



# Who seeks reelection: local fiscal restraints and political selection

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## Abstract

This paper analyzes the consequences of local fiscal autonomy with respect to political selection. We propose a model of political careers wherein the decisions to become candidates and to seek reelection are both endogenous. Private-sector aptitude and political ability are private information; the latter is revealed to the incumbent during her first period in office. We show that, following an unanticipated reduction in the returns from holding office, incumbents with high market ability are more likely to refrain from running for office again than their lower-ability counterparts. We test that prediction using an unexpected reduction in the upper bound of the municipal property tax rate, announced by Portugal's prime minister in July 2008, just 15 months before the local elections. We rely on a comprehensive data set for all Portuguese mainland municipalities for the 2005 and 2009 elections, including the characteristics of the municipalities and individual mayors. We employ a difference-in-differences strategy to show that affected mayors—those who were forced to reduce the property tax rate, and thus faced a sharp tax revenue decline—are less likely to seek reelection. This effect is driven by high-professional-status incumbents.

**Keywords** Political selection · Fiscal autonomy · Local governments

**JEL Classification** C23 · D71 · H71 · H72

## 1 Introduction

Politicians have a major impact on political dynamics. A study by Jones and Olken (2005) used natural death or terminal illness of leaders while in office as a source of exogenous variation to show that politicians' leadership qualities affect economic growth. Expanding on these data, Besley et al. (2011) reported that growth is higher when political leaders are more highly educated. A natural research question, then, is how best to attract and retain

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high-quality politicians in the political market. In this paper, we focus on local government autonomy as a determinant of political selection, following recent contributions by Brollo et al. (2013), Bordignon et al. (2017), and Gamalerio (2017). We rely on a quasi-natural experiment—an unexpected reduction in Portugal’s maximum local property tax rate, announced on July 2, 2008, by the prime minister—to show that a lower degree of autonomy leads mayors—mostly the high-quality ones—to retire from municipal politics.

In Portugal, property tax is set at the municipal level, within a range established by the central government. The value of the tax base (i.e., the fiscal value of property) is also determined centrally. This tax is main source of the municipalities’ own revenue. Following the unexpected change in the tax rate upper bound, a protest was launched by the local government association (Associação Nacional de Municípios) just 2 days later, on July 4. A representative of the Portuguese mayors complained about the likely decline in local government revenues, forecast at 12.5% of total revenue, claiming that they did not understand the central government’s decision to “*ease the taxpayers’ fiscal burden at the expense of someone else’s money*”.<sup>1</sup> We study mayors’ decisions to seek reelection in the municipal elections held 15 months later, in October 2009.

To motivate our analysis, we specify a simple model of political careers in the spirit of Mattozzi and Merlo (2008), wherein decisions to become candidates and to seek reelection are both endogenous. Private-sector and political ability are private information; the latter is revealed to the incumbent during her first term in office. Following an unanticipated reduction in the returns to holding office, we show that incumbents with high market ability are more likely to refrain from running for office again than those with low ability. We then test that prediction using a difference-in-differences strategy to show that affected mayors, i.e., those who were forced to reduce the property tax rate and thus faced a sharp decline in local revenue, are less likely to seek reelection than their non-affected counterparts. This effect is driven by mayors whose previous private occupations required an advanced educational degree. We use a comprehensive data set for all mainland Portuguese municipalities which includes economic, fiscal, and political variables, as well as demographic characteristics of individual mayors.

The Portuguese municipal elections, from the time of the first democratic elections in 1979 until 2005, saw almost 80% of mainland incumbents seek reelection (Aidt et al. 2011). The motivations of the one-fifth who did not seek reelection are not well known. Castro and Martins (2013a) underline the importance of municipal economic performance in a mayor’s decision to seek reelection.<sup>2</sup> We depart from Castro and Martins (2013a) in three main aspects: (i) we focus on local autonomy, (ii) we use a quasi-experimental setup, and (iii) we are interested in political selection.

