I Like the Way You Move: Tax Competition in Portuguese Municipal Corporate Income Tax

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Abstract

We study tax competition in municipal corporate income tax using a difference-in-differences approach based on the fact that municipalities with a left-wing mayor set consistently higher tax rates than those with a right-wing mayor. We use a panel of 278 Portuguese mainland municipalities, between 1998 and 2013. We show that left-run municipalities with a common border with one or more right-run municipalities (the treatment group) set lower tax rates than the remaining left-run municipalities (the control group). We also show that this lower tax rate does not result from a smaller left-leaning preference of the voters of treated municipalities. We build on this difference-in-differences approach to provide an instrumental variables estimation of the municipal tax reaction functions. Our preferred estimate suggests that municipalities react to an average increase of 1 pp of the neighbours' tax rate with an own tax increase of 0.884 pp. We show that the strategic interaction is invariant to the political strength of the incumbent mayor, which we take as evidence that tax, rather than yardstick competition, is driving our results.

Keywords: Tax Competition, Local Taxation, Corporate Income Tax, Portugal

JEL Classification: D72, H71, H73

1 Introduction

Strategic interaction among local governments has become a relevant issue in terms of local public finance. Namely, tax competition has been one of the most studied sources of interaction in the literature (see Wilson, 1999, and Baskaran and da Fonseca, 2013, for literature surveys). Taking the case of local corporate income tax, if the tax base (firms) is mobile, local governments can use this policy instrument as a way to attract more capital to the jurisdiction.[1] While this force leads, in general, to a "race to the bottom", on the other hand, local governments still rely on this instrument as a source of current revenue, raising concerns about the optimality of local taxes resulting from local tax competition.

The decision of tax setting ends up in a game where local jurisdictions set the tax rate as a function of surrounding jurisdictions' taxes rates. Since taxes are usually set simultaneously, this generates a problem of endogeneity in the tax reaction function: the tax rate of jurisdiction A depends on the taxes of the neighbours B and C, which also depend on the tax rate of jurisdiction A. In order to overcome this issue, Gibbons and Overman (2012) suggest an IV approach where an institutional arrangement might provide exogenous variation in the neighbours' tax rate. In this context, the purpose of this paper is to study the strategic interaction on the local corporate income tax in Portuguese municipalities, the so-called *Derrama*.[2] Using a difference-in-differences regression, we find that municipalities with left-wing governments in Portugal consistently set higher tax rates but such a difference diminishes if they are located on the border of a right-wing municipality. The fact that Portuguese political preferences in the municipal executive have been rather stable during the period in analysis provides the necessary validity and strength for the instrument in use. The main result can be summarized as follows: if the neighbours' tax rate decreases by one percentage point, the own tax rate should decrease by 0.884 percentage points, on average, *ceteris paribus*.

The remainder of the paper is organized as follows. Section 2 presents a literature

[1] Another theory is to attract votes on municipal elections. See the next section for a brief exposition on yardstick competition and Section 6.2 where we present no evidence of this type of interaction in our study.

[2] *Derrama*, collected at the municipality level, was initially set as a surtax on the national corporate income tax, *IRC*, collected at the central government. However, since 2007, the instrument is no longer dependent on *IRC* and therefore, henceforth, we will always treat *Derrama* as a local corporate income tax, for simplicity.

review on tax competition. Section 3 describes the local governance characteristics (financial and political) in Portugal. Section 4 describes the data. Section 5 presents the empirical strategy. Section 6 provides a discussion on the results and, finally, Section 7 concludes.

2 Literature Review

Strategic fiscal interaction among local jurisdictions has three main sources: 1) yardstick competition, 2) benefit spillovers, and 3) tax competition. The first type of strategic fiscal interaction emerges when voters evaluate local governance quality through local fiscal policies. In this set-up, relatively high taxes are perceived as inefficient, which creates an incentive for "tax-mimicking" across jurisdictions.[3] The second type of strategic fiscal interaction takes place when residents in neighbour jurisdictions can benefit from local spending, which may lead to underoptimal tax policy choices (Oates, 1972).[4] Finally, fiscal competition arises as an attempt to attract mobile tax bases.[5] This type of interaction has become particularly relevant as technological and financial innovations have promoted the mobility of factors between municipalities, countries and continents.[6] The usual conclusion in the literature is that the fiscal externality resulting from tax competition leads to underoptimal tax choices.[7] Additionally, Brülhart et al. (2012) show that agglomeration economies alleviate the corporate tax competition as they reduce the importance of the local tax rate as a location decision variable. This has been tested empirically by Baldwin and Krugman (2004). Despite such different findings, both national and international empirical studies have been dealing with three main challenges in the estimation of tax competition (Brueckner, 2003): the endogeneity of neighbours' tax rates, spatial error dependence and the correlation between jurisdictional

[3] On "yardstick competition" literature see Besley and Case (1995).

[4] See Case et al. (1993) for empirical evidence on "benefit spillovers" in United States.

[5] For a formalized model on "tax competition" see Zodrow and Mieszkowski (1986) and Wilson (1986) and for a literature review see Wilson (1999) and Baskaran and da Fonseca (2013). For an analysis with asymmetric jurisdictions refer to, e.g., Wildasin (1989).

[6] See Devereux and Griffith (1998) for the evaluation of tax burden as a relevant decision variable for location of US multinationals in Germany, France and United Kingdom.

[7] Thus, counter-arguing Brennan and Buchanan (1980) which interpret tax competition as beneficial as it decreases the excessive power of "Leviathan" local governments. For empirical evidence, in OECD countries, on the positive relationship between tax competition and public sector efficiency see Blöchliger and Pinero-Campos (2011).

characteristics and the error term.

Over the recent years, a small number of papers has developed alternative strategies to overcome the identification issues in tax competition. Carlsen et al. (2005) instrument mobility of firms with employment shares before the implementation of the local tax in Norway. The authors conclude that firm mobility puts downward pressure on local taxes and such an effect is stronger the higher the tax level of the neighbourhood.[8] Lyytikäinen (2012) uses a Finnish policy intervention as a source of exogenous variation in local property tax rates. To overcome the endogeneity present in neighbours' local tax rates, the author constructs an instrument defined by the imposed increase in the lower limit of local property tax rates. The main finding points towards the absence of strategic interaction, even in presence of a fiscal equalization scheme.[9,10]

Eugster and Parchet (2014) propose a difference-in-differences identification strategy based on the fiscal preferences discontinuity between the two Swiss language regions, namely, the fact that the French speaking Swiss prefer higher tax rates than their German-speaking counterparts. The treatment group, French-speaking municipalities which locate close to the border with German-speaking ones set a lower tax rate than the control group, i.e., those *not* located at the border. Therefore, the comparison of tax differentials between the two types of municipalities, directly at the language border, offers a unique setting for the identification of the existence of tax competition. In this context, the authors conclude that there is evidence for tax competition within a spatial range between 15 and 25 kilometres.[11]

We also follow a difference-in-differences approach, which is similar to Eugster and Parchet's, in that it relies on the different fiscal preferences of left- and right-wing municipal governments. The contributions of this paper to the literature are twofold: *(i)* to test tax competition on the local corporate income tax in Portugal (the *Derrama*) which, to our

[8] We have not proceeded on this strategy due to the lack of data for Portugal.

[9] In presence of fiscal equalization schemes, transfers are usually related to the tax-raising capacity of the municipality which discourages municipalities from engaging in tax competition. See Koethenbuerger (2002) for a theoretical exposition.

[10] In Portugal there was also a change in the rules of local capital income tax rates but once the tax base has changed, there is no clear comparison between the periods pre and post reform to follow this procedure.

[11] In a different set-up the language argument is also used by Gérard et al. (2009) which conclude that jurisdictions react more to those with the same language.

knowledge, has only been studied by Coimbra (2011) in a spatial autoregressive framework; *(ii)* to use the political parties of local governments as an instrument for neighbour's taxes.[12,13] As described in the next sections, the low turnover of political parties (and especially, ideologies) and the clear preference of left wing parties for high local tax rates in Portugal provides a good instrument to account for the simultaneity present in this type of analysis.

3 Local Governance in Portugal

Local governments in Portugal were only established with the Constitution of 1976 - two years after the institution of democracy in the country. Since then, each municipality is responsible for its own personnel, patrimony, finance and administration. In the following subsections we describe the evolution of both local finance and political history in the past 40 years.

3.1 Local Finance in Portugal

Despite the decentralization process along the last 40 years, Portuguese municipalities relative power is still short when compared to other countries. According to the OECD *Fiscal Decentralisation Database*, in 2013, only 13.25% of the expenditure in Portugal was generated by municipalities – almost 60% of the European average. According to the same database, from the total tax revenue in Portugal (fully collected at the central government), only 6.96% of the tax revenue was due to local taxes – roughly 50% of the European average. On the other hand, local taxes represented about 40% of municipalities current revenues. The other 60% of current revenues were mainly composed by transfers from the central government and the European Union (EU) and provision of public goods and services.[14]

[12] Coimbra (2011) has found evidence for strategic interaction on *Derrama* setting between 2000 and 2007.

[13] For strategic interaction among Portuguese municipalities in current expenditures see Costa et al. (2013). The authors have found evidence for strategic interaction but no source for ideology influence in the mimicking effect.

