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# On Defaults, Framing, and Local Tax Policy: Quasi-Experimental Evidence from Portugal

## Abstract

We find that policy decisions made by elected politicians in Portuguese municipalities violate the predictions of standard microeconomic theory. Municipalities can choose a withholding rate between zero and five percent of the income tax revenue collected within their boundaries by the national tax authority. A reform altered the withholding rate applicable if a municipality fails to communicate its chosen rate to the national tax authority, reducing it from five to zero percent. According to standard microeconomic theory, this reform leaves a municipality's decision problem unchanged. In municipalities with strong electoral competition, however, right-leaning mayors choose significantly lower rates than their left-leaning counterparts after the reform. Adopting a behavioral perspective, we argue that the reform influenced perceptions and resulted in increased electoral accountability, especially in municipalities with intense electoral competition. Politicians in these municipalities responded by adjusting withholding rates to better align with their constituents' (ideological) preferences.

JEL-Codes: D720, D910, H710.

Keywords: perception, income taxation, local taxation, ideology, accountability.

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# 1 Introduction

Even subtle and seemingly inconsequential changes to the description of a choice environment can affect decision makers' perceptions and choices (Dhami and al Nowaihi, 2012; Glaeser, 2004; Hattwick, 1989; Madrian, 2014). These *framing effects* (Tversky and Kahneman, 1981) are considered highly relevant in the context of public finance problems (Congdon et al., 2011; McCaffery and Slemrod, 2006). In this paper, we take advantage of a rare opportunity to examine the impact of framing effects on policy decisions made by elected politicians in a real-world setting. We provide quasi-experimental evidence from Portuguese municipalities which shows an ideology-dependent reaction of politicians to a seemingly insignificant adjustment to the law that grants municipalities the right to receive a share of the income tax revenue collected within their boundaries.

In Portugal, municipalities are entitled to receive a share of up to five percent of the income tax revenue collected within their boundaries. Since 2007, they can choose a withholding rate between zero and five percent, which determines their share of the income tax revenue. If a municipality chooses a rate below five percent, taxpayers receive a corresponding refund as a tax rebate. In 2013, the Portuguese government introduced a reform concerning the consequences of a municipality failing to communicate a withholding rate to the national tax authority. Before the reform, such municipalities received the maximum amount of revenue, whereas they receive no revenue after the reform. Although the legislation does not explicitly use the term *default rate*, the reform effectively changed the default withholding rate from five to zero percent.<sup>1</sup> Crucially, the reform did not affect the choice set available to municipalities: before and after, municipalities could choose any rate between zero and five percent.

According to standard economic theory, the default change should not influence withholding rates because, from a neoclassical perspective, the decision problem for local governments has not changed.<sup>2</sup> However, when considering the situation through the lens of framing effects, it is reasonable to expect that perceptions and decisions may change in response to altering the default rate. It is possible that the default change al-

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<sup>1</sup>While the term *default rate* may trigger associations with classical default effects (Madrian and Shea, 2001; Johnson and Goldstein, 2003), there are important differences between classical default effects and our setting. Classical default effects (in the sense that a pre-selected option is preferred by consumers) often arise in scenarios where uninformed consumers are confronted with a small number of discrete choice options (usually two) with consequences that are only felt in the distant future (e.g., pension plans or organ donation). In our case, we are dealing with specialized agents (local governments) who are elected to implement policies and can draw on the expertise of additional specialists (bureaucrats). Therefore, it is unlikely that a default rate is perceived as a recommendation by a more knowledgeable central government (the literature on fiscal federalism assumes that local governments possess a better understanding of local preferences compared to the central government). Especially a default rate of zero percent would appear peculiar as a recommendation, as the central government could simply abolish the tax altogether. Instead, we argue that the default change affects perceptions through a framing effect. We discuss potential mechanisms in section 2.2.2

<sup>2</sup>See section 2.2.2 for a more detailed discussion.

tered politicians' perceptions with respect to generating revenue through the withholding rate, indicating that they themselves are subject to behavioral biases. Alternatively, it is possible that voters are subject to behavioral biases and that rational politicians respond to a potential change in voters' perception and evaluation of tax policy.

The institutional evolution regarding municipalities' right to retain a share of the income tax revenue suggests that the default reform influenced perceptions that heightened electoral accountability. This right was introduced in 2007 as part of a reform of the intergovernmental tax-transfer system. The reform, guided by the paradigm of fiscal decentralization (Oates, 1972, 1999), aimed to expand municipalities' fiscal autonomy and increase the political ownership of local public budgets. The central government reduced municipal grants and gave municipalities the means to compensate for the loss in revenue through the participation in income tax revenue. Although the law classifies this arrangement as a vertical transfer<sup>3</sup>, from an economics perspective, the municipalities' right to decide how to split the five percent share of income tax revenue between their budget and taxpayers' pockets is a municipal tax (see also Portuguese Public Finance Council (2013, p. 10)). However, the five percent default implied that municipalities could receive the full share without actively making a decision, a situation hardly distinguishable from the period before 2007 when municipalities automatically received the money as a grant. As a result, municipalities might have felt entitled to this share of income tax revenue and perceived it as another transfer they automatically receive unless they actively opt out.

Behavioral economics concepts can explain why changing the default rate from five to zero percent can have strengthened the perception that local governments are responsible and accountable for choosing withholding rates (see section 2.2.2). Such an increase in accountability arguably makes politicians more responsive to voters' preferences, especially in the context of intense political competition (Besley and Burgess, 2002; Besley and Case, 2003). Consequently, we expect to observe an ideology-dependent response to the default reform in municipalities with close elections, because individuals' preferences regarding taxation and redistribution typically align with their political leanings (Blinder and Krueger, 2004; Kerschbamer and Müller, 2020; Stantcheva, 2021), and parties are most effective in representing citizens' preferences in competitive electoral environments (Key, 1950). Given that left-leaning ideology tends to prefer higher tax rates compared to right-leaning ideology (Pettersson-Lidbom, 2008; Freier and Odendahl, 2015; Fiva et al., 2018), we anticipate a stronger reaction to the default reform from right-leaning local governments in municipalities with close elections.

Our results confirm this reasoning. Using data on all 278 Portuguese municipalities and twelve years around the default change, we employ a difference-in-discontinuities

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<sup>3</sup>The municipalities' right to a share of the income tax revenue is stated in the section on vertical transfers rather than in the section on municipal taxes in the law that establishes this right (Law no. 2/2007 in *Diário da República* 10, Series I, 15 January 2007).

analysis (Grembi et al., 2016) to examine the difference in withholding rates between left- and right-leaning local governments in municipalities with close elections before and after the default change. We find that withholding rates in right-leaning municipalities are, on average, one percentage point lower than in left-leaning municipalities. Regression discontinuity regressions conducted separately for the periods before and after the default change demonstrate that the difference between left- and right-leaning municipalities only emerges after the reform.

We also find that the decrease in withholding rates leads to lower revenue through the participation in the income tax in right-leaning municipalities compared to their left-leaning counterparts. In other words, lower withholding rates are not compensated for by an increase in taxable income. As a result, taxpayers are refunded more money after the default reform.

Our paper contributes to the growing literature on behavioral public economics and behavioral public finance (for reviews, see McCaffery and Slemrod (2006), Congdon et al. (2011), Shafir (2013), Chetty (2015), or Bernheim and Taubinsky (2018)). Many empirical studies in this field aim to identify systematic deviations in citizens' behavior from a rational benchmark. Insights about these deviations shall enable rational, informed, and well-meaning social planners to design policies that improve people's well-being by considering and correcting their psychology-driven, seemingly flawed decisions. For example, Engstrom et al. (2015), Rees-Jones (2018) and Rees-Jones and Taubinsky (2020) examine the effect of behavioral phenomena on the actions of taxpayers and discuss the implications for policy design.

In contrast to this normative perspective, our findings contribute to the positive analysis of how behavioral phenomena influence the decisions of elected politicians. Our results suggest that politicians either consider the behavioral reaction of voters or are themselves subject to behavioral biases. These results have implications for decision makers at higher levels of government who design policies to achieve specific outcomes at the local level. It is crucial for them to carefully consider the potential responses of local politicians through the lens of behavioral economics. Thus, our paper offers a behavioral economics perspective on the literature on fiscal federalism (Oates, 1972, 1999).

Our results also contribute to the empirical evidence on the 'Do parties matter?' debate regarding the influence of political parties on policymaking at the local government level. On the one hand, recent evidence shows that the mayor's party does not affect the size of the local government or the allocation of public spending, both in U.S. cities (Ferreira and Gyourko, 2009) and Brazilian municipalities (Gouvêa and Girardi, 2021). On the other hand, consistent with our results, several recent papers provide evidence favoring the argument that 'parties matter' (de Benedictis-Kessner and Warshaw, 2016, 2020; Dippel, 2022; Folke, 2014; Gerber and Hopkins, 2011). Regarding local taxation in particular, our finding that right-leaning politicians charge lower taxes after the default

reform aligns well with existing evidence. Pettersson-Lidbom (2008) shows left-wing local governments spend and tax more than right-wing governments in Sweden, Freier and Odendahl (2015) find partisan influences on local tax rates in Bavaria, Germany, and Fiva et al. (2018) identify a systematic effect of party leanings on property taxation in Norway.

Furthermore, our results shed light on the question of whether increased electoral competition has a moderating effect on policymaking. In contrast to, for example, Besley and Preston (2007) who find a moderating effect of political competition on policies, we find that the default reform induced a gap between the rates charged by left- and right-leaning local governments in municipalities with close elections, suggesting that electoral competition does not generally induce policy moderation.

## 2 Institutional Setting

### 2.1 Local politics

To understand the institutional environment in which the municipalities' participation in the income tax revenue is embedded, we need to take a look at local politics first. Portugal is composed of 278 municipalities, which represent the primary subnational level of government.<sup>4</sup> At the municipal level, there are two governing bodies: the executive council and the legislative assembly. The executive council is headed by the mayor, the chief executive officer in local politics. The council consists of four to ten councilors, with the exact number depending on the municipality's population size.<sup>5</sup> The legislative assembly functions as a local parliament and is comprised of directly elected members and the presidents of the civil parishes that make up the municipality.<sup>6</sup>

Municipal elections for the executive council and the legislative assembly occur simultaneously nationwide every four years, following a proportional representation system based on closed lists. Political parties and independent lists of registered voters can participate in these elections, fielding separate lists for the council and the assembly. As a result, voters cast separate votes for each governing body. Parties form pre-electoral coalitions and do not need to hold a majority of council seats to govern. The candidate heading the council list that receives the highest number of votes becomes the mayor and holds significant power in shaping municipal policies during the electoral term. Typically, the mayor assigns roles and responsibilities among party members and allies in the council, leaving opposition councilors without a formal role in the executive. However,

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<sup>4</sup>We exclude the 30 municipalities in the Azores and Madeira Archipelagos to ensure comparability due to varying institutional details.

<sup>5</sup>Oporto and Lisbon municipalities are exceptions, having 12 and 16 councilors, respectively.

<sup>6</sup>Civil parishes represent Portugal's second subnational level of government. Each municipality consists of at least one civil parish.

the council may face opposition if a majority of a different political leaning controls the assembly. In over 90% of the municipalities, though, the council and the assembly are aligned, i.e., share the same ideology (see Panel A of Table A.1).

Local politics is predominantly influenced by national political parties. These parties, arranged from left to right on the political spectrum, include the Communist-Greens coalition, the Socialist Party, the Social Democrats, and the Christian Democrats. We classify a municipality as left-leaning if the ruling party in the municipal council is the Communist-Greens coalition or the Socialist Party. Conversely, a municipality is right-leaning if the ruling party is the Social Democrats or the Christian Democrats (the Social Democrats are considered a liberal-conservative party in Portugal). Pre-electoral coalitions are formed along ideological blocs. For example, the Social Democrats typically coalesce with the Christian Democrats, and the left-leaning Communist-Greens coalition consistently runs for elections together. The Socialist Party and the Social Democrats, or coalitions led by these parties, control over 85% of the municipal councils (see Panel A of Table A.1).

## **2.2 Local Participation in Income Tax Revenue**

### **2.2.1 Local Public Finance and Reform of Default Withholding Rate**

Municipalities are responsible for the supply of local public goods and services. To this end, municipalities receive grants from the central government that comprise, on average, 50% (and up to 89%) of their budget. Local governments may also charge two municipal taxes: a property tax and a business tax (see Panel B of Table A.1).<sup>7</sup> The central government determines the framework for municipal taxes. It defines the tax base, establishes the allowable range of tax rates, and sets a default tax rate. Municipalities either decide on their preferred tax rate that will be implemented in the upcoming year or allow the default rate to take effect if they fail to communicate their preferred tax rate to the national tax authority. Once taxes are collected by the national tax authority, the central government allocates the funds to the respective municipalities.

