficient of the variable *RatioORev*: the *size*,

Table 3. Over-budgeting determinants.

Model	Model (1) GMM-Sys	Model (2) GMM-Dif	Model (3) GMM-Sys	Model (4) GMM-Sys	Model (5) GMM-Dif	Model (6) GMM-Sys	Model (7) GMM-Dif
Constant	0.00612		0.0241	−0.0589**		22.78***	
	(0.21)		(1.01)	(−2.25)		(11.65)	
L.Overbud	0.557***	0.358***	0.562***	0.704***	0.506***	0.625***	0.415***
	(9.35)	(5.09)	(10.35)	(13.82)	(9.49)	(12.92)	(9.78)
L2.Overbud	0.168***	0.229***	0.163***	0.0933*	0.124***	0.0136	0.0218
	(4.25)	(4.79)	(4.36)	(1.79)	(2.86)	(0.27)	(0.58)
L3.Overbud						0.0128	−0.0439*
						(0.35)	(−1.69)
DifRev_1	0.0651***	0.0639***	0.0662***	0.0954***	0.143***	0.0626***	0.0934***
	(3.90)	(4.28)	(4.36)	(4.28)	(5.78)	(3.38)	(5.06)
ExcessDebt	−0.000411*	−0.000452**	−0.000392*	−0.000506***	−0.000247	−0.000315	−0.000114
	(−1.67)	(−2.54)	(−1.88)	(−2.16)	(−1.21)	(−1.34)	(−0.53)
RatioORev	0.0726**	0.146*	0.0783**	0.0520*	0.180***	0.0683*	0.230***
	(2.34)	(1.80)	(2.07)	(1.70)	(3.00)	(1.89)	(3.82)
Right	0.0252	−0.0318	0.0125	0.0591***	0.0638*	0.0399**	0.0275
	(1.39)	(−0.89)	(0.86)	(3.37)	(1.70)	(2.07)	(0.71)
Left	0.0172	−0.0717*	0.0107	0.0232	−0.00806	0.0276	−0.00138
	(0.96)	(−1.95)	(0.74)	(1.42)	(−0.22)	(1.57)	(−0.04)
Majority	0.00248	0.0350*	−0.00221	0.0242**	0.0689***	0.00581	0.0465**
	(0.26)	(1.87)	(−0.30)	(2.15)	(3.26)	(0.47)	(2.24)
NoMajority	−0.0101	0.0175	−0.0155*	−0.00330	0.0265	−0.0109	0.0265
	(−0.97)	(0.88)	(−1.74)	(−0.29)	(1.26)	(−0.80)	(1.36)
Prog	−0.0424***	−0.0502***	−0.0426***	−0.0566***	−0.0738***	−0.0545***	−0.0726***
	(−5.94)	(−6.15)	(−6.39)	(−6.22)	(−8.46)	(−6.42)	(−9.25)
SharedIdeol	0.00271	0.0000169	0.00307	0.0156	0.0136	0.00498	−0.00871
	(0.29)	(0.00)	(0.35)	(1.48)	(0.94)	(0.46)	(−0.66)
Large			−0.0468***				
			(−2.91)				
Medium			−0.0160**				
			(−2.07)				

(Continued)

LOCAL GOVERNMENT STUDIES 665

Table 3. (Continued).

Model	Model (1) GMM-Sys	Model (2) GMM-Dif	Model (3) GMM-Sys	Model (4) GMM-Sys	Model (5) GMM-Dif	Model (6) GMM-Sys	Model (7) GMM-Dif
ElectYear				0.0116** (2.36)	0.00930* (1.96)	0.0167*** (3.52)	0.0163*** (3.76)
Trend						-0.0113*** (-11.67)	-0.0163*** (-13.21)
N	3351	3009	3351	3043	2701	3043	2071
#Instruments	234	222	291	303	295	303	295
#Groups	308	308	308	308	308	308	308
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)	0.839	0.124	0.763	0.263	0.452	0.038	0.235
Hansen	0.114	0.299	0.494	0.374	0.263	0.464	0.310
Hansen-dif	0.091		0.457	0.124		0.232	
Time Dummies	Yes	Yes	Yes	No	No	No	No

See Table 2 for the variable description. Two-step GMM estimations for dynamic panel data models using robust standard errors corrected for finite samples (standard errors are reported in parentheses);

***, **, * significance levels at which the null hypothesis is rejected: at 1%, 5% and 10% respectively.

All variables except for the electoral year, dimension and time dummies are treated as endogenous in the GMM estimations.