[14] Data on local revenues composition in 2013 was obtained from *Direcção Geral das Autarquias Locais*.

Table 1: Main Sources of Direct Tax Revenue in Portuguese Municipalities, in 2013∗

	Mean	(Std Dev)	Min	Max	Coeff. Var.
Defined at the local level:					
Local Property Tax	0.64	(0.08)	0.17	0.82	0.13
Local Corporate Income Tax	0.05	(0.08)	0.00	0.74	1.51
Defined at the national level:					
Road Tax	0.16	(0.05)	0.04	0.32	0.29
Transfers of Real Estate Tax	0.15	(0.08)	0.00	0.47	0.52

∗Note: average percentage weight in municipal direct tax revenue
Names in Portuguese in the respective order: *Imposto Municipal sobre Imóveis, Derrama, Imposto Único de Circulação, Imposto sobre as Transmissões Onerosas de Imóveis*
Data source: *Direcção Geral das Autarquias Locais*

As illustrated in Table 1, the most important source of local direct tax revenue in Portugal is the local property tax (IMI), followed by road tax (IUC), transfers of real estate tax (IMT), and the local corporate income tax (the *Derrama*). The fact that *Derrama* has the largest coefficient of variation among the four main sources of direct tax revenue has inspired our interest for the study of this tax. Additionally, local corporate income tax falls on the most mobile tax base (firms), and is therefore a natural candidate to study tax competition.

The local corporate income tax was firstly set even before the official decentralization process in Portugal, in the 70s. At the time, *Derrama* was seen as an extraordinary tax to support local investment and financial imbalances. With the reform of 2007, *Derrama* is currently seen as a regular financing source for the Portuguese municipalities. Figure 4, in appendix, shows the evolution of both national corporate income tax (IRC – *Imposto sobre o Rendimento Colectivo*) and *Derrama* since 1982, according to the OECD *Tax Database*. IRC scale is on the left hand side axis and *Derrama* scale is on the right hand side axis. When analysing the evolution of these two taxes, one should take into account three major law changes in Portugal. In 1989 IRC was implemented as a single corporate income tax.[15] Even though IRC and *Derrama* co-moved from that year onwards, the redefinition of *Derrama* as a single surcharge on corporate income tax only took place nine years later. Until 1998 the

[15] In replacement of other local capital and property taxes: *contribuição industrial, imposto sobre a indústria agrícola, imposto de mais-valias, contribuição predial, imposto de capitais, imposto complementar* and *imposto do selo.*

surcharge covered both IRC and the so-called building contribution.[16] Additionally, from 1998 onwards, *Derrama* has been collected both in the municipality of the headquarters and in the municipalities of the additional establishments (as long as the corporate income tax base is larger than 50.000€, or 10M *escudos*, before 2002). Finally, since 2007, *Derrama*'s tax base is no longer attached to IRC. Nowadays, each municipality is able to charge within the range 0–1.5% of the taxable profit. This new rule has replaced the 0–10% range of the central government corporate income tax, *IRC* (for which the tax base is equal to taxable profit deductive of net operating losses and other deductions, if any).[17] With the new (wider) tax base, the total amount collected has not significantly changed but the total number of companies that have paid the local corporate income tax has increased 17% in the year of the reform. According to Morais (2010), given that local taxes' role is to finance the municipalities and not to redistribute income, it is reasonable that profitable companies pay a local tax, even in case of deductible losses, in order to contribute for the public goods and services they have resorted to in that year.

3.2 Local Political History in Portugal

Since the first municipal elections in Portugal, on the 12th of December of 1976, that most of the municipalities have been governed by either PS or PSD.[18] Figure 5, in appendix, plots the proportion of votes by party in mainland Portugal between 1976 and 2013. Four patterns can be observed in this figure. Firstly, the decreasing share of PCP compensated by an increasing share of PS.[19] Secondly, the high variation among the rightist parties (PSD, CDS and other right-wing coalitions).[20] Thirdly, the increasing abstention share which has reached almost half of the votes in the last municipal elections in Portugal. Finally, the substantial increase in the number of municipalities with majority in the local executive in 1997. Note that

[16]Note that before 1998 both IRC and building contribution were under control of the central government.

[17]Tax base of IRC: *matéria colectvel = lucro tributável - prejuízos fiscais e/ou benefícios fiscais*

[18]PS (*Partido Socialista*) is the main center-left party in Portugal. PSD (*Partido Social Democrata*) is the main center-right party in Portugal.

[19]PCP (*Partido Comunista Português*) is the main leftist party in Portugal.

[20]CDS (*Centro Democrático Social*) is the main rightist party in Portugal. The right-wing coalitions considered for this graph are all the ones that include either PSD and another party or CDS and another party or AD (*Aliança Democrática* – a rightist coalition constituted by PSD, CDS and PPM (*Partido Popular Monárquico*) existent between 1979 and 1983).

both the local executive (*Câmara Municipal*) and the local council (*Assembleia Municipal*) seats, proportional to the population of the municipality, are elected, separately, according to a proportional rule. This set-up opens the possibility for the existence of municipalities in which mayor's political party has no majority in the local executive.

Throughout 40 years of municipal elections in Portugal, one evidence stands out: the low turnover among parties (and ideologies) in the municipalities. Along 11 elections, 23 municipalities have always had the same party in charge of the local governance. When we relax the analysis to the same ideology (left- / right-wing), we verify that almost 30% of the 278 (mainland) Portuguese municipalities have been always led by a rightist/leftist party. Both numbers considerably increase when we restrict the analysis to the elections between 1997 and 2009 (considered in this paper) – 47% of the municipalities have not changed party and 59% have not switched ideology, in this period. As for the evolution of majorities in local executive since 1997, we point two main reasons. Firstly, the first polls, in 1996, may have led to a convergence of votes in the leading parties, as well as to an increase in the percentage of abstention. Secondly, the constitutional revision in 1997 has enabled the municipal mayor to choose the composition of the executive team of the jurisdiction, without municipal council's intervention. Such revision has mitigated the pluralism verified until then in local governance and assured a higher number of majorities in the municipal executive (Moreira, 2007).

Additionally to the low turnover among parties (and ideologies) in the municipalities, there is another prominent fact: the low mayor turnover. Until the last municipal elections, in 2013, there was no official limit in the number of terms in office in Portuguese local governments. In fact, with the imposition of the new limit of 3 terms in office, 82 incumbents were not allowed to run for re-election. During the 40 years of municipal elections, 61 local mayors were in charge for more than 20 years. Among these, there were 10 local mayors in charge for more than 30 years. Leading this group of "dinosaurs", as they were named, two mayors have been in power since the very first municipal election.[21]

Finally, to clarify the reader on the geographical organization of the main parties in Portuguese municipalities, we plot the four elections' results used in this study in Figure 6, in

[21] *Francisco Soares Mesquita Machado* in *Braga* and *Jaime Carlos Marta Soares* in *Vila Nova de Poiares.*

appendix. From a bird's eye view perspective we point three essential geographical patterns: the (decreasing) concentration of PCP municipalities in the south of the mainland country versus the concentration of municipalities with right-wing governments in the north and the dispersion of PS (left-center) municipalities along the mainland country.[22]

4 Data

We exploit a panel data of mainland Portugal municipalities between 1998 and 2013. The reason we have excluded the islands of Azores and Madeira has to due with the relatively small size of both regions and with the fact that they are sufficiently far away from the mainland to compete on the local corporate income tax with the mainland municipalities (278 from the 308 in Portugal). The time frame is in consistency with what was described in section 3.1. Until 1998 *Derrama* was a surcharge on top of both corporate and property income taxes. Moreover, with the constitutional reform of 1997 in Portugal, the number of majorities in the municipal executive has unprecedentedly increased to 90% of the mainland municipalities, which improves the stable environment in terms of local government ideologies. Furthermore, with this time frame, we are able to analyse four complete terms of municipal elections. Note that since Portuguese municipal elections usually take place at the end of the year, we only consider the election results (and change of party, if it is the case) one year post-election.

The dataset includes information on *Derrama* and political, economic, demographic and territorial characteristics of the Portuguese municipalities.[23] Political variables include the referendums on Regionalization, in 1998, and on the Voluntary Interruption of Pregnancy, in 2007, the percentage of abstention in municipal elections, a dummy for the majority of seats in the local executive and, finally, a dummy for whether there is a right-wing party in government.[24] Economic variables include other sources of local revenue, as capital revenues

[22]Since the number of municipalities with CDS government represent a small share of the mainland municipalities, we opt not to use this party in the empirical strategy.

[23]Sources of data: *Portal das Finanças*, National Commission of Elections in Portugal, Institute of National Statistics and *Quadros de Pessoal* – a widely used panel of employer-employee dataset in Portugal.

[24]No other referendums have been done in Portugal during this period.

and government current transfers, and also the average employee earnings, the employment share and industry employment share, both as a percentage of national levels, and the number of licences granted in the municipality. Finally we include other geographical characteristics such as area, maximum altitude and a dummy which takes the value of one if the municipality is located along the coast, and zero otherwise; and two demographic indicators, population and percentage of child (aged below 14 years old) in the local population.