In addition to the grants and the municipal taxes above, municipalities are entitled to receive a share of up to 5% of the income tax revenue collected within their jurisdiction.<sup>8</sup> This most recent source of municipal revenue was introduced in 2007 as part of a reform of the intergovernmental tax-transfer system to compensate for the simultaneous reduction in grants from the central government to the municipalities. The objective of this reform was to increase local tax autonomy and political ownership of local public budgets.

Since the reform in 2007, municipalities can choose a withholding rate between zero and five percent of the income tax revenue raised within their boundaries. If a municipal-

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<sup>7</sup>See also Table A.2 for descriptive statistics on municipal taxation by party.

<sup>8</sup>Law no. 2/2007 in *Diário da República* 10, Series I, 15 January 2007.



ity chooses a tax rate below the maximum of five percent, the residual revenue is refunded to municipal taxpayers, and the refund appears on taxpayers' income tax receipts.

The law classifies this arrangement as a vertical transfer. From an economics perspective, however, it is a municipal tax because local governments are responsible and should be held accountable for choosing the withholding rate (see also Portuguese Public Finance Council (2013, p. 10)). This tension between the legal framing and the economic interpretation of the municipal participation in the income tax revenue is the starting point for our analysis of how the reform influenced perceptions of politicians and/or citizens.

For simplicity, in the following, we refer to the municipal participation in the income tax revenue as the *municipal income tax* and to the withholding rate as the *tax rate*.

A municipality sets the tax rate yearly by communicating it to the national tax authority. Formally, municipalities have to proceed as follows regarding income tax revenue collected by the central government in year  $t$ : Until the end of year  $t - 1$ , the council proposes a tax rate for the year  $t$  for the assembly's approval and communicates it to the national tax authority. Tax revenue collection occurs throughout year  $t$ , and the balance is closed with the filing of the income tax returns in year  $t + 1$ . In this same year, the central government transfers the respective share of the income tax revenue to the municipalities and refunds taxpayers accordingly. For example, in 2008, municipalities choose the tax rate for 2009 and receive the respective revenue in 2010.

Due to this two-year lag, upon introducing the municipal income tax in 2007, the law established that in 2008 municipalities would receive income tax revenue based on the maximum rate. Thus, in 2008, all municipalities received five percent of the 2007 income tax revenue raised within their jurisdictions. Unlike the laws regulating the municipal property and business tax, the one regulating the municipal income tax did not establish a default tax rate. However, the practice of applying the maximum rate in case a municipality does not communicate a tax rate to the tax authority persisted in the following years. Effectively, this was a default rate of five percent. Consequently, if a municipality did not communicate a rate to the central government until the end of year  $t - 1$ , the municipality would receive municipal income tax revenue based on the maximum tax rate of five percent in year  $t + 1$ .

In 2013, the central government modified this situation in the new local finances law.<sup>9</sup> This reform is the object of our study. Consistent with the law regulating the two other municipal taxes, the revised law explicitly states that if a municipality fails to communicate a tax rate it forgoes income tax revenue, effectively establishing a default rate of zero percent. This change took effect in 2014, such that the new default rate of zero percent applied to taxable incomes generated in 2015. Thus, if a municipality did not communicate a tax rate to the central authority by the end of 2014, it would not

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<sup>9</sup>Law no. 73/2013 in Diário da República 169, Series I, 3 September 2013.

receive any income tax revenue in 2016. Instead, its residents would receive five percent of their income tax payment as a rebate.

The example in Table 1 illustrates the scenarios before and after the reform. For simplicity, assume that there is one representative citizen in a municipality and this citizen has to pay 100 Euros in income tax every year. Every year, the central authority collects these 100 Euros and keeps 95 Euros for itself, distributing the remaining 5 Euros in the following year between municipal tax revenue and a tax rebate for taxpayers according to the chosen municipal income tax rate.

TABLE 1 – COMMUNICATION AND CONSEQUENCES: EXAMPLE

Communicated tax rate (year $t - 1$ )	Municipal revenue (year $t + 1$ )	Tax rebate (year $t + 1$ )
<i>Panel A: Pre-reform</i>		
$\tau=5\%$	5 €	0 €
$\tau=2\%$	2 €	3 €
$\tau=0\%$	0 €	5 €
no communication	5 €	0 €
<i>Panel B: Post-reform</i>		
$\tau=5\%$	5 €	0 €
$\tau=2\%$	2 €	3 €
$\tau=0\%$	0 €	5 €
no communication	0 €	5 €

Notes: The table illustrates the consequences of communicated tax rates ( $\tau$ ) and of no communication with the national tax authority before (Panel A) and after (Panel B) the default reform.

Consider the 5 Euros of tax revenue collected in any year  $t$  and temporarily kept by the central government. Before and after the reform, the allocation of these 5 Euros between municipal tax revenue and tax rebates in year  $t + 1$  depends on the tax rate that the municipality communicated to the central authority by the end of the year  $t - 1$ . The only distinction arises when the municipality fails to communicate a tax rate to the tax authority. In this case, before the reform, the municipality receives 5 Euros, whereas after the reform, the 5 Euros are refunded to taxpayers.

## 2.2.2 Interpretation and Hypothesis

We expect an ideology-dependent response to the default reform, especially in municipalities with intense electoral competition. Our reasoning is based on a behavioral economics perspective on the default reform because, according to standard microeconomic theory, altering the default tax rate does not affect a municipality's decision problem. Consequently, from the perspective of standard economic theory, we should not observe any changes in the tax rates charged. This argument would be undermined if actively choosing a tax rate incurred significantly higher (cognitive) costs compared to passively accepting

the default. However, since municipalities need to plan their budgets in both cases, the cost differential between these two scenarios is negligible. Furthermore, municipalities already communicate two other municipal tax rates (property tax and municipal business tax) to the tax authority each year.

Under the assumption of full rationality, the reform should also not have altered municipalities' ability to blame the central government for tax-related issues. With a constant maximum tax rate of 5%, municipalities can blame the central government for a lack of funds to the same extent before and after the reform. In case of complaints about too high local tax rates, however, municipalities cannot blame the central government either before or after the reform, as the law clearly gives municipalities the authority to cut tax rates in both scenarios.

Alternatively, the default change could have reallocated bargaining power between the council and the assembly. Approval from the assembly is necessary if the council intends to deviate from the default rate. Thus, the assembly must approve any deviation from the maximum before the default change and any deviation from the minimum after. Following the reform, if municipal council and assembly are governed by parties with different views on income taxation, the party favoring lower taxes gains bargaining power, potentially resulting in a decrease in tax rates.<sup>10</sup> However, the vast majority of our sample (more than 90%) consists of aligned local governments. Aligned local governments can implement their preferred tax rate without bargaining before and after the default change. Nevertheless, we confirm that alignment does not affect our empirical results in Appendix D.<sup>11</sup>

These considerations reinforce the notion that, from the perspective of standard economic theory, we should not anticipate a policy response to the default change. Behavioral economics, however, has revealed that form matters for outcomes of decision problems. This phenomenon, referred to as *framing effect* (Tversky and Kahneman, 1981) means that even subtle modifications in the description of a choice environment can have profound effects on people's perceptions and decisions (Dharmi and al Nowaihi, 2012; Glaeser, 2004; Hattwick, 1989; Madrian, 2014). The influence of framing effects is considered highly relevant in the context of public finance problems (Congdon et al., 2011; McCaffery and Slemrod, 2006).

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<sup>10</sup>This mechanism can be illustrated using a simple model incorporating Nash-bargaining between two parties with different preferred tax rates.

<sup>11</sup>Figure D.1 shows that around the cutoff alignment is not different between left- and right-leaning local government before or after the default reform, nor does it change from pre- to post-reform. Table D.1 tests the robustness of our findings to different samples. In column (1) we drop divided local governments. In columns (2), (3), and (4) we drop draws in the number of council seats between the winner and runner-up, draws in the number of seats held by left- and right-leaning parties in the assembly, and both scenarios, respectively. Coefficient estimates are in line with our baseline findings. The significance level is slightly lower for some specifications, but this could be due to dropping the mentioned observations, which typically result from close elections, and consequently reduce the number of observations close to the cutoff.

Considering the impact of framing effects, it is reasonable to expect that altering the default tax rate can lead to changes in perceptions and decisions. This raises the question of whose perceptions are influenced by the framing effect and in what manner. It is possible that rational politicians take into account a potential change in perception among their constituents when implementing tax rates. Alternatively, it could be that politicians themselves are directly susceptible to altered perceptions and subsequently adjust the rates accordingly. However, for the results of the following discussion, it is not necessary to attribute behavioral biases to a specific side, since the respective predictions would agree.

Recall that, in any year, income tax revenue is collected by the national tax authority independent of a municipality's chosen tax rate. The tax rate determines how 5% of the income tax revenue is split between the municipality's budget and refunds into the pockets of the municipality's taxpayers in the following year. So the question is how politicians and/or taxpayers perceive this share of the income tax revenue collected and temporarily kept by the national tax authority and the task of splitting it before and after the default change. Also recall the tension between the legal framing and the proper interpretation from an economics perspective of the municipalities' participation in income tax revenue: the law classifies the arrangement as a vertical transfer whereas, from an economics perspective, we are dealing with a municipal tax. This observation places the setting of our analysis in a nuanced position that falls between distinct tax and grant classifications, and municipalities' perceptions may vary between these two classifications.

From a behavioral perspective, several established concepts may help explain a change in perception due to the default change. Although we cannot isolate one of these concepts as the single driver of a potential change of perception, they are closely related and predict responses to the default change that point in the same direction.

It is possible that the default change affected the extent to which politicians felt responsible for choosing the tax rate. As described, the municipalities' right to a share of the income tax revenue was introduced in 2007 as part of a reform of the intergovernmental tax-transfer system. By setting the default rate to the maximum of 5%, the central government, as an external authority, made it easy for municipalities to receive the full share without actively making a decision. This situation closely resembles the scenario before 2007 when a corresponding amount of grants was automatically transferred to municipalities. This situation evokes the concept of *responsibility-alleviation* (Charness, 2000; Charness and Jackson, 2009). According to this concept, the decision makers' motives and choices can be affected through even slight shifts in perceived responsibility to an external authority. In our case, the default change would have shifted perceived responsibility from the central government as the external authority to the local gov-

ernments. Local politicians would feel more accountable for the tax rates and put more emphasis on voters' preferences as a result.

Similarly, the default change could have affected feelings of ownership or entitlement regarding the 5% share of income tax revenue temporarily retained by the national tax authority (see De la Cuesta et al. (2022) for a conceptual discussion of feelings of ownership over (public) money). When the 5% default enabled municipalities to passively receive this revenue, they may have exhibited stronger feelings of ownership and entitlement regarding the money compared to taxpayers. However, the default change might have shifted the balance, resulting in stronger feelings of ownership and entitlement among taxpayers. Applying the concept of reference-dependent preferences to this interpretation would mean that taxpayers perceive the refunded money as a gain before the default change. In contrast, after the change, they would perceive the non-refunded money as a loss. Given that losses loom larger than gains (Kahneman and Tversky, 1979), taxpayers would feel worse off after the default change if the amount of money refunded remained constant, prompting politicians to lower the tax rate and increase the amount of money refunded to taxpayers out of accountability considerations.

Another closely related interpretation is based on the concept of mental accounting (Thaler, 1980, 1985, 1999). In the context of public finance, Hines and Thaler (1995) argue that monies from different revenue sources need not be fungible because citizens and/or politicians may put these monies into different mental accounts. The framing of a policy problem can depend on the mental account into which a revenue source is placed. For example, potential revenue sources could be sorted into a (*citizen*) *income account* from which tax revenue can be raised and a *grant account* that comprises monies received from higher levels of government. In contrast, when it comes to grant monies, Hines and Thaler (1995) argue that the framing of policy problems tends to emphasize the question of how to allocate the money across different public projects instead of how to allocate the grant money between lowering taxes and public spending. When it comes to raising money through the income account via taxation, the question of how much money should be raised receives more attention. Thus, although the questions of how much revenue to raise and how to spend it should apply to both revenue sources, their importance may differ depending on the respective mental account.<sup>12</sup>

Applied to our setting, it appears reasonable that before the default change, taxpayers and/or politicians assigned the 5% share of the income tax revenue to the mental grant account, considering it part of the local public budget. Local politicians felt entitled to the money and only considered how to spend it. However, after the default change, when the

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<sup>12</sup>This may also be related to choice bracketing, a concept postulated by Read et al. (1999). Choice bracketing refers to the phenomenon that a decision-maker who is confronted with a (large) number of interrelated decision problems focuses on a few (or only one) of these problems ignoring the implications for the other problems. In contrast, applying a comprehensive approach where all problems are considered together would be the rational approach for decision-making.

situation felt more like a tax, the 5% share was assigned to the mental income account and the question of how much money to raise via the tax became important. Politicians thus felt more accountable to choose a tax rate in accordance with their citizens' preferences after the reform.