The Hansen test reports the p-value for the null hypothesis of instrument validity; while Hansen-dif test reports the p value for the null hypothesis of instrument validity of the levels equation in the GMM-Sys estimator.

The values reported for AR(1)and AR(2) are the p-values of the Arellano–Bond tests for first and second order auto-correlated disturbances.

Table 4. Over-budgeting determinants with municipality wealth control.

Model	Model (8) GMM-Sys	Model (9) GMM-Dif	Model (10) GMM-Orth	Model (11) GMM-Sys	Model (12) GMM-Orth
Constant	−0.268		−0.225	**−0.340***	−0.230
	(−1.62)		(−1.40)	**(−1.80)**	(−1.42)
L.Overbud	**0.512***	**0.397***	**0.518***	**0.520***	**0.518***
	(6.87)	**(4.12)**	**(8.92)**	**(6.85)**	**(8.92)**
L2.Overbud	**0.157***	**0.145**	**0.188***	**0.154***	**0.188***
	(2.89)	**(1.98)**	**(3.70)**	**(2.80)**	**(3.76)**
DifRev_1	**0.0963***	**0.123***	**0.0692***	**0.0971***	**0.0685***
	(4.33)	**(4.43)**	**(3.50)**	**(4.33)**	**(3.46)**
ExcessDebt	−0.00151	−0.00176	0.000340	−0.00154	0.000315
	(−1.29)	(−1.31)	(0.82)	(−1.35)	(0.73)
RatioORev	**−0.102**	**−0.222***	**−0.104***	**−0.0929***	−0.0813
	(−2.13)	**(−1.64)**	**(−1.91)**	**(−1.82)**	(−1.22)
Right	−0.00862	−0.0188	−0.000	−0.00802	−0.000323
	(−0.42)	(−0.48)	(−0.00)	(−0.38)	(−0.01)
Left	−0.0124	−0.0381	−0.0134	−0.0112	−0.0132
	(−0.62)	(−1.01)	(−0.63)	(−0.56)	(−0.63)
Majority	−0.00660	**0.0515***	−0.00167	−0.00628	−0.00332
	(−0.51)	**(1.83)**	(−0.18)	(−0.48)	(−0.37)
NoMajority	**−0.0278***	0.00499	**−0.0250***	**−0.0265***	**−0.0265****
	(−1.94)	(0.17)	**(−1.86)**	**(−1.82)**	**(−2.04)**
Prog	**−0.0512***	**−0.0655***	**−0.0490***	**−0.0520***	**−0.0483***
	(−6.65)	**(−6.70)**	**(−5.96)**	**(−6.58)**	**(−5.76)**
SharedIdeol	0.00387	0.00138	0.0176	0.00480	**0.0189***
	(0.33)	(0.09)	(1.57)	(0.41)	**(1.70)**
Large				−0.00866	−0.0105
				(−0.82)	(−0.79)
Medium				−0.0286	−0.0272
				(−1.41)	(−1.17)
Log(PPM)	**0.0784**	**0.253***	**0.0716***	**0.0949**	**0.0722***
	(1.98)	**(2.61)**	**(1.90)**	**(2.15)**	**(1.92)**
N	1812	1470	1812	1812	1812
#Instruments	173	134	235	175	237
#Groups	308	308	308	308	308
AR(1)	0.000	0.000	–	0.000	–
AR(2)	0.260	0.148	–	0.250	–
Hansen	0.138	0.144	0.096	0.125	0.078
Hansen-dif	0.083		0.052	0.094	0.043
Time Dummies	Yes	Yes	Yes	Yes	Yes

See Table 2 for the variable description. Two-step GMM estimations for dynamic panel data models using robust standard errors corrected for finite samples (standard errors are reported in parentheses); ***, **, * significance levels at which the null hypothesis is rejected: at 1%, 5% and 10% respectively.
All variables except for the electoral year, dimension and time dummies are treated as endogenous in the GMM estimations.
The Hansen test reports the p-value for the null hypothesis of instrument validity; while Hansen-dif test reports the p value for the null hypothesis of instrument validity of the levels equation in the GMM-Sys estimator.
The values reported for AR(1) and AR(2) are the p-values of the Arellano–Bond tests for first and second order auto-correlated disturbances.

which is included in models (3), (11) and (12), and the log of the purchasing power in the municipality – *log(PPM)*, which is included in models (8) to (12). Regarding size, although model (3) shows significant effects, they disappear in models (11) and (12), once we include the purchasing power in the municipality, without affecting the significance or value of other variables.