Table 2 presents the descriptive statistics. Additionally to the mean, standard deviation, minimum and maximum we present the mean difference between left-run (PS or PCP) and non-left-run municipalities and also the difference between the treatment (left-run municipalities with BorderPSD) and control (left-run municipalities without BorderPSD) municipalities.[25,26] The means test between political wings corroborates the fact that municipalities with left-wing governments set significantly larger rates for *Derrama*. Even though this difference is present throughout the whole period of the database, it looses significance in the period of post-reform, especially during the years of crisis. In the last column, *Derrama* there is also evidence for significant differences towards smaller support for regionalization, smaller area and higher maximum altitude. The difference in support for regionalization could indicate that mainland Portugal is a continuum of political preferences. Section 5.1 presents strong evidence that this is not the case. As for the second significant difference, there is evidence in the literature that smaller municipalities tend to set lower tax rates but such evidence relies on population size rather than area, which reveals no statistical difference between treatment and control groups. Finally the fact that municipalities with higher altitude are less prone to business activities could lead to a smaller degree of strategic interaction. However, what we observe is that, even in adverse conditions (as higher maximum altitude) the municipalities still engage in tax competition, which reinforces our results. Summing up this analyses, we conclude that control and treatment groups are rather similar (with exceptional differences in regional characteristics), especially in economic and local finance characteristics.

[25]BorderPSD definition: =1 if the municipality has at least one common border with a PSD-run municipality; 0 otherwise

[26]Note that both left-run municipalities and those with BorderPSD are time-varying. See section 3.2 for an illustration of the stability of these dummies overtime

Table 2: Descriptive statistics

	Mean	(Std Dev)	Min	Max	Left-$\overline{\text{Left}}$	Left × BorderPSD - Left × $\overline{\text{BorderPSD}}$
Dependent variables:						
Derrama rate	0.032	(0.042)	0.000	0.100	0.017***	-0.024***
Derrama rate (before 2007)	0.050	(0.048)	0.000	0.100	0.027***	-0.031***
Derrama rate (2007 onwards)	0.009	(0.007)	0.000	0.015	0.002**	-0.004***
PCP	0.117	(0.321)	0.000	1.000		
PS	0.406	(0.491)	0.000	1.000		
PSD	0.392	(0.488)	0.000	1.000		
PSD-CDS Coalition	0.047	(0.211)	0.000	1.000		
Other parties1[†]	0.038	(0.191)	0.000	1.000		
Other parties2[‡]	0.020	(0.139)	0.000	1.000		
Capital revenues per cap.$_{t-1}$	354.617	(312.013)	0.031	9972.104	-0.023	0.030
Gov. current transf. per cap.$_{t-1}$	299.155	(352.971)	0.084	4702.954	-17.544	-8.144
Average employee earnings (€)	702.720	(178.670)	375.806	1801.266	0.348*	-0.355
Employment share (%)	0.004	(0.010)	0.000	0.147	0.000	0.000
Industry establishments (% total estab.)	0.050	(0.067)	0.000	0.401	-0.003	0.011
Licences granted (in thousands)	1.472	(1.598)	0.010	13.860	-0.110	0.221
Vol. Interruption of Pregnancy (% of "yes")	0.600	(0.060)	0.448	0.751	0.010	-0.003
Abstention (%)	0.348	(0.077)	0.000	0.559	0.022*	-0.027
Majority of seats in executive (dummy)	0.893	(0.309)	0.000	1.000	-0.060**	0.047*
Regional referendum (=1 if % of "yes">50)	0.129	(0.335)	0.000	1.000	0.225**	-0.465***
Right-wing party in government (dummy)	0.376	(0.484)	0.000	1.000	-0.006	0.007
Area (100km)	3.208	(2.836)	0.079	17.206	0.719	-1.138***
Child (% of resident population)	0.143	(0.026)	0.051	0.233	0.000	-0.005
Coastal (dummy)	0.213	(0.409)	0.000	1.000	0.013	-0.104
Maximum Altitude (meters)	6.486	(4.137)	0.000	1.000	-1.440**	3.405***
Population (thousands)	35.779	(57.426)	1.768	575.907	5400.695	180.099
Number of observations			4 442[♭]			

[†]Other parties1 include B.E., CDS-PP, *Grupo de cidadãos*, MPT, PPM, PSD-CDS-PPM-MPT, PSD-PPM, PS-PCP-PEV-UDP

[‡]Other parties2 include B.E., *Grupo de cidadãos*, MPT, PS-PCP-PEV-UDP

[♭] *Odivelas*, *Trofa* and *Vizela* were only considered from 2000. In all regressions we have also assumed a balanced panel with proxy data (either subsequent years' data or averages of neighbour jurisdictions) for these three municipalities and the results have not changed.

5 Empirical Strategy

The ultimate objective of this study is to estimate the local corporate income tax setting as a function of spatially weighted decisions of other municipalities (henceforth denoted as neighbours). In line with Tobler's First Law (Tobler, 1970) – "everything is related to everything else, but near things are more related than distant things", the empirical specification is written as

$$T_{it} = \rho \sum_{i \neq j} w_{ij} T_{jt} + X'_{it}\beta + u_{it} \tag{1}$$

where w_{ij} is a weighting matrix which captures the spatial dependence between the tax rate of one municipality (T_{it}) and the neighbours' tax rate ($T_{jt}, j \neq i$) and X_{it} is a set of controls which includes local characteristics and time dummies. Most of the literature in tax competition has been using complex spatial econometrics methods to overcome the endogeneity problem present in the tax reaction function above – the tax rate of jurisdiction A depends on the taxes of the neighbours B and C, which also depend on the tax rate of jurisdiction A.[27] As is usual with structural econometrics, the quality of the spatial econometric analysis depends heavily on the appropriateness of the specified model. This led Gibbons and Overman (2012) to suggest an IV approach where an institutional arrangement provides exogenous variation in $w_{ij}T_{jt}$ that affects non-directly T_{it}. In this set-up the last equation becomes:

$$T_{it} = \rho \sum_{i \neq j} \widehat{w_{ij} T_{jt}} + X'_{it}\beta + u_{it} \tag{2}$$

where $\sum_{i \neq j} \widehat{w_{ij}} T_{jt}$ are the fitted values from the instruments accounting for the simultaneous tax setting — political preferences of the municipality and of its neighbourhood, in this study. Given the law change in 2007 (which have changed both the tax range and tax base of *Derrama*) two alternative strategies existed and one could pursue. Either to transform the tax rate in a 0–100 scale or to treat both pre- and post-reform taxes in the same unit, percentage point, with no transformation in the scale. We have opted for the latter in all the

[27] See Anselin (2001) for different alternatives in this class of models.

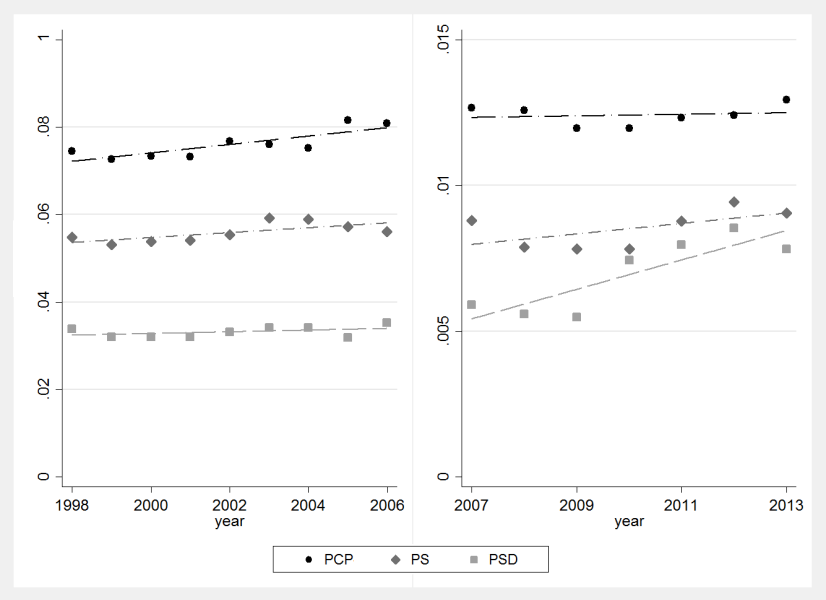
specifications.

According to parties' ideology, leftist local governments tend to set higher capital taxes in order to finance a wider provision of social security benefits, public education and health care services. On the other hand, their right-wing counterparts are usually associated to low tax setting as well as low levels of spending. In Figure 7, in appendix, we can confirm that both patterns hold for Portuguese municipalities. Throughout time, PS and PCP (left-wing) municipalities have consistently spent a larger share of the budget in the personnel category, while collecting a larger share of direct taxes than their right-wing counterparts.[28] Such dichotomy is more evident when we look to the local corporate income tax. Figure 1 plots the average tax set according to the three main parties leading the Portuguese municipalities along the period of study. Clearly, the leftist local governments (especially PCP) have been consistently setting higher taxes than the main rightist party in Portugal. Even in a period of crisis where we observe some convergence in tax setting, the average tax of PS has always had higher values than that of PSD (right-wing) municipalities. One could argue on the influence of local corporate income tax setting on the win margin of local government. We have tested for this effect and found no evidence for reverse causality.