These considerations illustrate potential mechanisms through which perceptions could be affected by the default change. What they have in common is that they imply stronger incentives for local politicians to choose tax rates according to voters' preferences after the change.<sup>13</sup> Given the heterogeneity in perceptions and preferences among people, it would be surprising to observe a uniform response in tax policies across municipalities. However, perceptions and preferences regarding public budgets and tax policies can be roughly categorized along ideological leanings: people's preferences regarding redistribution, the size of public budgets, and taxation typically align with their political ideology (Blinder and Krueger, 2004; Kerschbamer and Müller, 2020; Stantcheva, 2021), and left-leaning ideology generally tends to prefer higher tax rates and larger public budgets than right-leaning ideology (Pettersson-Lidbom, 2008; Freier and Odendahl, 2015; Fiva et al., 2018). Thus, it is likely that we will observe a stronger reaction from right-leaning municipalities to the default change.

To illustrate this point, consider a simple example with two municipalities  $A$  and  $B$ . In each municipality, there is one citizen with well-behaved, single-peaked preferences regarding tax rates. The citizen in  $A$  is right-leaning and prefers a tax rate of 3% whereas the citizen in  $B$  is left-leaning and prefers a tax rate of 6%. Assume that, before the default reform, politicians do not consider citizens' preferences, but passively accept the 5% default. After the default change, however, they feel accountable and want to implement their citizens' preferred tax rate. Given the maximum rate of 5%, municipality  $A$  can implement the preferred rate of 3%, whereas municipality  $B$  can only stick to the maximum rate of 5% as the best possible but sub-optimal rate for its citizen. In this case, we would only observe a response of municipality  $A$  with the right-leaning citizen to the default change. If the left-leaning citizen in municipality  $B$  had a preferred rate of 4%, we would observe a policy response of both municipalities to the default change, but the response of municipality  $A$  with the right-leaning citizen would be stronger.

Such an ideology-dependent effect should occur most likely in municipalities with close elections because intense political competition makes politicians more responsive to voters' preferences (Besley and Burgess, 2002; Besley and Case, 2003). In the following sections, we describe how we analyzed the effect of the default change empirically and tested the hypothesis that, after the default change, right-leaning local governments charge lower tax rates than left-leaning governments in municipalities with close elections.

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<sup>13</sup>Strictly speaking, this assumes stable preferences. In case of loss aversion, one could argue that a change of citizens' preferences induced by the default change (from a gain to a loss perspective) led to a policy response that can be considered an increase in effective accountability (Ashworth, 2012; Ashworth et al., 2017). That is, politicians allocate more resources to their citizens after the reform.

## 3 Identification Strategy

### 3.1 Methodology

We employ a quasi-experimental difference-in-discontinuities (diff-in-disc) design (Grembi et al., 2016) to identify the impact of the default change on the municipal income tax rates chosen by municipalities with different ideological leanings. In an ideal scenario, we would observe the tax-setting behavior of the same municipality under both left- and right-leaning local governments, with default rates set at five and zero percent. However, in reality, we can only observe a subset of these outcomes. To overcome this challenge, we utilize a combination of regression-discontinuity (RD) and difference-in-differences (diff-in-diff) methodologies, drawing on two sources of exogenous variation.

The RD component of our approach focuses on close elections, where the assignment of ideology to municipalities can be considered quasi-random and is discontinuous at the normalized zero cutoff. This serves as the first source of variation in our analysis. The second source of variation arises from the temporal dimension introduced by the timing of the reform, forming the basis of the diff-in-diff aspect of our methodology. Importantly, the reform is exogenous from the perspective of local governments.

We can rely on this approach because most elections in our context involve contests between a left- and a right-leaning party: typically the Socialist Party and the Social Democrats, or coalitions led by these parties. Even though we are dealing with a multi-party system, within a municipality, elections are effectively fought between two main contenders whose identities are persistent over time.<sup>14</sup> Consequently, we are able to apply a diff-in-disc methodology as if we were dealing with a two-party system. By utilizing a flexible polynomial function of the vote margin in our specifications, we can account for the specific characteristics of the electoral system, as long as they remain consistent from pre- to post-reform.

In situations where both major parties in a municipality lean in the same ideological direction (either left or right), we still categorize the municipality as left- or right-leaning based on the winning party. In these cases, we categorize the municipality as left or right, regardless of the specific party that wins the election. This classification is consistent with our understanding that left-leaning parties generally favor higher taxes than right-leaning parties, without considering variations within ideological blocs. Adopting a classification based on the relative position of the winning party on the political spectrum would lead to misclassifying the Social Democrats as left-leaning or the Socialists as right-leaning. Nevertheless, we assess the robustness of our estimates to this alternative

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<sup>14</sup>In 71% of our municipality-year observations, the council comprises only one or two different parties or pre-electoral coalitions. The vote share of the third party is generally much lower than that of the two main competitors, particularly in close elections, which is the focus of our analysis. See histograms in Figure C.1.

classification and find, as expected, that such measurement errors tend to weaken the coefficient estimates towards zero (Johnston and DiNardo, 1996).<sup>15</sup>

In our baseline analysis, we estimate the following diff-in-disc specification to examine how left-leaning municipalities differ from right-leaning municipalities in choosing the municipal income tax rate before and after the default change, using data from close elections where ideology assignment can be treated as quasi-random:

$$\begin{aligned} Tax_{it} = & \gamma_0 + \gamma_1 f(Margin_{ie}) + Right_{ie}(\rho_0 + \rho_1 f(Margin_{ie})) \\ & + Reform_t[\alpha_0 + \alpha_1 f(Margin_{ie}) + Right_{ei}(\beta_0 + \beta_1 f(Margin_{ie}))] + \epsilon_{it}. \end{aligned} \quad (1)$$

The variable  $Tax_{it}$  represents the municipal income tax, which serves as our primary outcome variable, in municipality  $i$  during year  $t$ .  $Reform_t$  indicates the post-reform years, that is, after the default change.  $f(Margin_{ie})$  is a function of the running variable, as in an RD setup, and measures the margin of victory for the right-leaning party in the election preceding the electoral term  $e$ .  $Right_{ie}$  is a binary variable indicating right-leaning municipalities. The parameter of interest  $\beta_0$  captures the combined effect of both treatments, namely being a right-leaning municipality post-reform.

We also assess these two discontinuities separately with the following RD specification:

$$Tax_{it} = \gamma_0 + \gamma_1 f(Margin_{ie}) + \rho_0 Right_{ie} + \rho_1 Right_{ie} \cdot f(Margin_{ie}) + \epsilon_{it}. \quad (2)$$

where the parameter  $\rho_0$  quantifies the difference in tax-setting behavior between left- and right-leaning municipalities.

We employ non-parametric kernel-weighted local polynomial diff-in-disc and RD point estimators with robust bias-corrected confidence intervals to estimate equations (1) and (2).<sup>16</sup> This approach involves fitting two regressions on each side of the cutoff that separates left- from right-leaning municipalities. We use a triangular kernel that gives more weight to observations near the cutoff. We employ robust estimators following the procedure outlined in Calonico et al. (2014); our preferred specification minimizes the

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<sup>15</sup>See column (1) of Table C.1. In column (2) of the same table, we check whether our results change if we drop these observations from the analysis. The magnitude and significance of the coefficient estimate remain in line with our baseline findings.

<sup>16</sup>We rely on the `mdrd` Stata package to estimate our models. While this package does not support clustered standard errors, we acknowledge the need to consider clustering in our setting. In Table C.2, we present estimations of the local OLS parametric multiple linear regression model in Equation (1), incorporating clustered standard errors. The first column corresponds to the baseline regression with robust standard errors, comparable to our main specification but employing this inferior estimation method. In the remaining columns, we use different levels of clustering. The magnitude of the estimates is in line with our baseline findings. The significance is lower but already in the first column, where the only difference is the estimation method. For our RD estimates, we can test the robustness with the `rdrobust` package that is similar to the `mdrd` but allows for clustered standard errors. We collect the RD results in Table C.3.



mean squared error with a bias correction and robust standard errors (CCT/MSERD), which minimizes potential bias to the greatest extent (Calonico et al., 2019). As an alternative, we employ optimal bandwidth choices computed according to the IK method proposed by Imbens and Kalyanaraman (2012). These data-driven bandwidths vary across different specifications.

We test the internal validity of our findings to different bandwidths and polynomials. In particular, we halve the CCT and IK bandwidths to restrict the analysis to a narrower window around the cutoff, and we test polynomial specifications with second-degree polynomials of the running variable using each of the optimal bandwidth selection procedures and the full sample. Although higher-degree polynomials are common in the literature, Gelman and Imbens (2019) warn against using higher than quadratic polynomials of the running variable.<sup>17</sup>

By employing quasi-experimental diff-in-disc and RD methodologies, we have the flexibility in including or excluding fixed effects in our analysis. While it makes sense to test the robustness of our estimates to year fixed effects, which account for time-variant shocks, we avoid relying on overtime variation within municipalities to focus on the effect of the default change. Including year fixed effects helps control for factors that may vary over time, such as general improvements in living conditions or income levels, which could influence tax rate decisions. Including municipality fixed effects, however, shifts the focus away from the default reform to changes in the ideology of the local government.

Ideally, to capture the effect of the default change, we would have a setting where municipalities do not change their political leanings. However, in reality, 94 municipalities transition from left- to right-leaning local governments (and vice versa) over the entire sample period. If we focus on within-municipality variation, we cannot disentangle the effect of changing the default from that of switching the ideology of the local government. Thus, in our main analysis, we dispense with fixed effects. Nevertheless, we test the robustness of our estimates to including year and municipality fixed effects.<sup>18</sup> Additionally, we employ two strategies in robustness tests to understand the role of these municipalities that switch ideology. First, we restrict the analysis to two periods, before and after the reform, to minimize switches. Second, we drop these municipalities from the analysis.<sup>19</sup>

The RD identification rests on the assumption that the distribution of potential confounders changes continuously around the cutoff, with the only discrete change being the shift in the municipality's ideology. The diff-in-disc design is superior to the RD as it captures a second source of variation by exploiting the reform. The diff-in-disc aspect of this approach addresses concerns with the continuity assumption, whereas the RD aspect controls for differential trends and unobservable municipal characteristics.

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<sup>17</sup>Our findings are robust to higher-degree polynomials. Estimates are available from the authors upon request.

<sup>18</sup>See Table C.4.

<sup>19</sup>See columns (3) and (4) of Table C.1.

Still, one assumption must be fulfilled to validate a diff-in-disc design: we need to ensure that the ability or incentives to manipulate the victory margin did not change from pre- to post-reform. It is unlikely that parties strategically sort themselves around the cutoff as this would require precise prediction and manipulation of election outcomes. Close elections are typically characterized by uncertainty rather than deliberate manipulation. To provide empirical support to this assumption, we employ a variant of the McCrary (2008) plot, which examines the change in the number of observations around the cutoff from the pre- to post-reform. Figure B.1 presents the empirical evidence, showing no significant jump at the cutoff. The number of observations near the cutoff remains constant between the pre- and post-treatment periods. Consequently, we have no reason to suspect that parties can manipulate their vote shares or that their ability to do so changes following the reform.

Additionally, in our specific context, it is crucial to assess whether the reform influenced local election outcomes, considering that voters may associate the actions of central agents with local political parties. Although the reform was implemented in 2014, the law was passed on September 3, 2013, just before the 2013 local elections held on September 29. While the default change was not politically motivated and aimed to standardize the procedure for municipal taxes, there is a possibility that the right-leaning coalition in power at the time could have suffered locally if the measure turned out to be unpopular. To investigate this potential effect, we examine whether alignment with the central government correlates with margins of victory at the local level. Our analysis reveals no correlation for any of the elections in our sample period.<sup>20</sup>

## 3.2 Data

Our units of observation are the 278 Portuguese municipalities during twelve years from 2008 to 2019.<sup>21</sup> This timeframe encompasses four electoral terms: the final two years of the 2006-2009 term, the 2010-2013 and 2014-2017 terms, and the initial two years of the 2018-2021 term. To examine the political landscape during this period, we collected information on the municipal elections held in 2005, 2009, 2013, and 2017 from the official website of the National Electoral Commission (*Comissão Nacional de Eleições*)<sup>22</sup>. These electoral data provide details at the list level for each municipality, including the number of votes and seats obtained by each list. We utilized this information to create various political variables.