Empirical studies of political selection have focused on the political wage (Besley 2004; Ferraz and Finan 2009; Kotakorpi and Poutvaara 2011; Gagliarducci and Nannicini 2013; Dal Bó et al. 2013; Fisman et al. 2015), outside options (Gagliarducci et al. 2010), district competitiveness (Galasso and Nannicini 2011), monitoring institutions (Grossman and Baldassarri 2012), electoral rules (Beath et al. 2016; Galasso and Nannicini 2017), gender

<sup>1</sup> <https://expresso.pt/actualidade/descida-de-imi-beneficiara-centenas-de-milhares-de-proprietarios-diz-opm=f363754>.

<sup>2</sup> When it comes to local political careers, a number of papers examine the determinants of mayors’ reelection decisions, emphasizing economic drivers such as unemployment and fiscal variables, including the countries of Brazil (Sakurai and Menezes-Filho 2008), Portugal (Castro and Martins 2013a, b), France (Cassette and Farvaque 2014), Spain (Balaguer-Coll et al. 2015), and Greece (Chortareas et al. 2016).

quotas (Baltrunaite et al. 2014; Besley et al. 2017), organized crime (Daniele and Geys 2015; Daniele 2017), and financial asset disclosure laws (Fisman et al. 2016).<sup>3</sup>

Four recent papers in particular are related to our focus on the impact of local autonomy in mayoral selection. Brollo et al. (2013) use the fact that Brazilian central government transfers to municipalities are dependent on the local population, in order to specify and test a regression discontinuity design. They find that larger transfers increase observed corruption and reduce the average education level of candidates for mayor. Bordignon et al. (2017) analyze the 1993 electoral and funding reforms of Italian municipalities, which included the implementation of property taxes, a reduction in central government grants, and the introduction of direct mayoral elections. The reforms led voters in richer cities to elect mayors coming from top private professions with less political experience. Gamalerio (2017) exploits a difference-in-discontinuity design to compare the results of elections held before and immediately after a 2001 Italian central government reform that relaxed fiscal rules for municipalities with populations of less than 5000. That study concludes that fiscal rules negatively affect the quality of politicians as measured by their educational attainment. Finally, Revelli (2016) exploits a centrally imposed freeze on local income tax surcharges in Italy to implement a difference-in-differences strategy. Contrary to the other literature, Revelli (2016) shows that the quality of elected mayors in treated (i.e., fiscally restrained) municipalities increases. That increase is accompanied by a larger winning electoral margin, and this result is taken as evidence that fiscal restraints allow the voters to focus on the consensual valence type of politician, as opposed to the divergent ideological one, which makes less of a difference when mayors have less autonomy in implementing their respective agendas.<sup>4</sup> Because these previous papers analyze elected politicians, they cannot distinguish selection effects from voter behavior. The advantage of our contribution is that we are able to do so; however, this approach comes with the cost of focusing on a selected pool of politicians, namely, those who have already been elected for at least one term in office.

While the three above-mentioned papers examine all candidates, we focus specifically on incumbent mayors' decisions to seek reelection.<sup>5</sup> We follow the literature and rely on an observable characteristic—previous occupation—as a proxy for politicians' leadership qualities.<sup>6</sup> The only empirical alternatives that have been exploited are education level or previous political experience. The exception is a very recent contribution by Dal Bó et al. (2017), who circumvent the problem using a unique data set that tracks all Swedish municipal politicians in the pre- and post-political office labor market, including non-cognitive

<sup>3</sup> Interestingly, papers by Ferraz and Finan (2009), Beath et al. (2016), Grossman and Baldassarri (2012), and Fisman et al. (2016) examine political selection in developing countries. Since educated people are relatively scarce in those countries, educational attainment is more likely to be a determinant of good governance. Beath et al. (2016) report that only 9% of male council members in Afghanistan have finished high school and only 17% have finished middle school, in sharp contrast to the evidence in Dal Bó et al. (2017) that the average Swedish politician spends between 12.8 and 14.5 years on formal education.

<sup>4</sup> Actually, the author finds no statistical difference between the treated and comparison municipalities for all but one proxy of politician valence considered, namely, "high professional status".

<sup>5</sup> The seminal papers on seeking reelection focus on the retirement decisions of members of the US Congress, which is related to a small expected margin of victory, a fractionalized legislative process, shrill constituents and abrasive single-issue interest groups, lack of privacy, the large amount of fundraising required to conduct modern campaigns, the desire to acquire committee power, and the demise of seniority systems (Hibbing 1982; Moore and Hibbing 1992).