Our identification strategy relies on a difference-in-differences approach that compares the taxes of municipalities with left-wing governments which have a common border with at least one municipality with a right-wing government (the treatment group) with those that do *not* have a common border (the control group). One could argue that municipalities with left-wing governments that are close to municipalities with right-wing governments have a weaker preference for left-wing policies. The next subsection provides convincing evidence that this is not the case.

[28] For a complete analysis on expenditure and revenues' differences between the main political parties in Portugal see Silva (1995).

Figure 1: *Derrama* average rate by main political local party



5.1 Testing for continuum of political preferences in Portuguese municipalities

To test this hypothesis we use two measures to evaluate whether political preferences significantly change with distance to the closest municipality with a right-wing government. Figure 8, in appendix, shows the average win margin, i.e., the difference of votes between the winner party and the runner-up, along the four elections in consideration. On the left graph we plot the average win margin for municipalities with PS and PCP (left-wing political parties) governments along the minimum distance to a municipality with PSD (right-wing political party) government and on the right graph we apply the reverse process.[29] In both sides of the figure we observe that there is no clear difference between the win margin as municipalities get closer to the other political wing.[30]

For purposes of robustness, we have also taken into consideration the majorities in the

[29]Note that, since there is a smaller number of municipalities with right-wing governments we have extended the horizontal axis for the municipalities with left-wing governments scatter plot to give the reader a full view of the distribution.

[30]The results on means tests have corroborated the absence of a relationship between distance to the other wing and the win margin in local elections.

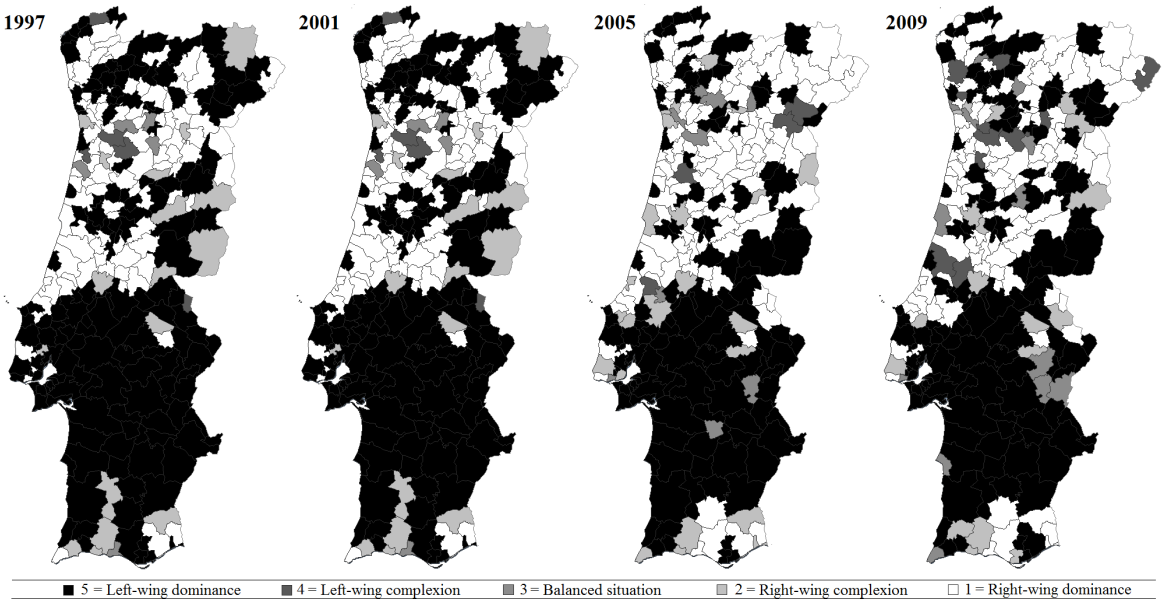
number of seats, both in municipal executive and municipal council. Recall from Figure 1, municipalities with left-wing governments consistently set higher rates of *Derrama*. However, since the tax setting has to be approved both in the executive and in the council, the lack of majority of seats (and hence votes) in either component of the local government may induce that the tax setting of municipalities with left-wing governments is not as high as if both majorities were verified. Therefore, to rule out the continuum of political preferences hypothesis, we should test whether municipalities with left-wing governments located in the border of municipalities with right-wing governments have less political strength than those located further away. In line with the *Ideological Complexion of Government and Parliament* index constructed nation-wide for Portugal by Tavares (2004), we have created the *Ideological Complexion of Municipal Executive and Council* index (ICMEC, henceforth). This index ranges from 1 to 5 where the lower extreme (denoted as Right-wing dominance) is attributed to municipalities with right-wing governments with majority of seats both in executive and council, number 2 (denoted as Right-wing complexion) is attributed to municipalities with right-wing governments with no majority of seats either in executive or in council and number 3 (denoted as Balanced situation) is attributed to municipalities that are either led by an independent political party *or* that have no majority of seats in both executive and council. Numbers 4 and 5 are attributed with the same definition as 1 and 2 but to municipalities with left-wing governments.[31]

In Figure 9, in appendix, the graph on the left plots the ICMEC index values for municipalities with left-wing governments according to the distance to PSD-run municipalities and the graph on the right plots the ICMEC index values for municipalities with right-wing governments (PSD, CDS and any other right-wing coalition) along the distance to PS/PCP-run municipalities (in a reversed scale horizontal axis). From here we observe that municipalities with left-wing governments have not a significantly larger degree of complexion (or decrease in

[31] ICMEC Index Definition:
1 = Right-wing Mayor and majority of seats both in executive and council
2 = Right-wing Mayor and no-majority of seats in executive *or* no-majority of seats in council
3 = No-majority of seats in both executive and council *or* Mayor not affiliated to a political party
4 = Left-wing Mayor and no-majority of seats in executive *or* no-majority of seats in council
5 = Left-wing Mayor and majority of seats both in executive and council

the executive and council majorities) as they get closer to a PSD-run municipality. The same pattern is identified on the right-side of the figure. Finally, in Figure 2 we have mapped the ICMEC index along mainland Portugal considering the results of the four elections analysed in this study. If continuum of political preferences was present, we would see much more left-wing dominant (value 5 in ICMEC index, black color in the map) municipalities to have borders with grey-shaded municipalities (either weak-majority municipalities with left-wing governments, politically balanced municipalities or weak-majority municipalities with right-wing governments) and no borders with the opposite extreme of the index (Right dominance which assumes the value 1 in ICMEC index, white color in the map). Indeed that is not observed in the maps and therefore we believe to have evidence to rule out the continuum of preferences hypothesis.

Figure 2: Geographical organization of the Ideological Complexion of Municipal executive and Municipal Council Index

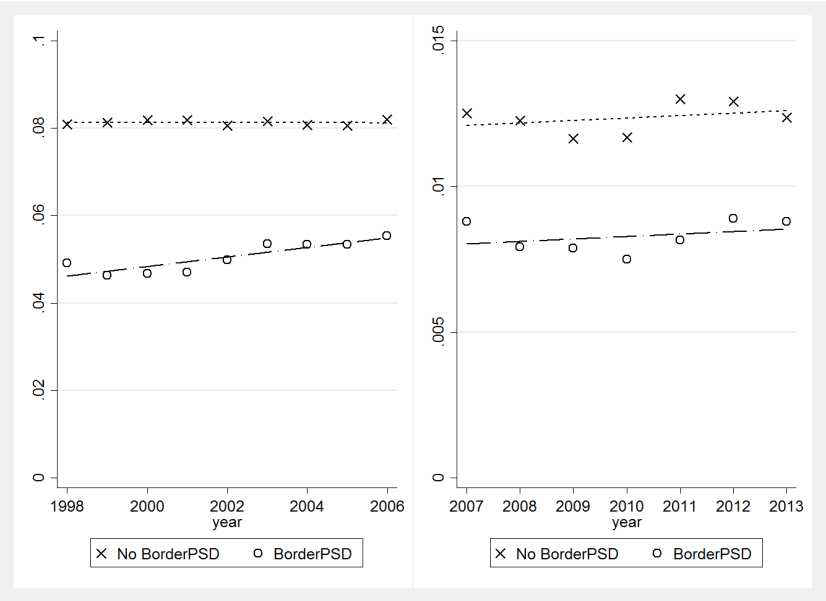


5.2 Difference-in-Differences Approach

Considering thus, a non-continuum of political preferences set-up along the country, the fact that leftist local governments set lower taxes when close to rightist governments, must

reveal tax competition.[32] Since rightist local governments set, on average, lower corporate income tax, leftist neighbours will be pressured on lowering the tax as well, even though the ideology points on the opposite direction. Figure 3 shows evidence on the this reaction.