One key variable we constructed is the running variable  $Margin_{ie}$ , which measures the margin of victory for right-leaning parties in municipality  $i$  during electoral term  $e$ . To calculate this margin, we used the municipal council election data to determine the

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<sup>20</sup>Correlations available from the authors upon request.

<sup>21</sup>For summary statistics on the variables used in the analysis, see Table A.1.

<sup>22</sup>[www.cne.pt](http://www.cne.pt)

difference in votes between the winning party and the runner-up, reflecting the margin of victory. If the election winner is not a right-leaning party, we multiplied this variable by  $-1$ .<sup>23</sup> For this purpose, we construct the treatment dummy  $Right_{ie}$  to indicate whether the mayor is right-leaning in the municipality  $i$  in term  $e$ . Treatment assignment depends on the value of the running variable as follows:  $Right_{ie} = 1[Margin_{ie} > 0]$ .

Data on our primary dependent variable, the municipal income tax rate, comes from the website of the Tax and Customs Authority (*Autoridade Tributária e Aduaneira*)<sup>24</sup>. We collect the municipal income tax rate charged in each year  $t$  by municipality  $i$ . Whenever necessary, we supplemented any missing data by referencing the State Budget Laws for the years 2007-2018, which are available online on the website of the Directorate-General for Budget (*Direcção Geral do Orçamento*)<sup>25</sup>. The tax rate variable is continuous and ranges from zero to five.

To evaluate the financial implications of changes in tax rates, we obtained data on municipal tax revenues. Data are available for the whole sample period from official online sources. Namely, we collect the data from the Directorate-General for Local Authority's website (*Direcção Geral das Autarquias Locais*)<sup>26</sup>. We adjust the variables to reflect 2015 prices for meaningful comparisons across time. This adjustment involved deflating the data using the national consumer price index obtained from the World Economic Outlook Database of the International Monetary Fund. Additionally, we express the variables in per capita terms by dividing them by the population size of each municipality, data provided by the Portuguese National Statistics Institute (INE). This per capita measurement allows us to account for differences in population when analyzing the impact of tax rate changes. Furthermore, we apply a logarithmic transformation to the variables to address potential skewness or nonlinearity.

In addition to the municipal income tax, we considered the property tax and business tax as placebo outcome variables. Both of these taxes are municipal tax instruments, and the corresponding data were sourced from the Tax and Customs Authority website. The property tax varies between 0.2 and 0.5 percent, while the business tax ranges from zero to 1.5 percent. Throughout the sample period, the default tax rates for both the property and business tax have consistently been set at the lower bounds of their respective tax intervals.

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<sup>23</sup>We exclude municipality-year observations in which independent lists of organized, registered voters emerge victorious in the elections. Throughout the sample period, 23 municipalities elect an independent list, and we cannot definitively assign a political ideology to these observations. In robustness tests, we confirm that including municipality-year observations where an independent list emerges victorious in our analysis does not affect the results, regardless of whether we assume these to be left- or right-leaning. See columns (5) and (6) of Table C.1.

<sup>24</sup>[www.portaldasfinancas.gov.pt](http://www.portaldasfinancas.gov.pt)

<sup>25</sup>[www.dgo.gov.pt](http://www.dgo.gov.pt)

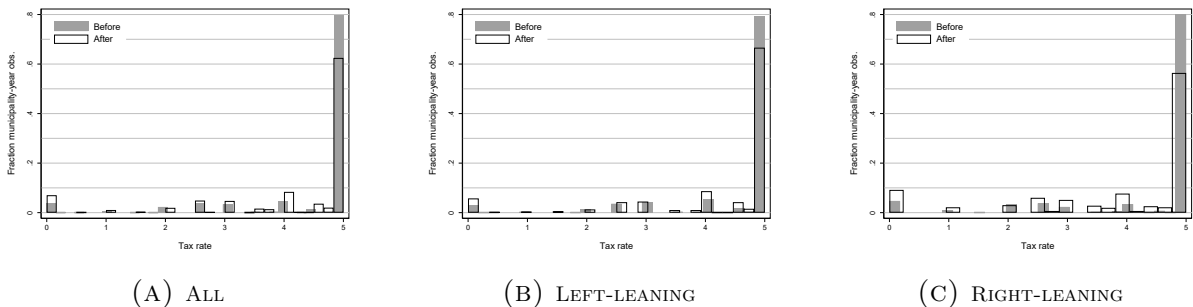
<sup>26</sup>[www.portalautarquico.dgal.gov.pt](http://www.portalautarquico.dgal.gov.pt)

## 4 Descriptive evidence

Figure 1 presents histograms illustrating the distribution of the municipal income tax rate before and after the default change for (A) all municipalities and separately for (B) left- and (C) right-leaning municipalities. The histograms show bunching at the 5% tax rate pre- and post-reform. Pre-reform, 80% of the municipality-year observations for both left- and right-leaning municipalities were at the maximum default tax rate of 5%. Post-reform, bunching decreases, especially for right-leaning municipalities. Nevertheless, the proportion of municipality-year observations at the 5% tax rate remains at just below 60% for right-leaning municipalities and just below 70% for left-leaning municipalities. The remaining observations are spread across the entire range of possible tax rates.

Although there is a higher share of observations at the 0% tax rate post-reform, it is not comparable to the bunching we observe at the maximum tax rate throughout the entire timeframe. These histograms thus dismiss a classical default effect characterized by a consistent bunching at the default (Madrian and Shea, 2001; Johnson and Goldstein, 2003). Such a pattern is evident only in the pre-reform period. The persistent bunching at 5% post-reform may be attributed to factors such as stickiness in decision-making or a preference for larger budgets, perhaps stemming from a strict interpretation of the law that entitles municipalities to this income.

FIGURE 1. MUNICIPAL INCOME TAX RATES



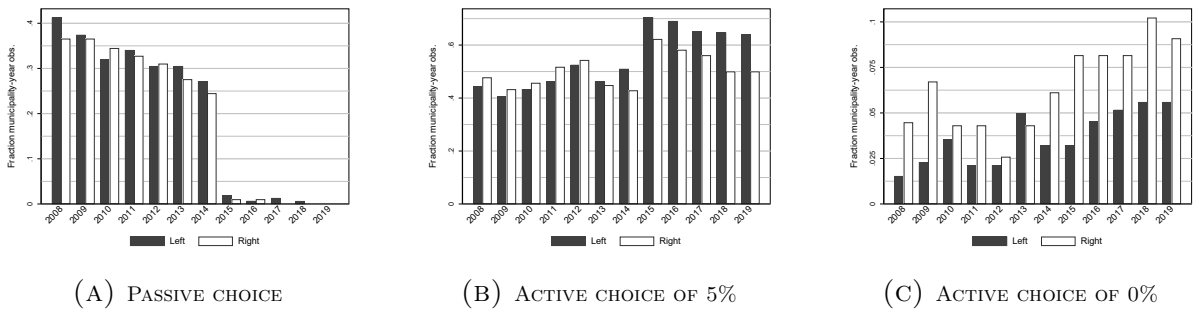
Notes: Histograms depicting the distribution of municipal income tax rates before and after the default change.

Figure 2 illustrates the decision-making process behind the histograms above. Figure 2 (A) displays the fraction of municipality-year observations where municipalities passively choose the default tax rate. The fraction of passive choices gradually declines pre-reform to around 25% in 2014 for both left- and right-leaning municipalities. Passive choices then practically disappear from 2015 onwards. Between 2008 and 2014, a passive choice results in an effective tax rate of 5%, while from 2015 onwards, a passive choice translates into completely forgoing municipal income tax revenue.

Figures 2 (B) and (C) show the share of observations involving active choices of the maximum and minimum tax rates, respectively. Pre-reform, the proportion of left- and

right-leaning municipalities actively selecting the maximum rate is similar. However, post-reform, left-leaning municipalities choose 5% at a higher rate than right-leaning municipalities. This pattern emerges as early as 2014, indicating that a change in perceptions may have been triggered even before the implementation of the reform.<sup>27</sup> Conversely, the share of right-leaning municipalities opting for the minimum tax rate consistently exceeds that of their left-leaning counterparts, and this disparity increases after the reform. The only exception is observed in 2013, an election year, where the proportion of left-leaning municipalities selecting the 0% rate surpasses that of right-leaning municipalities. This observation suggests a potential strategic use of this tax instrument surrounding electoral periods.

FIGURE 2. ACTIVE AND PASSIVE TAX-SETTING DECISIONS



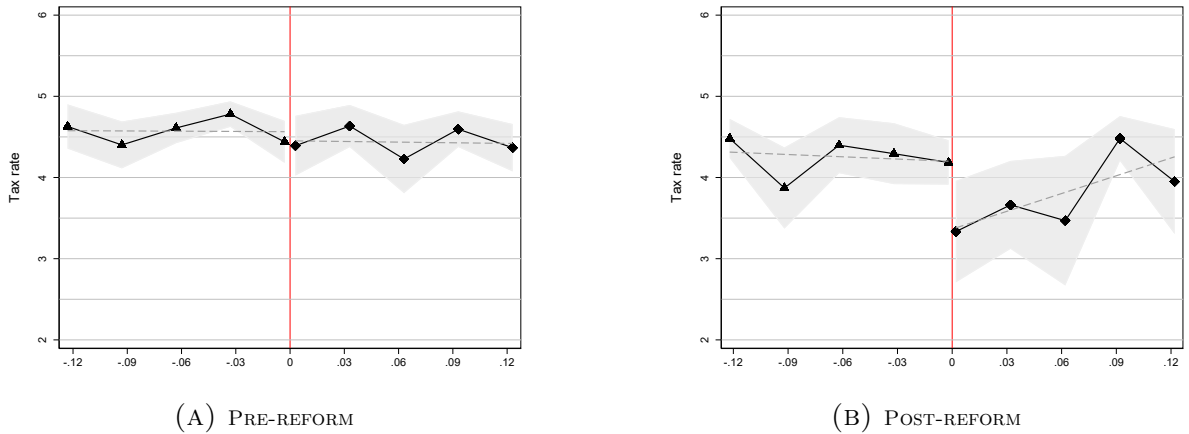
Notes: Bars indicate the fraction of left- and right-leaning municipality-year observations making specific tax-setting decisions over time.

As hypothesized, the graphs indicate differential responses to the default reform between left- and right-leaning municipalities. We expect that electoral competition influences the reaction of local governments to the default reform. Therefore, we examine RD-type graphs that compare municipalities with close elections pre- and post-reform. Figure 3 provides plots showcasing the average municipal income tax rate within 2.5 percentage-points-wide bins of the running variable (the margin of victory), within a bandwidth of 12 percentage points centered around the cutoff. To aid visualization, we fit a linear regression on each side of the cutoff. Figure 3 (A) displays the relationship between the tax rate and the running variable for the pre-reform years from 2008 to 2014, while Figure 3 (B) shows the same relationship for the post-reform years from 2015 to 2019. On the left-hand side of the cutoff, we observe the average tax rate in left-leaning municipalities. On the right-hand side, we observe the average tax rate in right-leaning municipalities.

Unlike pre-reform, post-reform tax rates exhibit a discontinuous jump at the cutoff. On average, right-leaning parties that narrowly win an election choose tax rates

<sup>27</sup>Tax rates for 2014 were determined at the end of 2013, while the law came into effect in 2014 for the tax rate choices pertaining to 2015. See Figure C.2 for annual estimates of the local treatment effect. The 2014 coefficient estimate for right-leaning municipalities is negative but fails to reach conventional levels of statistical significance.

FIGURE 3. AVERAGE MUNICIPAL INCOME TAX PRE- AND POST-REFORM



Notes: RD-type graphs. Continuous lines link local averages of the outcome variable (y-axis) within 2.5 percentage-point-wide bins of the running variable (margin of victory, x-axis). Dotted lines are linear fits. 95% confidence intervals in gray.

approximately one percentage point lower than their left-leaning counterparts. Figure 3 (B) further demonstrates that left-leaning municipalities maintain, on average, relatively constant tax rates, whereas right-leaning municipalities choose higher tax rates as the margin of victory increases away from the cutoff. Right-leaning municipalities opt for lower tax rates only when their victory is marginal. This observation supports our hypothesis and justifies our chosen methodology, which focuses on close elections.