Overall, the previous results confirm H2 that budgetary arrangements are an important factor into determining the municipalities over-budgeting.

As to the *log(PPM)*, it not only shows a robust positive sign, but it also changes the sign of the *RatioORev* variable. This shows that, for equally wealthy municipalities, the one with higher ratio of own revenues (which can mainly come from higher taxes, licence fees and service prices) will have a lower propensity to overestimate the revenues. However, for the same ratio of own revenues, richer municipalities tend to overestimate the revenues. These results alter the interpretation of the relationship expected between the proportion of municipalities' own-source and revenue over-budgeting – municipalities that tend to over-budgeting are those knowing they have a richer taxable base and therefore can be more independent by raising taxes if they wish.

Regarding the political variables (*Right/Left, ElectYear, Majority/NoMajority* and *SharedIdeol*), the evidence is mixed. As to the ideological variables, although significant in some cases, their effect is not robust across the models. Only models (2), (4), (5) and (6), and contrary to the expected relationship, show that when the Executive is ideologically from the right wing, over-budgeting is more likely to occur than when is left wing.[12] This evidence contradicts the theory about left-wing parties advocating expansionists budgets, as in the conclusions by Brück and Stephan (2006) and Mink and Haan (2006). However, the robustness is rather weak, as most models reject the significance of these variables; so, just as happened with other authors, e.g., Boukari and Veiga (2018), Benito, Guillamón, and Bastida (2015) and Bischoff and Gohout (2006), one could not confirm entirely that political ideology plays a role in over-budgeting.

As for the political cycle, the electoral year (*ElectYear* in models (4) to (7)) shows that Executives have an opportunistic behaviour, over-budgeting the revenue in order to justify expenses to maximise the odds of being re-elected; this is in line with most of the literature summarised in Table 1.

In what regards the fragmentation of the Executive,[13] evidence shows that majority Executives seem to be more prone to over-budgeting than minority Executives (positive sign in the *Majority* variable in models (2), (4), (5), (7) and (9), and negative in the *NoMajority* variable in models (3), (8) and (10) to (12)), while Executives that are formed by coalition majority seem to be somewhere between these two extremes (as in Allers et al., 2001, for example). One can argue that when the Executive is from a single political party, there is less political scrutiny of the budget and so it is easier to over-budget the revenue to increase expenditures (like in Boukari and Veiga 2018); on the contrary, when the Executive is in minority, as the opposition thinks that has a higher chance of coming into power in future elections, there is more surveillance over the budget presented to be approved. Although this result is contrary to the findings of Goeminne, Geys, and Smolders (2008), it confirms those of Benito,

Guillamón, and Bastida (2015), also meeting the findings of Tabellini and Alesina (1990) and Persson and Svensson (1989). Therefore, there is evidence that fragmentation (more political competition) reduces over-budgeting.

However, the idea that the Municipal Council could exert pressure over the Municipal Executive to over-budgeting does not seem to be true, as in all but one models the variable that measures if the ideology/political party is the same or not in both bodies (*SharedIdeol*) does not show any evidence of significance, thus not confirming the expected relationship, and going against the conclusions of Ribeiro and Jorge (2015).

Concluding, regarding H2, that political factors influence municipality overbudgeting, we found that the only variables that are statistically significant are the ones associated with political competition and re-election. So, the results highlight the importance of political factors, even if not all channels (as for instance ideology) are important.

The excessive debt effect (*ExcessDebt*) is not significantly robust across models, so the evidence that a high debt level can exert control over the municipality's Executives regarding revenue over-budgeting is weak at best, meaning that the expected relationship that revenue over-budgeting would be negatively influenced by excessive debt, is not confirmed. Despite the expected effect that exceeding debt level could have in helping to discipline local finances, in line with Lobo and Ramos (2011) a certain warranty that central government will support municipalities when financial problems arise, seems to contribute for continue over-budgeting.

The *Prog* variable presents a statistically significant negative effect, robust across all models, denoting the importance of this variable. Portuguese municipalities that were (and may still be) under a debt restructuring program seem less susceptible to over-estimate municipal revenue. This result is in accordance with the expectations, given that a municipality subject to a debt restructuring program will, most likely, show greater control over their accounts and elaborate a more prudent and careful budget. They also meet the findings of Couture and Imbeau (2009) and Ter-Minassian (2007). This result shows the importance of institutional arrangements in controlling overbudgeting, thus confirming our H3.