Figure 3: *Derrama* average rate for municipalities with left-wing governments, with and without common border with PSD-run municipalities (right-wing)



To investigate this hypothesis we assume the following specification:

$$T_{it} = \beta_0 + \delta_0 Left_{it} + \delta_1 BorderPSD_{it} + \delta_2 (BorderPSD_{it} \times Left_{it}) + X'_{it}\beta + \gamma_t + u_{it} \quad (3)$$

where $Left_{it}$ equals 1 if the municipality is governed by a left-wing government (i.e., PS or PCP) and 0 otherwise, $BorderPSD_{it}$ equals 1 if the municipality has a border in common with a municipality governed by PSD and 0 otherwise, X_{it} is a set of controls and γ_t is a group of year dummies to account for time-specific differences.[33] To avoid a particular structure on the form of serial correlation in u_{it} we adjust the standard errors for clustering at the district

[32] Yardstick competition alternative is discarded in section 6.2

[33] Note that the difference-in-differences is captured by δ_2, i.e., the tax preferences differential of left-run jurisdictions with a common border with a PSD-run jurisdiction ($\delta_0+\delta_2$) minus the counterfactual tax preferences differential of left-run jurisdictions without a common border with a PSD-run municipality (δ_0).

level. [34,35]

For purposes of robustness of the baseline specification in equation (3), different alternative models were examined. In Table 3 we have relaxed both definitions of BorderPSD and PS/PCP. In columns (2) and (4) we have considered the border with any right-wing municipal government (instead of PSD alone) and we have separated municipalities governed by PS from those governed by PCP (the main leftist parties). The difference between a border with PSD or a border with any right-wing party should not be significant since, on average, PSD has been representing 86% of the right-wing municipalities in Portugal. Regarding the difference between PS and PCP, we expect that PCP sets a higher rate of *Derrama* and reacts less to tax competition than the counterpart left-center party PS. In Table 7, three additional alternatives are considered. Regression (5) uses the same specification as baseline (1) but takes fixed-effects into account. Given the nature of the difference-in-differences approach in this study, we expect the tax differential to be smaller. Specifications (6) and (7) consider two different definitions for the border. In the first one we have considered whether the percentage of PSD municipalities among border municipalities is greater than 50%. Using this alternative, we want to test whether the tax competition increases with the agglomeration of right-wing parties.[36] Finally, we consider a more restrictive border definition. Using re-elected PSD mayor, we want to test whether the degree of tax competition diminishes with the persistence of the border political party. [37]

In section 6.2. we describe the results of the IV approach as well as evidence for the strong and valid instruments in use.

[34]Since *Derrama* is limited both on the floor and on the ceiling, we have also ran the two-way limit Tobit model. The qualitative results do not change.

[35]There are 18 districts in the mainland Portugal. The average area is 4941 km^2 and the average number of municipalities by district is approximately 15.

[36]We have also tried distance measures instead of dummies but there was no clear pattern in the regressions.

[37]For similar approaches see Redding and Sturm (2008) and Carlsen et al. (2005). We have also used border with municipalities that have had PSD mayor during the whole period in analysis to ensure that the treatment effect did not depend on the local parties evolution in Portugal but the tax competition has revealed to be non-significant.

6 Results

6.1 Difference-in-Difference Results

Column (1) in Table 3 presents our preferred specification. Controlling for the observables mentioned in the Data section, and clustering the standard errors at the district level, once again we confirm one of the main results of this paper. municipalities with left-wing governments set, on average, higher tax rates (approximately 2 percentage points more). Such difference decreases (to 0.5 percentage points) when the left-wing municipality has a border with PSD (the main right-wing party in Portugal). When we relax the definition of border to any right-wing party the effects are roughly the same. When we separate the two left-wing parties two evidences stand out. The difference in *Derrama* setting between PCP- (the most leftist party) and PSD-run municipalities appears to be larger than that between PS- and PSD-run municipalities. Moreover, the evidence of strategic interaction that is revealed in (1) and (2) seems to only take place in municipalities led by PS (left-center party). The loss of significance in PCP dummy may be explained by the lower number of municipalities when compared with the number of municipalities with PS governments.

Table 7, in appendix, presents additional difference-in-differences regressions for purposes of robustness. Column (5) provides the estimates of our preferred specification, with municipality fixed effects. Once we control for this feature, both party and tax differentials decrease in absolute value, without major consequences regarding statistical significance. In columns (6) and (7) new border definitions are considered. When we consider the percentage of PSD-run municipalities in the border we conclude that having less than half of the borders with PSD government or the majority of them with PSD government yields roughly the same strategic interaction, when compared to a municipality with no PSD government in the border. Finally, when we consider a border with a re-elected incumbent the estimates are roughly the same.

Results on the observables of Tables 3 and 7 are presented in Tables 6 and 8, respectively. Since there are no major differences between the coefficients among the seven specifications we conclude that our results are rather robust. Additionally we can also observe that the

Table 3: Difference-in-Differences Results – Part 1 – Coefficients of interest

Dependent Variable: *Derrama*	(1)	(2)	(3)	(4)
$\mathbb{1}$ PS			**0.019*** **	**0.021*** **
			(0.005)	(0.005)
$\mathbb{1}$ PCP			**0.026*** **	**0.027*** **
			(0.006)	(0.008)
$\mathbb{1}$ PS/PCP	**0.019*** **	**0.021*** **		
	(0.005)	(0.006)		
$\mathbb{1}$ PSD-CDS Coalition	-0.016***		-0.016***	
	(0.005)		(0.005)	
$\mathbb{1}$ Other parties1 †	0.011		0.015**	
	(0.007)		(0.008)	
$\mathbb{1}$ Other parties2 †		0.015*		0.019**
		(0.008)		(0.010)
$\mathbb{1}$ BorderPSD	0.002		0.002	
	(0.003)		(0.003)	
$\mathbb{1}$ BorderPSD $\times\mathbb{1}$ PS			**-0.013** **	
			(0.005)	
$\mathbb{1}$ BorderPSD $\times\mathbb{1}$ PCP			**-0.015**	
			(0.010)	
$\mathbb{1}$ BorderPSD $\times\mathbb{1}$ PS/PCP	**-0.014*** **			
	(0.005)			
$\mathbb{1}$ BorderPSD $\times\mathbb{1}$ PSD-CDS Coalition	0.016***		0.016***	
	(0.006)		(0.005)	
$\mathbb{1}$ BorderPSD $\times\mathbb{1}$ Other parties1	-0.011		-0.015	
	(0.009)		(0.010)	
$\mathbb{1}$ BorderRight		0.005		0.005
		(0.005)		(0.005)
$\mathbb{1}$ BorderRight $\times\mathbb{1}$ PS				**-0.015*** **
				(0.006)
$\mathbb{1}$ BorderRight $\times\mathbb{1}$ PCP				**-0.015**
				(0.011)
$\mathbb{1}$ BorderRight $\times\mathbb{1}$ PS/PCP		**-0.015** **		
		(0.007)		
$\mathbb{1}$ BorderRight $\times\mathbb{1}$ Other parties2		-0.019		-0.022*
		(0.012)		(0.013)
Other Sources of Local Revenue	Yes	Yes	Yes	Yes
Local Economic Characteristics	Yes	Yes	Yes	Yes
Local Ideology Characteristics	Yes	Yes	Yes	Yes
Other Local Characteristics	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Constant	0.393***	0.396***	0.385***	0.390***
	(0.122)	(0.123)	(0.121)	(0.123)
Overall R-squared	0.45	0.447	0.452	0.449

†Other parties1 include Left- and Right-wing parties (and coalitions) with small representativeness and non-affiliated executives. Other parties2 include include Left-wing parties (and coalitions) with small representativeness and non-affiliated executives

* p<0.1, ** p<0.05, *** p<0.01

Note: Standard errors clustered at the district level in parenthesis, below the estimates

signs of the coefficients are the expected ones.

6.2 Instrumental Variables Results

In order to solve the endogeneity present in equation (1), we have resorted to an IV approach. Using the difference-in-differences specification (1), from Table 3, to set the first stage (presented in Table 9, in appendix), we obtain the necessary exogenous variation in neighbour's corporate income tax to solve the simultaneity issue. Note that this procedure yields consistent estimates, even when there is presence of spatial error autocorrelation (Kelejian and Prucha, 1998). In order to account for any type of heterogeneity and for serial correlation in the error term, we have used HAC consistent standard errors with Bartlett kernel bandwidth of $T^{1/3} \approx 3$.[38] Table 4 presents both OLS and IV estimates. Cragg-Donald's and Hansen's statistics supports, respectively, the strength ad validity of our instruments. Analysing the estimates' results we conclude that there is positive strategic interaction in local corporate income tax between Portuguese municipalities. Namely, if the neighbours' tax rate decreases by one percentage point, the own tax rate should decrease by 0.884 percentage points, on average, *ceteris paribus*. Moreover, the IV estimate is larger than the OLS one. Both findings are in line with previous works like Edmark and Ågren (2008).

Albeit statistical evidence for strategic interaction, the results presented in Table 4 do not rule out the possibility of yardstick competition. In presence of yardstick competition, mayors with higher political strength should react less to the average tax rate of their neighbours. To test for this hypothesis we use three different indicators to measure the political strength of the municipality: majority in executive (values 2 and 4 from ICMEC index), majority in executive and council (values 1 and 5 from ICMEC index) and incumbency of the municipal mayor.[39] The test results are presented in Table 5. None of the indicators have revealed to be significant, meaning that there is no evidence for yardstick competition in *Derrama* tax setting, i.e., the reaction to neighbours' tax rate does not differ according to the

[38] Kernel bandwidth suggested by den Hann and Levin (1997).