Although the descriptive evidence provides valuable insights into the impact of the default reform, it does not establish a causal relationship. In the next section, we move beyond these broad observations to causally identify the impact of the default reform and ideological leanings on municipal income taxation.<sup>28</sup>

## 5 Empirical evidence

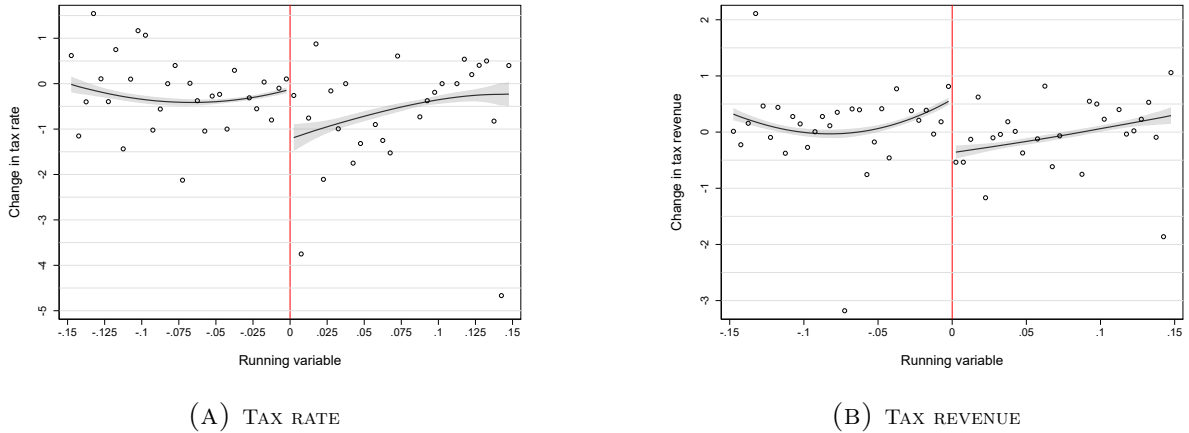
We begin with a graphical analysis of the results in Figure 4 (A). Each dot in the graph depicts the average change in the municipal income tax rate from pre- to post-reform within 0.005 percentage-point bins of the running variable (the margin of victory). For visualization, we fit a quadratic polynomial on each side of the cutoff.<sup>29</sup> The graph clearly displays a discontinuity at the cutoff. On the left-hand side of the cutoff, the

<sup>28</sup>Tables A.3 and A.4 present the average differences we exploit in our quasi-experimental analysis. Table A.3 indicates the average difference in municipal income taxation pre- and post-reform for (A) right- and (B) left-leaning municipalities. Table A.4 calculates the average difference between right- and left-leaning municipalities (A) before and (B) after the reform. Consistent with our hypothesis, the tables reveal that on average all municipalities experience a decrease in municipal income tax rates post-reform. Moreover, reflecting their ideological preferences regarding taxation, the decrease in tax rates for right-leaning municipalities is almost double that of left-leaning municipalities. These differences between right- and left-leaning municipalities only emerge after the default reform.

<sup>29</sup>See Figure B.2 (A) for a linear fit.

quadratic fit ranges between -0.5 and zero, indicating that left-leaning municipalities with a narrow margin of victory either maintain their pre-reform tax rates or make only marginal reductions. On the right-hand side, the fit hovers just below -1 percentage point at the cutoff and gradually approaches zero as the bandwidth widens. The non-overlapping gray confidence intervals indicate that the difference in tax rates between left- and right-leaning municipalities is statistically significant.

FIGURE 4. IMPACT OF DEFAULT REFORM ON MUNICIPAL INCOME TAXATION



Notes: Diff-in-disc graphs. Dots represent the local average change in the outcome variable (y-axis) within 0.005 percentage-point-wide bins of the running variable (margin of victory, x-axis). Continuous lines are a quadratic fit. Robust standard errors clustered at the elected government level. 95% confidence intervals in gray.

Thus, right-leaning municipalities charge significantly lower tax rates after the reform compared to both left-leaning municipalities and their own pre-reform tax rates. Specifically, right-leaning municipalities with a narrow margin of victory decrease their tax rates by approximately one percentage point post-reform. Panel A in Table 2 presents various specifications that provide coefficient estimates consistent with the graphical analysis. Each column corresponds to a separate regression, with column (1) presenting the main specification relying on a linear polynomial of the running variable and the CCT bandwidth (Calonico et al., 2014, 2019). The estimate in column (2) tests the robustness of the results to halving the optimally calculated bandwidth, while column (3) utilizes a quadratic polynomial of the running variable. Columns (4), (5), and (6) replicate the first three columns but employ the IK optimal bandwidth selection method instead (Imbens and Kalyanaraman, 2012). In the last column (7), the treatment effect is estimated using a quadratic polynomial of the running variable and the full sample.

Coefficient estimates range from -0.99 to -1.29 percentage points. The level of statistical significance is high, except for columns (2) and (5), where we halve the optimally calculated CCT and IK bandwidths. Ours is a very data-intensive empirical approach, and halving the optimal bandwidths leaves us with a limited number of observations around the cutoff making it challenging to estimate a precise local treatment effect.

While we benefit from using a sample restricted to a narrow bandwidth around the cut-off where political competition is high, the bandwidth must be wide enough to include sufficient observations to estimate the treatment effect precisely. In Figure C.3, we perform a bandwidth sensitivity analysis.<sup>30</sup> We test bandwidths from 0.025 through 0.5 in 0.025 intervals to calculate the diff-in-disc estimates in Figure C.3 (A).<sup>31</sup> The narrow bandwidth of 0.025 provides an imprecisely estimated coefficient with a magnitude close to -0.75 percentage point but a large confidence interval. Coefficient estimates between bandwidths 0.05 and 0.15 are comparable in magnitude and significance to those obtained in our baseline specifications. The larger the bandwidth, the smaller and less significant the coefficient estimates, supporting our focus on close elections.

Considering that the average municipal income tax rate is approximately 4.4% (Table A.1), a one percentage point decrease in the average tax rate post-reform places the municipal income tax rate at 3.4% for right-leaning municipalities. This change represents a reduction of over 20% in the municipal income tax rate charged by right-leaning municipalities due to the default reform.

TABLE 2 – IMPACT OF DEFAULT REFORM ON MUNICIPAL INCOME TAXATION

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Panel A: Tax rate</i>							
Right x Reform	-1.185*** (0.372)	-0.999* (0.582)	-1.285*** (0.411)	-1.143*** (0.395)	-1.036* (0.613)	-1.187** (0.483)	-0.990*** (0.303)
Observations	1106	586	2058	1602	822	2068	3068
Bandwidth	0.141	0.070	0.268	0.204	0.102	0.271	1
Polynomial	1	1	2	1	1	2	2
Method	CCT	1/2 CCT	CCT	IK	1/2 IK	IK	
<i>Panel B: Tax revenue</i>							
Right x Reform	-1.094*** (0.295)	-1.200*** (0.416)	-1.159*** (0.318)	-1.076*** (0.313)	-1.217*** (0.440)	-1.177*** (0.344)	-0.811*** (0.227)
Observations	1066	546	2000	1320	656	1910	3068
Bandwidth	0.133	0.066	0.260	0.163	0.081	0.245	1
Polynomial	1	1	2	1	1	2	2
Method	CCT	1/2 CCT	CCT	IK	1/2 IK	IK	

Notes: Diff-in-disc estimates on the impact of the default reform on municipal income taxation. Each column reports the results from a separate local polynomial regression. Separate polynomials are fitted on each side of the cutoff. The polynomial order and the optimal bandwidth selection procedure for each specification are indicated. Robust standard errors are in parentheses. Stars indicate significance levels based on robust p-values. \*p < 0.1, \*\*p < 0.05, \*\*\*p < 0.01.

<sup>30</sup>To construct the plots, we rely on the OLS estimation of the multiple linear regression model in Equation (1).

<sup>31</sup>We perform the same bandwidth sensitivity analysis to calculate the disaggregated RD estimates before and after the reform in figures C.3 (B) and (C).



To ensure that right-leaning municipalities that narrowly won the election did not benefit from an economic upturn coinciding with the default reform, allowing them to maintain income tax revenue while reducing tax rates, we examine whether municipal income tax revenue decreases in right-leaning municipalities close to the cutoff. Figure 4 (B) illustrates that the decrease in the tax rate led to a significant reduction in municipal income tax revenue for right-leaning municipalities. While income does seem to increase post-reform (as evidenced by positive and statistically significant revenue for left-leaning municipalities at the cutoff where the tax rate remains unchanged), right-leaning municipalities experience a 40% reduction in municipal income tax revenue. Furthermore, right-leaning municipalities that barely win the election collect around 90% lower income tax revenue than the counterfactual scenario of a left-leaning victory. These magnitudes derive from a 50% increase in income tax revenue for left-leaning municipalities and a 40% decrease in income tax revenue for right-leaning municipalities at the cutoff.

The formal estimates in Panel B of Table 2 are negative, significant, and consistent with the graphical analysis. Each estimate corresponds to a different regression, with the specifications matching those used for the tax rate.<sup>32</sup> The results confirm that despite the apparent rise in income, right-leaning municipalities decrease the income tax rate to an extent that significantly reduces their revenue after the default change. The magnitude of the effect is large and, in all likelihood, driven not only by the fact that we have a positive change for left-leaning and negative change for right-leaning municipalities but also by a small set of municipalities that changed the municipal income tax rate to zero. If we exclude these municipalities from the analysis, we obtain a highly significant local treatment effect of -0.479.<sup>33</sup>

Figure 5 displays the RD graphs for both outcome variables, allowing us to examine the discontinuities in the variables before and after the reform separately. Dots represent the average municipal income tax rate or revenue within 0.005 percentage-point-wide bins of the running variable. To aid visualization, we fit quadratic polynomials on each side of the cutoff.<sup>34</sup> Figure 5 (A) illustrates the tax-setting behavior of left- and right-leaning municipalities before the reform, revealing no discontinuity at the zero cutoff. However, Figure 5 (B) shows a discontinuity at the zero cutoff in the post-reform period. Similarly, Figure 5 (C) shows no pre-reform discontinuity at the zero cutoff for municipal income tax revenue, whereas Figure 5 (D) presents a significant post-reform discontinuity. Analyzing these before and after discontinuities allows us to conclude that political ideology influences municipal income taxation only after the default change.

Table 3 presents the formal estimates of these four discontinuities. Each column corresponds to a separate RD regression, relying on the pre-reform years in columns (1)

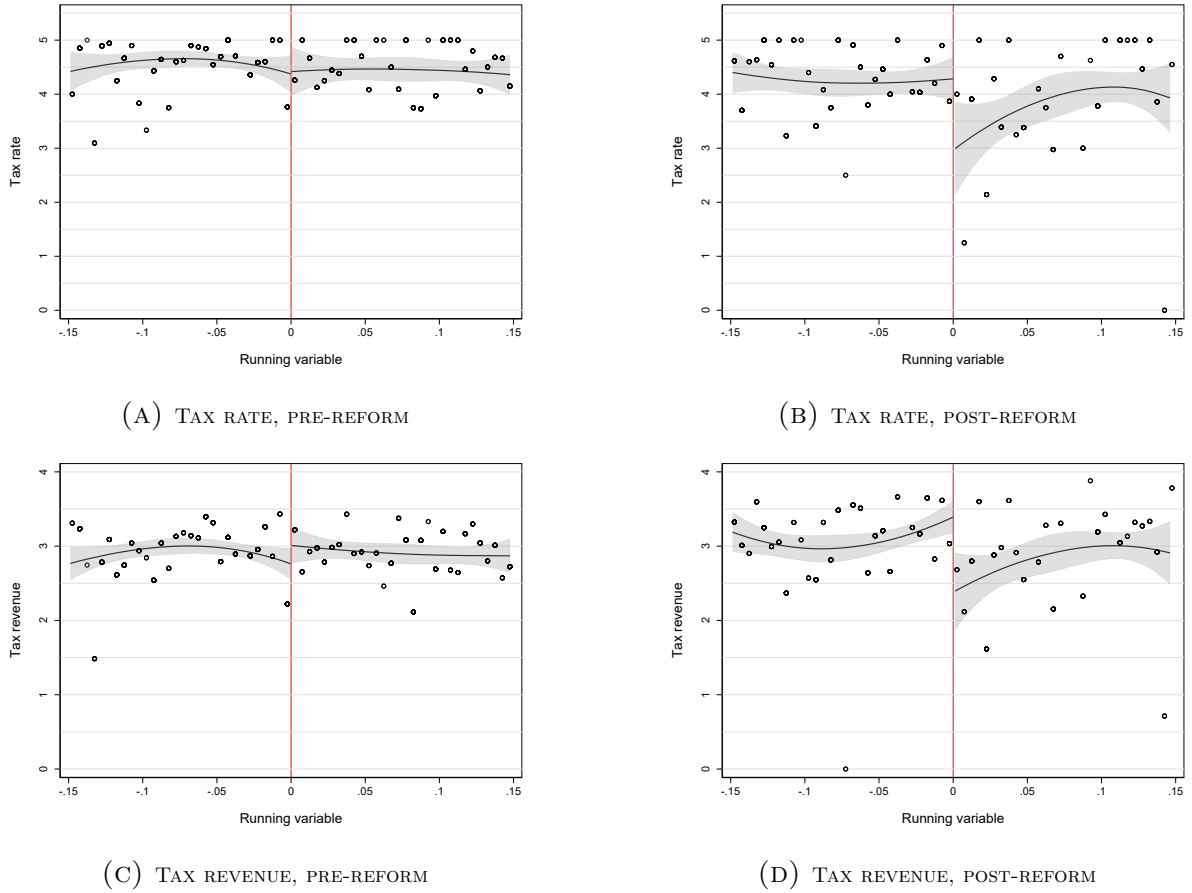
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<sup>32</sup>Figure C.4 provides the bandwidth sensitivity analysis for income tax revenue.