6. Conclusion

This study analysed municipal revenue over-budgeting, seeking to explain its potential determinants using data of Portuguese municipalities during the period of 2005–2017.

Revenue over-budgeting occurs when a municipality estimates a revenue amount in its budget that is far superior to that which it expects effectively to collect by the end of the year. A certain degree of imprecision in revenue

estimates is inevitable, but a high disparity between the estimated and collected values of municipal revenue for successive years, may be indicative of intentional practices.

Excessive revenue estimation allows municipalities to take on a level of expenditure that they do not have the capacity to support. If there is no budgetary mechanism obliging an adjustment, in total terms, from the expenditures incurred to the effectively collected revenue, this practice can lead to the possibility of creating serious budgetary imbalances and indebtedness.

The execution of the global revenue budget in all Portuguese municipalities has allowed for the practice of over-budgeting to be observed across successive years, especially during the recent financial crisis period and for capital revenue.

The literature on the topic suggests that there may be many potential determinants of municipal revenue over-budgeting, especially factors of political nature. In the empirical quantitative analysis developed in this paper, those determinants were grouped into three larger categories: budgetary, political and institutional.

Main findings of the study allowed for the conclusion that municipal revenue over-budgeting is influenced by the three main categories considered: budgetary factors, political determinants and institutional arrangements.

As for the budgetary factors, overbudgeting is a practice that has implications for several years, given that the effect of over-budget in any given year tends to take up to 3 years to dissipate. Also, the greater the ratio of own-source revenue to total collected revenue, the greater the revenue over-budgeting. However, this works through the wealth of the municipality rather than higher taxes and municipal fees and prices. This is because, in theory, if a municipality has a higher taxable base, it allows for more discretion in the future as present over-budgeting can be balanced with higher taxes, licence fees and service prices in the future.

As to political determinants, only when a municipality has a majority acting Executive and it is an electoral year there is a positive effect on over-budgeting. The first is due to a less control to the municipality accounts by other parties, and the second depicts an opportunistic behaviour in order to maximise the odds of being re-elected.

In terms of institutional determinants, the participation of a municipality in any financial restructuring program seems to be an obstacle to revenue over-budgeting, probably due to the greater control and scrutiny, which exerts a disciplinary effect on the Executive. The adjustment effort, in the most recent years, in the Portuguese context, is the result of the imposition of municipal debt restructuring programmes, just as municipal laws that sought

greater control over commitments and municipal debt levels. On the contrary, the excessive debt *per se* does not seem to act as an enough incentive for the municipalities to stop their practice of over-budgeting.

Accordingly, it could be interesting to understand the impact of over-budgeting revenue on the financial situation of municipalities, and particularly on their indebtedness. Such study may well be a future development of this research.

Overall, it seems that the lack of control (being it by opposition parties or external restructuring programmes) leads the municipality's Executives to engage in practices of over-budgeting, being these more serious in wealthier municipalities and/or in electoral years. So, as policy implication, one cannot expect that the market by itself (excessive debt) come to correct misbehaviour of municipal Executives in majority in respect to revenue over-budgeting, when only an external control over their accounts seem to work.

Notes

1. Because budgets are cash-based, all cash-inflows are considered revenue.
2. The revenue execution degree is measured through collected revenue, due to the cash principle. Therefore, independently of the moment when the revenue-generating event takes place or the existence of a right to collect, revenue is considered executed only when it is actually received.
3. In their analysis between 1998 and 2015, Boukari and Veiga (2018) also state that budget forecasts are biased and inefficient in Portuguese municipalities.
4. http://www.occ.pt/pt/a-ordem/publicacoes/anuario-financeiro-dos-municipios-portugueses/
5. http://www.cne.pt/
6. https://www.ine.pt/
7. http://www.portalautarquico.pt/
8. The data that support the findings of this study are available from the corresponding author, upon reasonable request.
9. Particularly in the case of 'large' N and 'small' T, as is this case (N = 308, T = 12).
10. One of the questions that may arise is whether there is no reverse causality. To check this, a robustness estimation was performed with the dependent variables set in leads of the base models of Tables 3 and 4 (see Appendix). All explanatory variables set in leads are non-significant except for *'Prog'* and *'log(PPM)'*, meaning that over-budgeting does not precede variations in the other variables and so one can rule out that over-budgeting is the cause.