[39] Similar approaches have been used in Besley and Case (1995), Sollé-Ollé (2003), Edmark and Ågren (2008) and Costa et al. (2013).

Table 4: Strategic Interaction Results (OLS vs. IV)

Dependent Variable: *Derrama*	OLS	IV
Neighbours' tax rate	**0.509*** **	**0.884*** **
	(0.064)	(0.182)
Other Sources of Local Revenue		
log(capital revenues per capita)$_{t-1}$	0.001	0.000
	(0.001)	(0.001)
log(government current transfers per capita)$_{t-1}$	0.002**	0.002***
	(0.001)	(0.001)
Economic Characteristics of the Municipality		
Average employee earnings (100 €)	0.012***	0.009***
	(0.004)	(0.003)
Average employee earnings (100 €) ^{2}	-0.001***	-0.000***
	(0.000)	(0.000)
log(employment share)	0.012*	
	(0.006)	(0.005)
Industry establishments' share	-0.107***	-0.080***
	(0.025)	(0.020)
Licenses granted (in thousands)	0.002**	0.002***
	(0.001)	(0.001)
Ideology Characteristics of the Municipality		
Abstention share in municipal elections	0.026	-0.011
	(0.026)	(0.026)
$\mathbb{1}$ Majority of seats in municipal executive	-0.003	-0.002
	(0.002)	(0.002)
$\mathbb{1}$ Right-wing party in General Government	-0.028***	-0.010
	(0.007)	(0.010)
Populational Characteristics of the Municipality		
Child (% of resident population aged 0-14)	-0.309**	-0.267***
	(0.130)	(0.084)
log(population)	-0.046*	(0.012)
	(0.025)	(0.023)
Year Dummies	Yes	Yes
Fixed Effects	Yes	Yes
Cragg-Donald $\mathcal{X}^2$		8.779***
		[0.000]
Hansen J $\mathcal{X}^2$		10.258
		[0.114]

Note: HAC Standard errors in parenthesis, below the estimates
p-value for validity and weakness tests in square parenthesis, below the estimates
* p<0.1, ** p<0.05, *** p<0.01

political strength of the municipality. For robustness we have also tested whether an election caused different reactions to the neighbours' tax rate but the set of instruments we use in the IV estimation did not provide accurate estimates for this indicator. Still, by doing a simple means-test on *Derrama* (taking into account for clusters at the district level) we conclude that there is no statistical difference between the local corporate income tax in years prior to election. Such a result is in line with Coimbra (2011). When we apply the same test for the change in the local corporate income tax, the difference becomes statistically significant, but with a positive sign, meaning that municipalities set higher tax rates prior to election, which is against the theory of yardstick competition.

Table 5: Strategic Interaction Results – Yardstick Competition Tests

Dependent Variable: *Derrama*	IV	IV	IV
Neighbours' tax rate	0.790***	0.908**	0.847***
	(0.290)	(0.360)	(0.258)
—— ×𝟙 Majority in Executive	0.442		
	(0.407)		
—— ×𝟙 Majority in Executive and Council		0.005	
		(0.360)	
—— ×𝟙 Incumbent Mayor			0.379
			(0.293)
𝟙 Majority in Executive	-0.020		
	(0.016)		
𝟙 Majority in Executive and Council		0.001	
		(0.011)	
𝟙 Incumbent Mayor			-0.012
			(0.010)
Other Sources of Local Revenue	Yes	Yes	Yes
Local Economic Characteristics	Yes	Yes	Yes
Local Ideology Characteristics	Yes	Yes	Yes
Other Local Characteristics	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes
Cragg-Donald $\mathcal{X}^2$	42.213***	56.980***	58.620***
	[0.000]	[0.000]	[0.000]
Hansen J $\mathcal{X}^2$	8.085	10.265*	7.126
	[0.152]	[0.068]	[0.211]

Note: HAC Standard errors in parenthesis, below the estimates
p-value for validity and weakness tests in square parenthesis, below the estimates
* p<0.1, ** p<0.05, *** p<0.01

7 Conclusions and Policy Implications

This paper shows evidence for strategic interaction on local corporate income tax in Portugal, the so called *Derrama*. Our approach relies on the instrumental variables method which uses the political preferences in municipalities as an exogenous variation in neighbours' tax rate. The first stage of the model is identified through a difference-in-differences regression which uses both the political party of the municipality and of the respective border. We have found that PS- and PCP-run (main leftist local government political parties) municipalities consistently set a higher rate of local corporate income tax. However, when these municipalities have common a border with a PSD-run (main rightist local government political party) municipality there is evidence for a decrease in the tax setting (which still does not completely offsets the difference between the two political wings). Controlling for other sources of local revenue, local economic, ideological and other characteristics we show evidence of strategic interaction between own local corporate income tax and neighbours' tax rate. The coefficient is positive, statistically significant, and becomes larger when we allow for simultaneous tax setting (using IV instead of OLS). On average, *ceteris paribus*, if the neighbours' average tax rate decreases by one percentage point, the own tax rate should decrease by 0.884 percentage points. This result goes in line with estimates from previous works like Edmark and Ågren (2008).

Constructing an index on *Ideological Complexion of Municipal executive and Municipal Council*, we have increased the robustness of our results as we have rejected both the hypotheses of continuum of preferences and yardstick competition. Despite the evidence of our results, we believe there is still space for further research in order to perform any policy implication. In a country where population desertification in the non-coastal areas is increasing as faster as entrepreneurship, if properly set, *Derrama* could be used to attract new businesses to the less populated areas in order to counteract the desertification effect, and especially, to take advantage on the innumerate list of natural resources in Portugal. Nevertheless, the study on whether companies in Portugal react to differences in the local corporate income tax is still non-existent. Since *Derrama* is collected both in the headquarters and in local establishments

(when the deducted taxable income is above 50 000 €) and usually corporate information is published at a centralized level, there is lack of availability of proper data to perform this analysis.

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Appendix

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Figure 4: Evolution of *Derrama* and IRC during 1982-2015

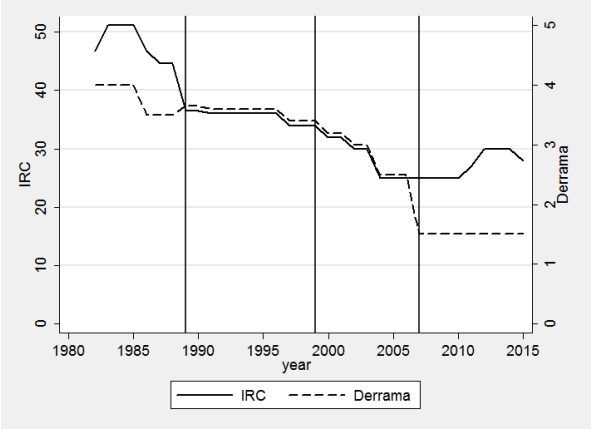


Figure 5: Vote share by party in Portuguese municipal elections

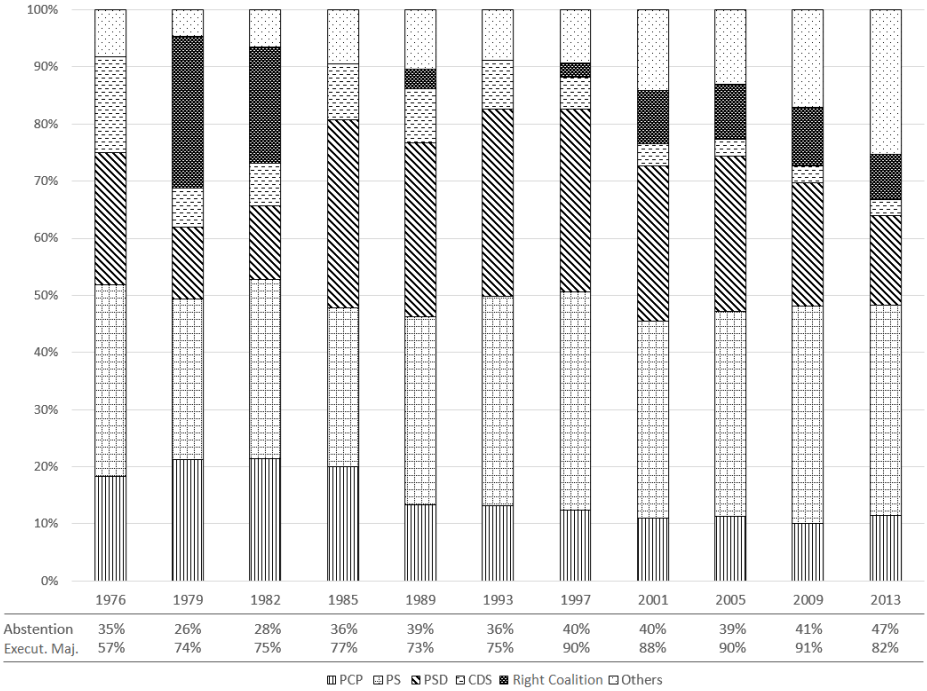


Figure 6: Geographical organization of the Portuguese municipal elections 1997-2009