<sup>33</sup>Regression result details available upon request.

<sup>34</sup>For a linear fit, see Figure B.3.

FIGURE 5. IMPACT OF IDEOLOGY ON MUNICIPAL INCOME TAXATION



Notes: RD graphs. Dots represent local averages of the outcome variable (y-axis) within 0.005 percentage-point-wide bins of the running variable (margin of victory, x-axis). Continuous lines are a quadratic fit. Robust standard errors clustered at the elected government level. 95% confidence intervals in gray.

and (3), and the post-reform years in columns (2) and (4).<sup>35</sup> The RD coefficient estimates for the pre-reform period do not reach conventional levels of statistical significance for both outcome variables. However, the RD coefficient estimates become negative and highly significant in the post-reform period. These findings align with the baseline results from the diff-in-disc framework, indicating that right-leaning local governments charge approximately one percentage point lower tax rates than their left-leaning counterparts and experience a reduction of nearly 100% in revenue. These results also confirm that the disparity in local income taxation between right- and left-leaning local governments only exists after the reform, suggesting that the importance of ideological preferences increased post-reform.

We rely on two types of placebos to test our estimates. First, we use the classic placebo reform to ascertain that the timing of the reform coincides with the estimated treatment effects. Our pre-reform RD estimates show that right- and left-leaning municipalities' tax-setting behavior and revenue are similar before the default change. With the placebo

<sup>35</sup>See Table C.3 for results with clustered standard errors.

TABLE 3 – IMPACT OF IDEOLOGY ON MUNICIPAL INCOME TAXATION

	Tax rate		Tax revenue	
	2008–14	2015–19	2008–15	2016–19
	(1)	(2)	(3)	(4)
Right x Reform	0.011 (0.221)	-1.181*** (0.298)	0.034 (0.092)	-0.998*** (0.274)
Observations	715	456	1128	332
Bandwidth	0.147	0.145	0.210	0.138

Notes: RD estimates on the impact of ideology on municipal income taxation. Each column reports the results from a separate local polynomial regression. Separate polynomials are fitted on each side of the cutoff. The polynomial order is 1, and the optimal bandwidths are derived under the CCT (MSERD) procedure. Robust standard errors in parentheses. Stars indicate significance levels based on robust p-values. \*p < 0.1, \*\*p < 0.05, \*\*\*p < 0.01.

test, we also restrict the sample to pre-reform but introduce a placebo reform in 2011, dividing our timeline into a pre-reform period between 2008 and 2010 and a placebo post-reform from 2011 through 2013 and perform a diff-in-disc analysis. Second, to understand whether the decrease in municipal income taxation is a consequence of the reform or a broader trend of lowering municipal taxes, we use the other taxes available to the municipality and respective revenue as placebo outcome variables. The property tax is more politicized and more financially relevant for municipalities than the income tax.<sup>36</sup> The business tax, in turn, is more ideologically charged.

We collect our placebo tests in Table C.5. Each column corresponds to a different diff-in-disc placebo test. Columns (1) and (2) provide the classic placebos for the municipal income tax rate and revenue. Both coefficient estimates fail to reach conventional levels of statistical significance, reinforcing the internal validity of our findings. Columns (3) and (4) report the coefficient estimates for the property and municipal business tax rates. Tax-setting did not change from pre- to post-reform for these two other municipal taxes.<sup>37</sup> Columns (5) and (6) provide the corresponding diff-in-disc estimates for the revenue from these alternative taxes. Likewise, coefficient estimates are insignificant. The effect we identify for municipal income taxation is thus not part of a broader trend of lowering municipal taxes but rather a targeted effect resulting from the default change.

The observation that right-leaning municipalities with close elections lowered the income tax rate but left the two other tax rates unchanged could be interpreted as evidence that politicians do not bracket the respective choices together (Read et al., 1999). In contrast, from the perspective of traditional public finance, a change in the marginal effect of one tax usually should be accompanied by a marginal reaction of the other taxes.

<sup>36</sup>According to the latest statistics from EUROSTAT, home ownership in Portugal stands at approximately 80%. The percentage of families paying income tax, in turn, is just over 45%, according to the Portuguese Tax Authority.

<sup>37</sup>This does not mean, however, that tax rates are similar between left- and right-leaning municipalities; rather, it suggests that the pattern has not changed from pre- to post-reform.

Finally, we assess whether total tax revenue changes from pre- to post-reform between right- and left-leaning municipalities. The coefficient estimate in column (7) fails to reach conventional levels of statistical significance, suggesting no clear change in total revenue. Municipal income tax revenue is but a small part of total tax revenue, which mostly consists of revenue from the property tax (see Panel B of Table A.1).<sup>38</sup> Moreover, most municipalities, including right-leaning, still charge rates close to or at the maximum post-reform.

## 6 Discussion and Conclusion

Altogether, our results suggest that the default change led to significantly lower income tax rates and revenue in right-leaning municipalities with intense electoral competition (as compared to left-leaning municipalities with intense electoral competition). Thus, after the default change, more money sticks with the taxpayers in these municipalities. We do not observe this difference between left- and right-leaning municipalities before the default change.

The response of right-leaning municipalities may seem peculiar from a neoclassical perspective, according to which the default change should not affect the decision problem of local politicians. However, our findings fit well with a behavioral economics perspective. They suggest that policy choices made by elected politicians are influenced by framing effects: changing the default tax rate appears to have altered the perceptions of politicians and/or citizens in a way that heightened politicians' accountability which, in municipalities with intense political competition, led to a stronger emphasis on citizens' preferences. As a consequence, in municipalities with close elections, politicians implemented tax rates that aligned with traditional (ideology-based) preferences regarding tax policies.

Interestingly, income tax rates in right-leaning municipalities with less intense electoral competition are higher and on a level comparable with tax rates in left-leaning municipalities. This indicates that politicians' decisions can be driven by different, competing motives. Besley and Burgess (2002) and Besley and Case (2003), for example, show that intense political competition makes politicians more responsive to voters' preferences. This incentive is weaker for governments that enjoy an electoral advantage. Instead, they enjoy leeway to pursue other goals. For instance, politicians from all political camps might enjoy having larger public budgets at their disposal. This could be the case, because large budgets are a result of or allow engaging more strongly in rent-seeking or because money can be used as a substitute for effort in solving policy problems.

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<sup>38</sup>Figure C.5 shows the diff-in-disc graphs for municipal tax revenues corresponding to columns (5), (6), and (7) of Table C.5; the similarity between the property tax and total tax revenue is evident.

Consequently, when there is less electoral competition, even right-leaning politicians may exhibit a tendency to charge comparatively higher tax rates.

A noteworthy interpretation of our results relates to the argument put forth by Hines and Thaler (1995) that behavioral phenomena such as mental accounting can be responsible for flypaper effects in public finance. Our findings are consistent with the following assumption regarding the 5% share of the income tax revenue collected yearly by the central government which is allocated in the following year to taxpayers and municipalities according to the chosen withholding rate: the 5% share was perceived as an additional vertical transfer before the default change but as additional income that can be taxed afterward. The comparison of allocations in these two scenarios is at the heart of the flypaper effect in public finance.

Our results align well with predictions based on the flypaper effect: (i) more money sticks with the taxpayers in the scenario framed as taxation as compared to the scenario framed as grants and (ii) in line with traditional ideology-based preferences regarding taxation, this effect is stronger in right-leaning municipalities. The latter implication is often overlooked in the analysis of flypaper effects because the theoretical analysis usually is based on one stylized jurisdiction with a representative taxpayer disregarding heterogeneity of preferences within and across jurisdictions. Apart from recent experimental evidence by Becker et al. (2020) and Alekseev et al. (2021) there has been little empirical work that seeks to test the argument by Hines and Thaler (1995). Our paper helps fill this gap by providing quasi-experimental results based on real-world data which are consistent with their argument.

Considered through the lens of behavioral economics, one could argue that changing the default accomplished what the national legislature intended to achieve when the municipalities' participation in income tax revenue was introduced: to increase political ownership of local budgets and make local politicians more accountable and responsive to citizens' preferences. In line with the recent literature on behavioral public economics and behavioral public finance, our findings thus stress the importance of paying close attention to seemingly insignificant institutional details when it comes to designing policy environments. Otherwise, the goals of institutional reforms can be missed.

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# Appendix

## A Summary statistics

TABLE A.1 – SUMMARY STATISTICS

Variable	Count	Mean	SD	Min	Max
<i>Panel A: Political variables</i>					
Socialist party	3068	0.458	0.498	0.000	1.000
Social Democrats	3068	0.415	0.493	0.000	1.000
Communist-Greens	3068	0.116	0.320	0.000	1.000
Christian Democrats	3068	0.008	0.088	0.000	1.000
Right-leaning	3068	0.424	0.494	0.000	1.000
Left-leaning	3068	0.576	0.494	0.000	1.000
Aligned	3068	0.913	0.282	0.000	1.000
Margin of victory	3068	-0.028	0.261	-0.655	0.758
<i>Panel B: Socio-economic variables</i>					
Income tax rate	3068	4.360	1.316	0.000	5.000
Property tax rate	3068	0.352	0.062	0.200	0.500
Business tax rate	3068	0.878	0.689	0.000	1.500
Income tax revenue	3068	23.729	14.546	0.000	138.602
Property tax revenue	3068	103.121	70.908	7.968	745.317
Business tax revenue	3068	12.398	26.374	0.000	728.516
Transfers	3068	455.573	348.416	11.127	2701.155
Population	3068	34.753	55.965	1.634	550.934

Notes: This table presents summary statistics on municipal (A) political and (B) socio-economic variables. Tax revenue and transfers are deflated to 2015 prices and measured per capita. Population is measured in thousands.

TABLE A.2 – MUNICIPAL TAXATION BY PARTY

Variable	Count	Mean	SD	Min	Max
<i>Panel A: Christian Democrats</i>					
Income tax rate	24	2.135	1.902	0.000	4.500
Property tax rate	24	0.324	0.026	0.300	0.400
Business tax rate	24	0.723	0.635	0.000	1.500
Income tax revenue	24	13.899	11.605	0.000	28.101
Property tax revenue	24	89.728	22.967	52.301	112.481
Business tax revenue	24	14.530	12.745	0.000	29.114
<i>Panel B: Social Democrats</i>					
Income tax rate	1274	4.297	1.395	0.000	5.000
Property tax rate	1274	0.348	0.061	0.200	0.500
Business tax rate	1274	0.787	0.704	0.000	1.500
Income tax revenue	1274	22.755	15.252	0.000	138.602
Property tax revenue	1274	104.626	77.280	20.750	745.317
Business tax revenue	1274	9.871	15.062	0.000	226.618
<i>Panel C: Socialist Party</i>					
Income tax rate	1406	4.320	1.317	0.000	5.000
Property tax rate	1406	0.354	0.061	0.200	0.500
Business tax rate	1406	0.875	0.686	0.000	1.500
Income tax revenue	1406	22.739	13.593	0.000	129.840
Property tax revenue	1406	102.396	69.202	7.968	514.912
Business tax revenue	1406	12.344	22.000	0.000	310.628
<i>Panel D: Communist-Greens</i>					
Income tax rate	356	4.886	0.502	0.000	5.000
Property tax rate	356	0.353	0.060	0.200	0.500
Business tax rate	356	1.216	0.533	0.000	1.500
Income tax revenue	356	31.796	13.222	0.122	69.477
Property tax revenue	356	102.446	54.426	22.310	300.916
Business tax revenue	356	21.339	56.208	0.000	728.516

Notes: This table presents summary statistics on local taxation per party. Tax revenue is deflated to 2015 prices and measured per capita.