    As for *'Prog'* and *'log(PPM)'* the result was expectable, as over-budgeting was one of the reasons to set up a restructuring program in the future, hence the positive sign for *'Prog'*, as well as a future negative impact on the purchasing power due to the restrictive measures. Note that in both cases, the reverse impact changes the estimator signal.
11. The confirmation of this relationship is important to support the use of the GMM methodology as the presence of the lagged value would bias the coefficients estimators of the remaining variables if we had resorted to more traditional panel estimators, as explained in Section 4.3.

12. Note that, in Tables 3 and 4, the estimated coefficients for left-wing and right-wing corresponds to the difference relatively to the base case (independent). Results are invariant when the left-wing or right-wing are used as base case (the results not tabulated are available from the authors upon request).
13. The base case is *Coalition Majority*.

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Appendix. Over-budgeting forward robustness estimation

	Model (1A)	Model (2A)	Model (3A)	Model (4A)	Model (5A)
Model	GMM-Sys	GMM-Dif	GMM-Sys	GMM-Sys	GMM-Orth
Constant	0.0296		1.055**		−0.546*
	(0.79)		(2.34)		(−1.77)
L.sobreorc	**0.655***	**0.359***	**0.442***	**0.271**	**0.834***
	(11.75)	**(4.76)**	**(3.98)**	**(2.20)**	**(14.43)**
L2.sobreorc	0.120	0.0897			
	(1.34)	(1.05)			
L3.sobreorc	−0.0154	**0.120***			
	(−0.27)	**(1.73)**			
F.DifRev	0.0201	0.0690	0.0197	0.00947	0.0804
	(0.55)	(1.32)	(0.40)	(0.29)	(1.42)
F.ExcessDebt	0.000717	0.0000388	0.00229	0.00192	0.00140
	(0.65)	(0.05)	(1.07)	(0.57)	(1.20)
F.RatioORev	0.0224	−0.154	0.183	−0.122	−0.00317
	(0.55)	(−1.15)	(1.44)	(−0.37)	(−0.03)
F.Right	−0.0152	0.00283	−0.0887	0.0185	0.0624
	(−0.64)	(0.04)	(−0.98)	(0.18)	(1.18)
F.Left	−0.0271	−0.0654	−0.119	−0.0682	0.0661
	(−1.34)	(−1.12)	(−1.39)	(−0.65)	(1.37)
F.Majority	0.0161	0.0603	−0.0521	0.0337	0.0202
	(1.12)	(1.63)	(−0.91)	(0.36)	(0.67)
F.NoMajority	0.0174	0.0404	−0.131	−0.0103	0.00215
	(1.04)	(1.23)	(−1.49)	(−0.09)	(0.06)
F.Prog	−0.0295	**0.0735***	**0.0901***	**0.102***	0.00674
	(−1.49)	**(3.14)**	**(2.68)**	**(3.01)**	(0.39)
F.SharedIdeol	−0.0284	−0.0238	0.104	0.0498	−0.0251
	(−1.31)	(−0.86)	(1.33)	(0.50)	(−1.00)
F.Log(PPM)			−0.203**	−0.281*	0.110
			(−2.15)	(−1.66)	(1.56)
N	2393	2052	1197	856	1504
Groups	308	308	308	308	**308**
#Instruments	176	153	72	54	125
AR(1)	0.000	0.000	0.000	0.006	
AR(2)	0.327	0.769	0.158	0.185	
Hansen	0.048	0.137	0.110	0.054	0.018
Hansen-dif	0.028		0.344		0.082
Time Dummies	YES	YES	YES	YES	YES

See Table 1 for the variable description. The F operator means one period ahead (lead).
Two-step GMM estimations for dynamic panel data models using robust standard errors corrected for finite samples (standard errors are reported in parentheses);
***, **, * significance levels at which the null hypothesis is rejected: at 1%, 5% and 10% respectively.
All variables except for the electoral year, dimension and time dummies are treated as endogenous in the GMM estimations.
The Hansen test reports the p-value for the null hypothesis of instrument validity; while Hansen-dif test reports the p value for the null hypothesis of instrument validity of the levels equation in the GMM-Sys estimator.
The values reported for AR(1) and AR(2) are the p-values of the Arellano–Bond tests for first and second order auto-correlated disturbances.