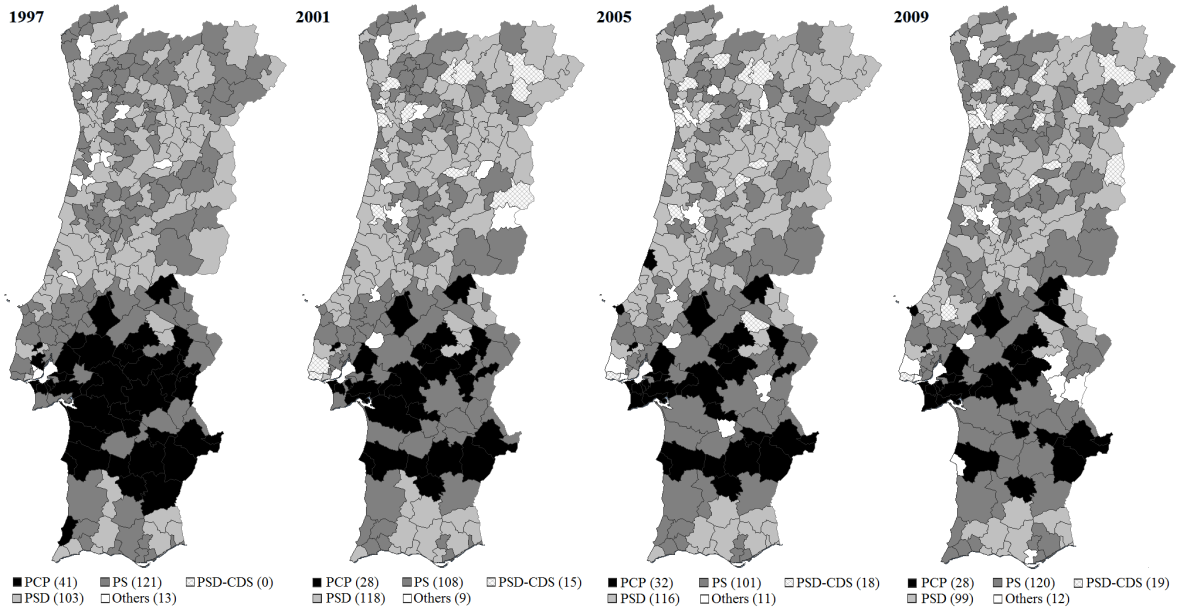


Figure 7: Personnel Expenditure and Direct Taxes by PSD and PS/PCP

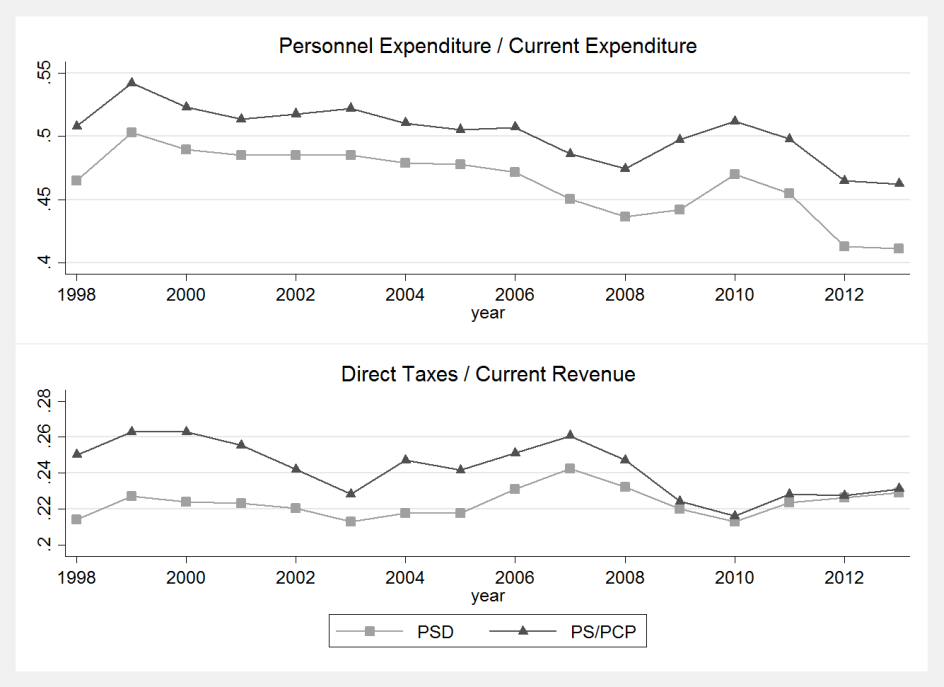
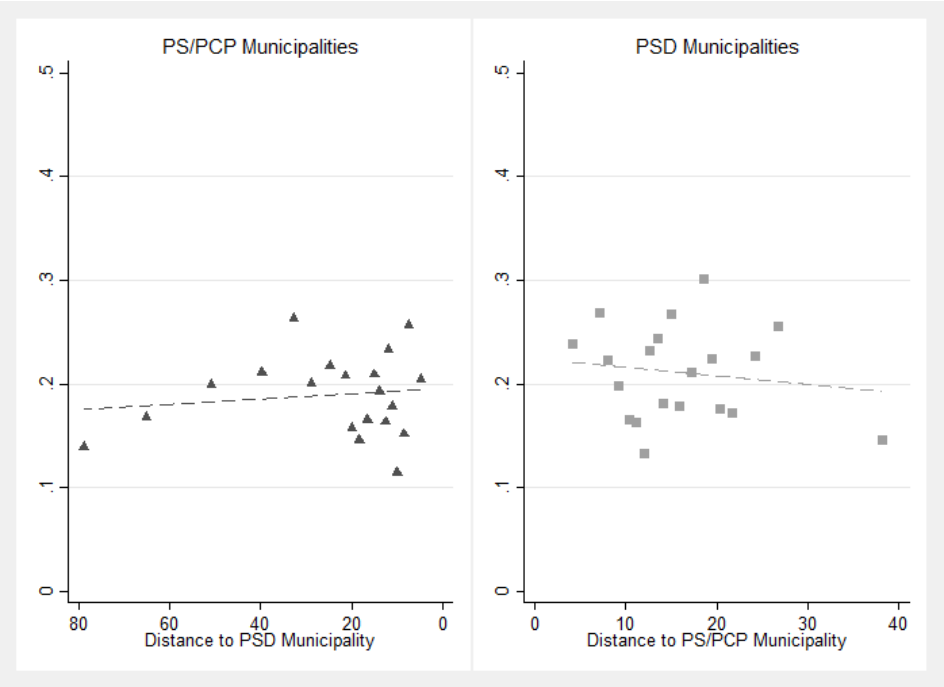
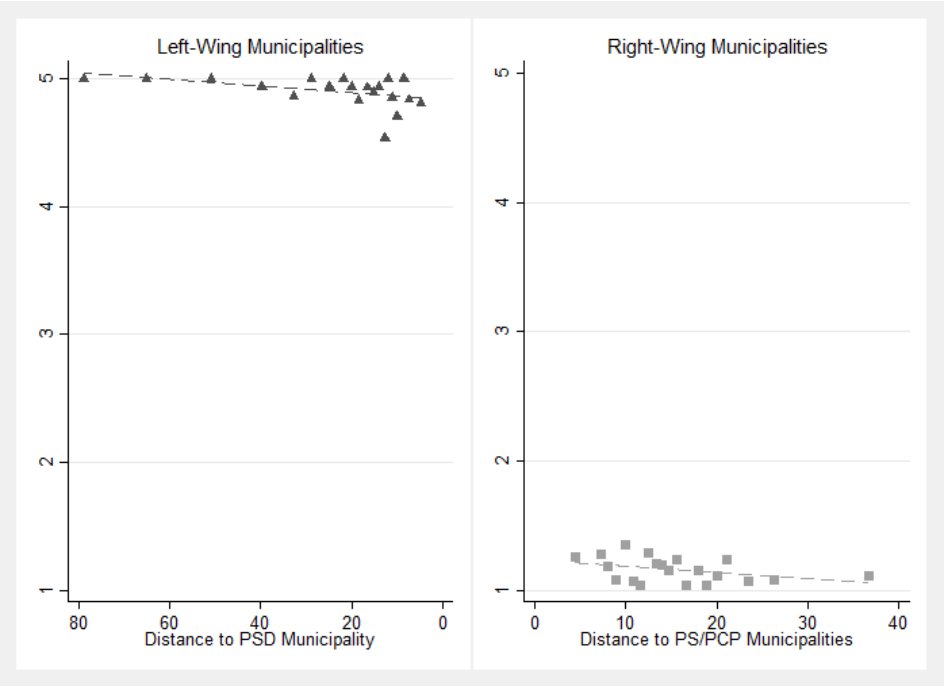


Figure 8: Win Margin by Minimum Distance to PSD and PS/PCP



Distances are measured in km. Note that Distance to PSD Municipality increases from the left to the right while Distance to PS/PCP municipality is plotted in the reverse scale.

Figure 9: Ideological Complexion of Municipal executive and Municipal Council Index by Minimum Distance to PSD and PS/PCP



Distances are measured in km. Note that Distance to PSD Municipality increases from the left to the right while Distance to PS/PCP municipality is plotted in the reverse scale.