TABLE A.3 – MUNICIPAL INCOME TAXATION: PRE- VS. POST-REFORM

	Full sample				−.15 < Margin of victory < .15			
	After	Before	Diff.	Std. E.	After	Before	Diff.	Std. E.
<i>Panel A: Right-leaning municipalities</i>								
Tax rate	3.935	4.442	-0.507***	0.082	3.782	4.435	-0.653***	0.142
Tax revenue	23.058	22.404	0.654	0.934	21.832	22.424	-0.593	1.558
<i>Panel B: Left-leaning municipalities</i>								
Tax rate	4.298	4.546	-0.248***	0.058	4.259	4.570	-0.311***	0.094
Tax revenue	27.162	23.123	4.039***	0.687	27.062	22.739	4.323***	1.242

Notes: This table presents the difference in municipal income taxation between pre- and post-reform for right- and left-leaning municipalities separately. Tax revenue is deflated to 2015 prices and measured per capita.

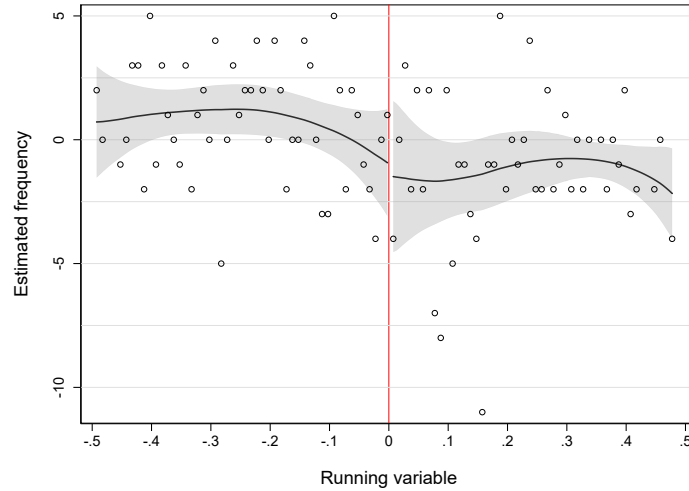
TABLE A.4 – MUNICIPAL INCOME TAXATION: RIGHT VS. LEFT

	Full sample				−.15 < Margin of victory < .15			
	Right	Left	Diff.	Std. E.	Right	Left	Diff.	Std. E.
<i>Panel A: Pre-reform</i>								
Tax rate	4.442	4.546	-0.104*	0.056	4.435	4.570	-0.136	0.091
Tax revenue	22.404	23.123	-0.719	0.639	22.424	22.739	-0.315	1.090
<i>Panel B: Post-reform</i>								
Tax rate	3.935	4.298	-0.363***	0.084	3.782	4.259	-0.477***	0.146
Tax revenue	23.058	27.162	-4.104***	0.943	21.832	27.062	-5.230***	1.670

Notes: This table presents the difference in municipal income taxation between right- and left-leaning municipalities pre- and post-reform separately. Tax revenue is deflated to 2015 prices and measured per capita.

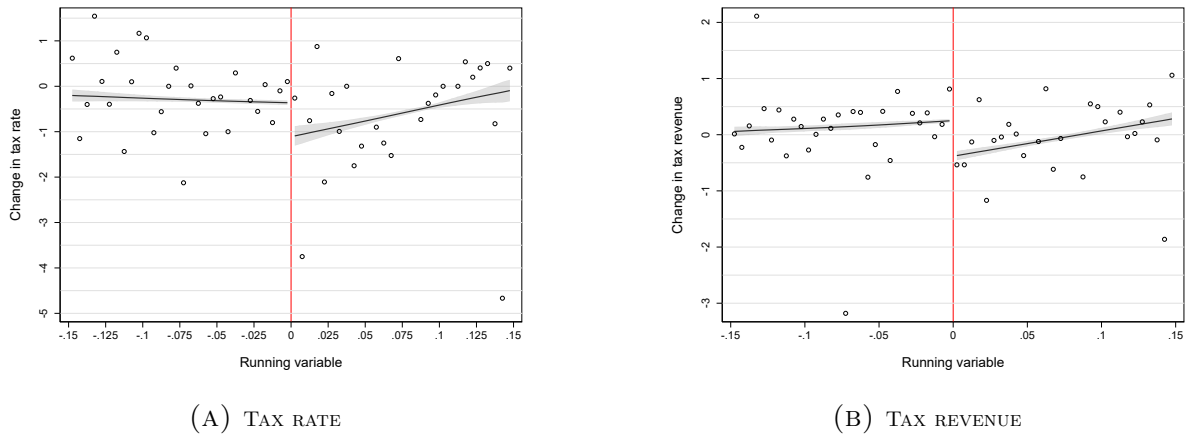
## B Internal validity

FIGURE B.1. MCCRARY-STYLE PLOT.



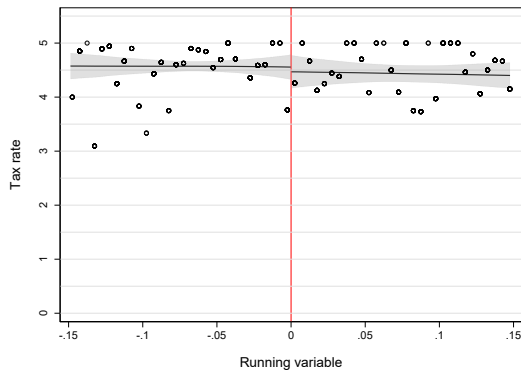
Notes: McCrary-style plot. Graphs the change in the frequency of the running variable (margin of victory) from pre- to post-reform. 95% confidence intervals in gray.

FIGURE B.2. IMPACT OF DEFAULT REFORM ON MUNICIPAL INCOME TAXATION (LINEAR FIT)

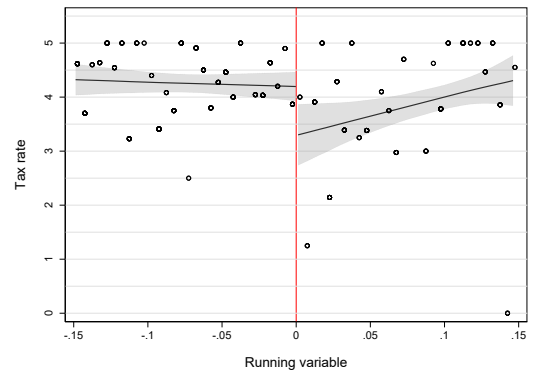


Notes: Diff-in-disc graphs. Dots represent the local average change in the outcome variable (y-axis) within 0.005 percentage-point-wide bins of the running variable (margin of victory, x-axis). Continuous lines are a linear fit. Robust standard errors clustered at the elected government level. 95% confidence intervals in gray.

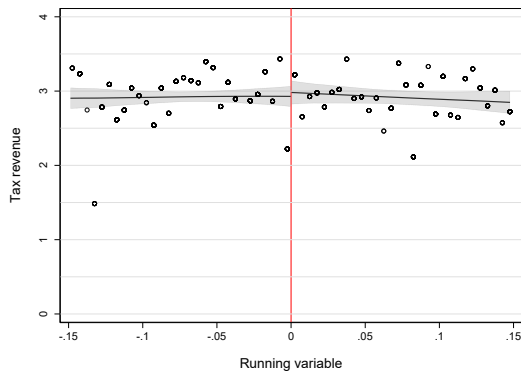
FIGURE B.3. IMPACT OF IDEOLOGY ON MUNICIPAL INCOME TAXATION (LINEAR FIT)



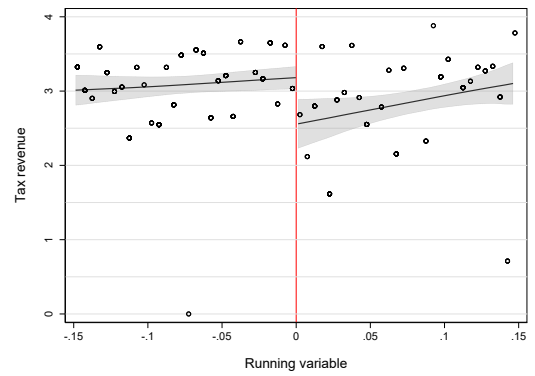
(A) TAX RATE, PRE-REFORM



(B) TAX RATE, POST-REFORM



(C) TAX REVENUE, PRE-REFORM



(D) TAX REVENUE, POST-REFORM

Notes: RD graphs. Dots represent local averages of the outcome variable (y-axis) within 0.005 percentage-point-wide bins of the running variable (margin of victory, x-axis). Continuous lines are a linear fit. Robust standard errors clustered at the elected government level. 95% confidence intervals in gray.

## C Additional tables and figures

TABLE C.1 – ROBUSTNESS TESTS

	Within blocs		Switchers		Independents	
	Adapt	Drop	2010–17	Drop	Right	Left
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Tax rate</i>						
Reform x Right	-0.615**	-1.097***	-1.244***	-1.173**	-0.894***	-0.898***
	(0.307)	(0.399)	(0.365)	(0.588)	(0.343)	(0.344)
Observations	1478	922	744	1026	1440	1432
Bandwidth	0.189	0.149	0.136	0.233	0.160	0.160
<i>Panel B: Tax revenue</i>						
Reform x Right	-0.664**	-0.998***	-0.965***	-0.906**	-1.069***	-1.071***
	(0.257)	(0.304)	(0.299)	(0.374)	(0.288)	(0.294)
Observations	1150	796	948	752	1142	1142
Bandwidth	0.145	0.130	0.177	0.186	0.130	0.129

Notes: Diff-in-disc estimates on the impact of the default reform on municipal income taxation. Each column reports the results from a separate local polynomial regression. Separate polynomials are fitted on each side of the threshold. The polynomial order is 1, and the optimal bandwidths are derived under the CCT (MSERD) procedure. Sample restrictions are indicated in the first two rows. Robust standard errors in parentheses. Stars indicate significance levels based on robust p-values. \*p < 0.1, \*\*p < 0.05, \*\*\*p < 0.01.

TABLE C.2 – CLUSTERED STANDARD ERRORS

	Tax rate			Tax revenue		
	(1)	(2)	(3)	(4)	(5)	(6)
Reform x Right	-0.922**	-0.922*	-0.922*	-0.735***	-0.735**	-0.735**
	(0.378)	(0.488)	(0.535)	(0.255)	(0.318)	(0.309)
Cluster SE	No	M	M x ET	No	M	M x ET
Observations	1120	1120	1120	1066	1066	1066

Notes: Diff-in-disc estimates on the impact of the default reform on municipal income taxation. Each column reports the results from a separate local polynomial regression. The polynomial order is 1, and the bandwidth equal to that derived under the CCT (MSERD) procedure. Robust standard errors in parentheses. Clustering as specified. Stars indicate significance levels based on robust p-values. \*p < 0.1, \*\*p < 0.05, \*\*\*p < 0.01.

TABLE C.3 – IMPACT OF IDEOLOGY ON MUNICIPAL INCOME TAXATION (CLUSTERS)

	Tax rate		Tax revenue	
	2008–14	2015–19	2008–15	2016–19
	(1)	(2)	(3)	(4)
Right x Reform	-0.015	-1.121**	0.128	-0.960***
	(0.384)	(0.568)	(0.243)	(0.347)
Observations	826	595	714	1004
Bandwidth	0.170	0.192	0.128	0.155

Notes: RD estimates on the impact of ideology on municipal income taxation. Each column reports the results from a separate local polynomial regression. Separate polynomials are fitted on each side of the cutoff. The polynomial order is 1, and the optimal bandwidths are derived under the CCT (MSERD) procedure. Robust standard errors clustered at the elected government level in parentheses. Stars indicate significance levels based on robust p-values. \*p < 0.1, \*\*p < 0.05, \*\*\*p < 0.01.

TABLE C.4 – FIXED EFFECTS REGRESSIONS

	Tax rate			Tax revenue		
	(1)	(2)	(3)	(4)	(5)	(6)
	Right x Reform	-1.110***	-0.712***	-0.594***	-1.062***	-0.596***
	(0.367)	(0.214)	(0.209)	(0.290)	(0.185)	(0.182)
Year FE	Yes	No	Yes	Yes	No	Yes
Municipality FE	No	Yes	Yes	No	Yes	Yes
Observations	1112	1108	1120	1058	1066	1060
Bandwidth	0.142	0.142	0.142	0.132	0.133	0.132

Notes: Diff-in-disc estimates on the impact of the default reform on municipal income taxation using fixed effects. Each column reports the results from a separate local polynomial regression. Separate polynomials are fitted on each side of the cutoff. The polynomial order is 1, and the optimal bandwidths are derived under the CCT (MSERD) procedure. Robust standard errors are in parentheses. Stars indicate significance levels based on robust p-values. \*p < 0.1, \*\*p < 0.05, \*\*\*p < 0.01.

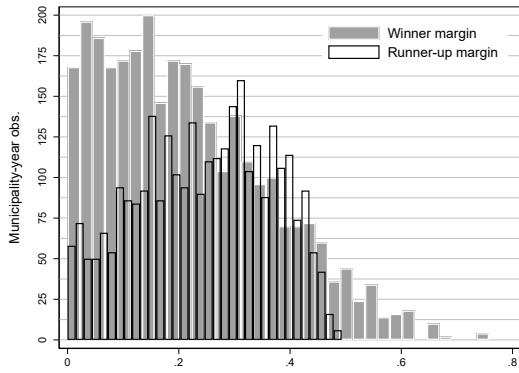
TABLE C.5 – PLACEBO TESTS

	Reform in 2011		Tax rate		Tax revenue		
	Rate	Revenue	Property	Business	Property	Business	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Right x Reform	0.007	0.225	0.005	-0.311	0.006	-0.710	-0.088
	(0.445)	(0.271)	(0.015)	(0.201)	(0.120)	(0.467)	(0.121)
Observations	510	430	1866	1000	1852	1024	1602
Bandwidth	0.167	0.143	0.237	0.126	0.236	0.128	0.204

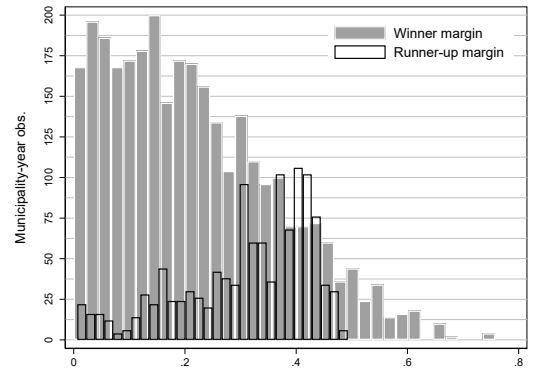
Notes: Diff-in-disc placebo estimates on the impact of the default change on municipal taxation. Each column reports the results from a separate local polynomial regression. Separate polynomials are fitted on each side of the zero-cutoff. The polynomial order is 1, and the optimal bandwidths are derived under the CCT (MSERD) procedure. Sample restricted to pre-reform in columns (1) and (2). Robust standard errors in parentheses. Stars indicate significance levels based on robust p-values. \*p < 0.1, \*\*p < 0.05, \*\*\*p < 0.01.



FIGURE C.1. MARGIN OF VICTORY: WINNER AND RUNNER-UP



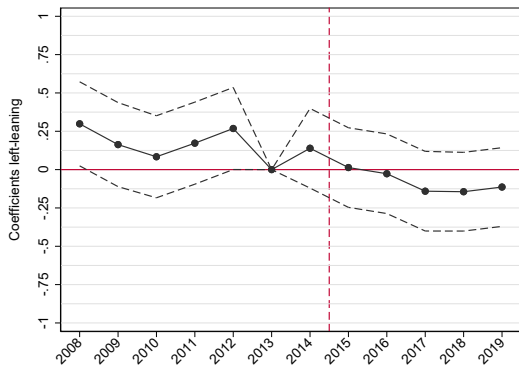
(A) FULL SAMPLE



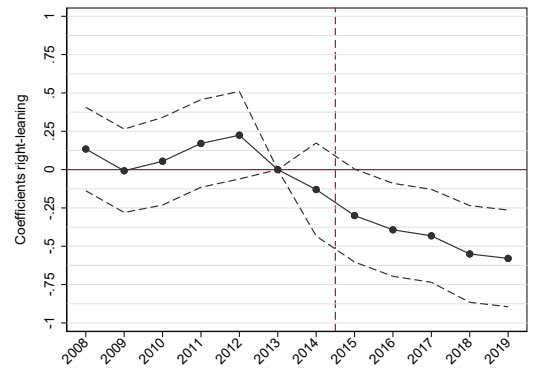
(B) WINNER MARGIN < 0.15

Notes: Histograms depicting the margin of victory of the winner and runner-up.

FIGURE C.2. IMPACT OF DEFAULT REFORM ON THE MUNICIPAL INCOME TAX (BY YEAR)



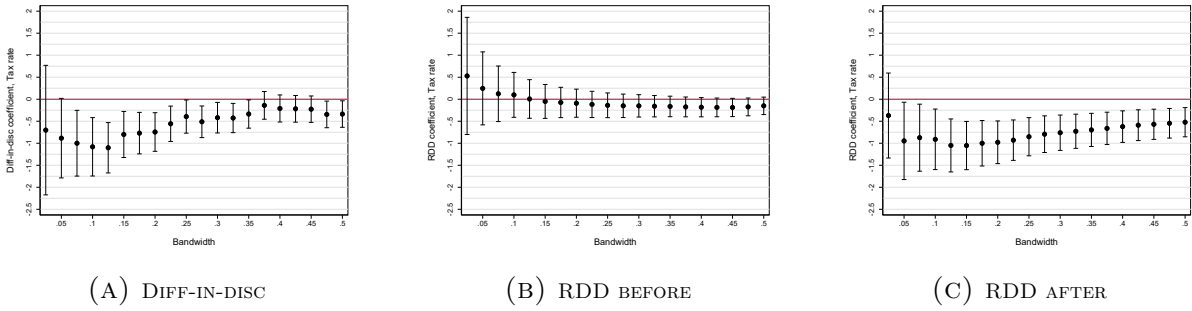
(A) LEFT-LEANING



(B) RIGHT-LEANING

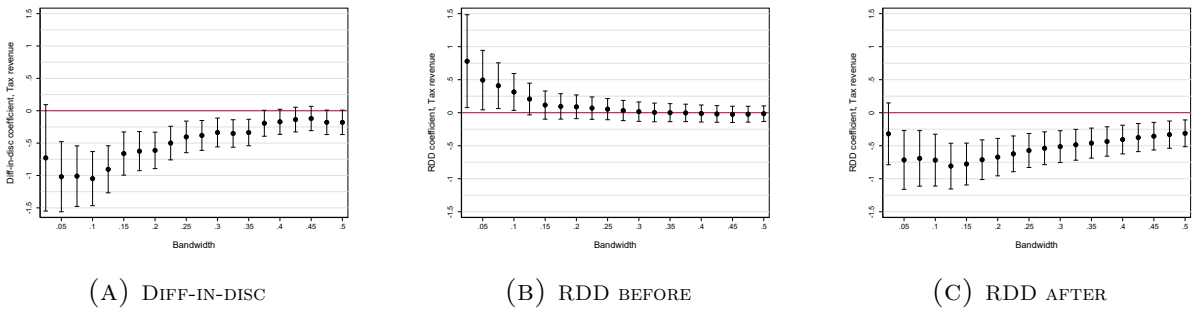
Notes: Annual impact of the default reform on municipal income taxation. Coefficient estimates obtained by regressing the municipal income tax on yearly dummy variables indicating left- and right-leaning municipalities. The x-axis indicates the years and the y-axis the coefficient estimates for the outcome variable municipal income tax. The dashed vertical line indicates the start of the post-reform period. The omitted baseline year is 2013, which lies at the horizontal line at zero. 95% confidence intervals.

FIGURE C.3. BANDWIDTH SENSITIVITY TEST: TAX RATE



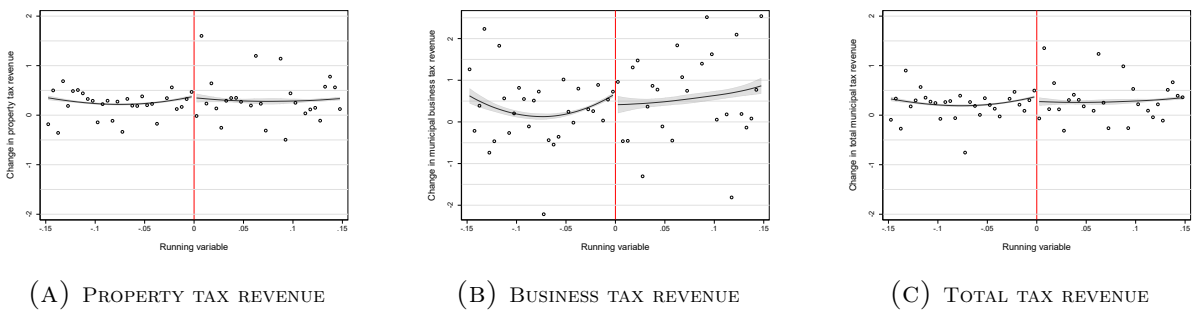
Notes: RD and diff-in-disc estimates using different bandwidths around the cutoff. Dots represent coefficient estimates obtained from the OLS estimation of the multiple linear regression model in equations (1) and (2). The polynomial order is 1. Caped lines are 90% confidence intervals.

FIGURE C.4. BANDWIDTH SENSITIVITY TEST: TAX REVENUE



Notes: RD and diff-in-disc estimates using different bandwidths around the cutoff. Dots represent coefficient estimates obtained from the OLS estimation of the multiple linear regression model in equations (1) and (2). The polynomial order is 1. Caped lines are 90% confidence intervals.

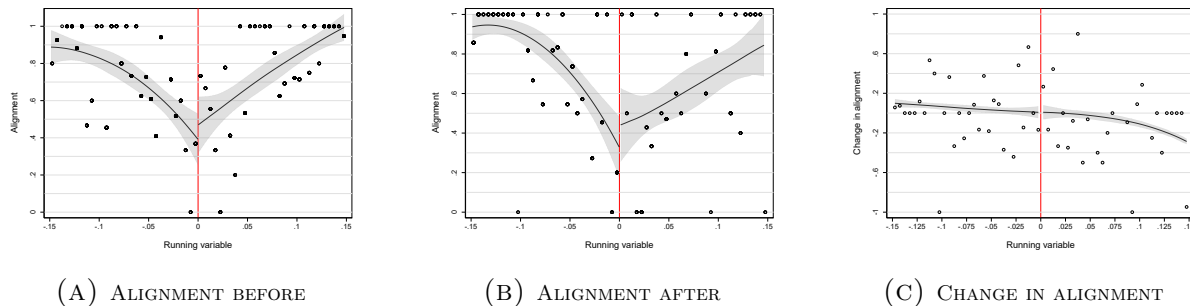
FIGURE C.5. MUNICIPAL TAX REVENUES



Notes: Diff-in-disc graphs. Dots represent the local average change in the outcome variable (y-axis) within 0.005 percentage-point-wide bins of the running variable (margin of victory, x-axis). Continuous lines are a quadratic fit. Robust standard errors clustered at the elected government level. 95% confidence intervals in gray.

## D Extension: United and divided local governments

FIGURE D.1. LOCAL INCOME TAXATION



Notes: Graphs test for discontinuities in alignment between left- and right-leaning municipalities. Dots represent the local averages of the outcome variable within 0.005 percentage-point-wide bins of the running variable (margin of victory, x-axis). Lines are a quadratic fit. 95% confidence intervals in gray.

TABLE D.1 – POST-REFORM MUNICIPAL INCOME TAXATION

	Tax rate			
	Aligned	Drop draws in		
		Council	Assembly	C & A
	(1)	(2)	(3)	(4)
Right x Reform	-0.924** (0.466)	-0.932** (0.405)	-1.168*** (0.377)	-1.010** (0.407)
Observations	1176	1060	1100	1070
Bandwidth	0.191	0.154	0.146	0.163

Notes: Diff-in-disc estimates on the impact of the default reform on municipal income taxation. Each column reports the results from a separate local polynomial regression. Separate polynomials are fitted on each side of the cutoff. The polynomial order is 1 and the optimal bandwidths are derived under the CCT (MSERD) procedure. Samples restricted according to rows two and three. Robust standard errors are in parentheses. Stars indicate significance levels based on robust p-values. \*p < 0.1, \*\*p < 0.05, \*\*\*p < 0.01.