Table 6: Difference-in-Differences Results – Part 1 – Observables

Dependent Variable: *Derrama*	(1)	(2)	(3)	(4)
Other Sources of Local Revenue				
log(capital revenues per capita)$_{t-1}$	0.003**	0.003**	0.004***	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
log(government current transfers per capita)$_{t-1}$	0.002*	0.002*	0.001	0.002*
	(0.001)	(0.001)	(0.001)	(0.001)
Economic Characteristics of the Municipality				
Average employee earnings (100 €)	0.017***	0.017***	0.017***	0.017***
	(0.005)	(0.004)	(0.005)	(0.004)
Average employee earnings (100 €) ^{2}	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
log(employment share)	0.023***	0.023***	0.022***	0.023***
	(0.006)	(0.006)	(0.006)	(0.006)
Industry establishments' share	-0.128***	-0.128***	-0.128***	-0.129***
	(0.036)	(0.037)	(0.037)	(0.037)
Licenses granted (in thousands)	0.004***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Ideology Characteristics of the Municipality				
VIP referendum 2007	-0.069*	-0.071*	-0.063*	-0.065*
	(0.038)	(0.038)	(0.035)	(0.036)
Abstention share in municipal elections	0.047**	0.049**	0.043*	0.046**
	(0.023)	(0.022)	(0.022)	(0.022)
$\mathbb{1}$ Majority of seats in municipal executive	-0.004**	-0.004**	-0.004**	-0.004**
	(0.002)	(0.002)	(0.002)	(0.002)
$\mathbb{1}$ Regional referendum 1998	0.006	0.007	0.004	0.004
	(0.005)	(0.006)	(0.004)	(0.005)
$\mathbb{1}$ Right-wing party in General Government	-0.044***	-0.044***	-0.044***	-0.043***
	(0.009)	(0.009)	(0.009)	(0.009)
Other Local Charachteristics				
log(area)	-0.006***	-0.006***	-0.006***	-0.006***
	(0.002)	(0.002)	(0.002)	(0.002)
Child	-0.351***	-0.354***	-0.353***	-0.356***
	(0.098)	(0.103)	(0.098)	(0.103)
$\mathbb{1}$ Coastal	-0.015**	-0.015**	-0.015**	-0.015**
	(0.007)	(0.007)	(0.007)	(0.007)
Maximum altitude (100 of meters)	-0.001*	-0.001*	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)
log(population)	-0.015**	-0.015**	-0.014*	-0.015*
	(0.007)	(0.007)	(0.007)	(0.007)

Note: Standard errors clustered at the district level in parenthesis, below the estimates
* p<0.1, ** p<0.05, *** p<0.01

Table 7: Difference-in-Differences Results – Part 2 – Coefficients of interest

Dependent Variable: *Derrama*	(5)	(6)	(7)
𝟙 PS/PCP	**0.016*** **	**0.019*** **	**0.016*** **
	(0.005)	(0.005)	(0.004)
𝟙 PSD-CDS Coalition	-0.01	-0.016***	-0.011***
	(0.007)	(0.005)	(0.004)
𝟙 Other parties1†	0.009	0.01	0.009*
	(0.008)	(0.007)	(0.006)
𝟙 BorderPSD	0.002		
	(0.003)		
𝟙 BorderPSD ×𝟙 PS/PCP	**-0.011***		
	(0.006)		
𝟙 BorderPSD ×𝟙 PSD-CDS Coalition	0.018*		
	(0.010)		
𝟙 BorderPSD ×𝟙 Other parties1	-0.01		
	(0.010)		
𝟙 % BorderPSD < 50%		0.003	
		(0.004)	
— ×𝟙 PS/PCP		**-0.014*** **	
		(0.006)	
— ×𝟙 PSD-CDS Coalition		0.011**	
		(0.005)	
— ×𝟙 Other parties1 †		-0.016	
		(0.011)	
𝟙 % BorderPSD ≥ 50%		0.001	
		(0.003)	
— ×𝟙 PS/PCP		**-0.013** **	
		(0.006)	
— ×𝟙 PSD-CDS Coalition		0.020***	
		(0.007)	
— ×𝟙 Other parties1 †		-0.004	
		(0.010)	
𝟙 Border Re-elected PSD			0.004
			(0.003)
— ×𝟙 PS/PCP			**-0.011** **
			(0.004)
— ×𝟙 PSD-CDS Coalition			0.012*
			(0.006)
— ×𝟙 Other parties1 †			-0.011
			(0.008)
Other Sources of Local Revenue	Yes	Yes	Yes
Local Economic Characteristics	Yes	Yes	Yes
Local Ideology Characteristics	Yes	Yes	Yes
Other Local Characteristics	Yes	Yes	Yes
Fixed Effects	Yes	No	No
Year dummies	Yes	Yes	Yes
Constant	0.950**	0.387***	0.409***
	(0.347)	(0.124)	(0.124)
Overall R-squared	0.011	0.451	0.441

Note: Standard errors clustered at the district level in parenthesis, below the estimates
* p<0.1, ** p<0.05, *** p<0.01

†Other parties1 include Left- and Right-wing parties (and coalitions) with small representativeness and non-affiliated executives.

Table 8: Difference-in-Differences Results – Part 2 – Observables

Dependent Variable: *Derrama*	(5)	(6)	(7)
Other Sources of Local Revenue			
log(capital revenues per capita)$_{t-1}$	0.003*	0.004**	0.003**
	(0.001)	(0.001)	(0.001)
log(government current transfers per capita)$_{t-1}$	0.002*	0.002*	0.001
	(0.001)	(0.001)	(0.001)
Economic Characteristics of the Municipality			
Average employee earnings (100 €)	0.015***	0.017***	0.017***
	(0.005)	(0.005)	(0.005)
Average employee earnings (100 €) ^{2}	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
log(employment share)	0.018**	0.022***	0.023***
	(0.008)	(0.006)	(0.006)
Industry establishments' share	-0.145***	-0.127***	-0.128***
	(0.040)	(0.036)	(0.036)
Licenses granted (in thousands)	0.002**	0.004***	0.004***
	(0.001)	(0.001)	(0.001)
Ideology Characteristics of the Municipality			
VIP referendum 2007 (share of "yes")		-0.070*	-0.069*
		(0.037)	(0.040)
Abstention share in municipal elections	0.071**	0.047**	0.046**
	(0.030)	(0.023)	(0.023)
$\mathbb{1}$ Majority of seats in municipal executive	-0.004**	-0.004**	-0.004**
	(0.002)	(0.002)	(0.002)
$\mathbb{1}$ Regional referendum 1998		0.006	0.009*
		(0.005)	(0.005)
$\mathbb{1}$ Right-wing party in General Government	-0.049***	-0.044***	-0.044***
	(0.011)	(0.009)	(0.009)
Other Local Characteristics			
log(area)		-0.006***	-0.006***
		(0.002)	(0.002)
Child	-0.379**	-0.353***	-0.362***
	(0.151)	(0.098)	(0.100)
$\mathbb{1}$ Coastal		-0.015**	-0.015**
		(0.007)	(0.008)
Maximum altitude (100 of meters)		-0.001*	-0.001*
		(0.000)	(0.000)
log(population)	-0.082**	-0.014*	-0.016**
	(0.037)	(0.007)	(0.007)

Note: Standard errors clustered at the district level in parenthesis, below the estimates
* p<0.1, ** p<0.05, *** p<0.01

Table 9: Strategic Interaction Results – IV First Stage

Dependent Variable: Neighbours' average tax rate	
$\mathbb{1}$ PS/PCP	0.008***
	(0.003)
$\mathbb{1}$ PSD-CDS Coalition	-0.014**
	(0.006)
$\mathbb{1}$ Other parties1†	-0.006
	(0.004)
$\mathbb{1}$ BorderPSD	0.000
	(0.002)
$\mathbb{1}$ BorderPSD $\times\mathbb{1}$ PS/PCP	-0.005**
	(0.003)
$\mathbb{1}$ BorderPSD $\times\mathbb{1}$ PSD-CDS Coalition	0.017***
	(0.006)
$\mathbb{1}$ BorderPSD $\times\mathbb{1}$ Other parties1†	0.008*
	(0.005)
Other Sources of Local Revenue	
log(capital revenues per capita)$_{t-1}$	0.002***
	(0.001)
log(government current transfers per capita)$_{t-1}$	0.000
	(0.000)
Economic Characteristics of the Municipality	
Average employee earnings (100 €)	0.006***
	(0.002)
Average employee earnings (100 €) ^{2}	0.000***
	(0.000)
log(employment share)	0.015***
	(0.002)
Industry establishments' share	-0.077***
	(0.010)
Licenses granted (in thousands)	0.001*
	(0.000)
Ideology Characteristics of the Municipality	
Abstention share in municipal elections	0.088***
	(0.020)
$\mathbb{1}$ Majority of seats in municipal executive	-0.001
	(0.001)
$\mathbb{1}$ Right-wing party in General Government	-0.042***
	(0.003)
Other Local Characteristics	
Child	-0.134***
	(0.049)
log(population)	-0.080***
	(0.009)
Year dummies	Yes
Fixed Effects	Yes

Note: HAC Standard errors in parenthesis, below the estimates
* p<0.1, ** p<0.05, *** p<0.01
†Other parties1 include Left- and Right-wing parties (and coalitions) with small representativeness and non-affiliated executives.