<sup>6</sup> For a discussion of the appropriateness of using education as a proxy for a politician's leadership qualities, see Carnes and Lupu (2016).

capabilities measured at the time of military conscription. The authors conclude that politicians are on average smarter and better educated than the typical citizen.

Our paper is also related to the recent public finance literature that exploits quasi-natural experiments. Those closest to our empirical analysis are works by Lyytikäinen (2012) and Baskaran (2014), who rely on similar centrally legislated changes in local tax rates. Lyytikäinen (2012) uses a change in minimum property tax rates set by the Finnish central government to identify local tax competition. Lyytikäinen (2012) studies an increase in the lower bound of the local tax rate, whereas we analyze a reduction in the upper bound. Baskaran (2014) uses a difference-in-differences approach to compare two German states, of which North Rhine-Westphalia faced an increase in business and property tax rates. Hessami (2018), using quasi-natural variation in the selection rule for German mayors, shows that elected public officials attract more grants in election years for highly visible investment projects than their appointed counterparts.

The remainder of the paper is organized as follows. In Sect. 2, we introduce a simple model of political careers. In Sect. 3, we provide a short tour of the institutional background. We present our data set and explain our empirical strategy in Sect. 4, while results are shown in Sect. 5. Finally, Sect. 6 concludes the paper.

## 2 The model

We illustrate the possible mechanism behind our empirical results with a simple two-period citizen-candidate model, where the incumbent must decide whether to seek reelection at the end of the first term in office. We then introduce an unexpected shock to the payoff for holding office that leads incumbents with high professional status to retire from politics.

Our model borrows a number of important ingredients from Mattozzi and Merlo (2008), but differs in one crucial aspect. Like Mattozzi and Merlo (2008), we consider two sectors—the market and the political sectors—along with individuals who live for two periods and must decide whether (i) to run for political office in the first period of their lives, and if so, whether (ii) to seek reelection in the second period. Elections are held under plurality rule. We also follow Mattozzi and Merlo (2008) in assuming that individuals differ in both their market ability  $m$  and their political ability  $p$ , which are positively correlated. The seminal paper by Dal Bó et al. (2017) finds empirical support for this assumption. Indeed, the authors find that individuals with better leadership skills and higher IQs are more likely to become politicians, and then discuss how “strong positive selection on intelligence and leadership alone might just reflect a lower opportunity cost for those who become politicians. But the opposite seems to be true, as politicians also have higher residual ability (a measure driven by earnings) as well as actual pre-office earnings” (p. 1893).

Contrary to Mattozzi and Merlo (2008), we assume that individuals know their own market ability  $m$ , which is distributed uniformly on the  $[0, 1]$  interval, but not their political ability  $p \in \{l, h\}$ , with  $l = 0$ .<sup>7</sup> Our information structure can be explained by the fact that individuals know their education level and school quality, together with their family background, which have been found to be important salary determinants (Card 1999; Mazumder 2005). Market ability is private information. Political ability is revealed during the first

<sup>7</sup> Our model thus reverses the assumptions in Mattozzi and Merlo (2008), where market ability has discrete support and is not known, and political ability has continuous support and is known to the individual.

period in office.<sup>8</sup> The probability that an individual with market ability  $m$  also has high political ability is given by  $\alpha + \lambda m$ , with  $0 \leq \alpha < 1$ ,  $0 < \lambda \leq 1 - \alpha$ , both being common knowledge.<sup>9</sup> We normalize units such that a type  $p$  politician earns total utility of  $p$  from being in office, which includes both the salary earned in public office (in monetary units) and ego rents, which comprise the intrinsic motivation to serve, prestige of the office, and public approval of the politician.<sup>10</sup> Individuals make their career decisions to maximize lifetime earnings. When there is no difference, they opt for politics. They do not discount the future.<sup>11</sup>

During the first period in office, the politician's quality is unknown and her ego rent is equal to the population's average political ability

$$r = h \frac{2\alpha + \lambda}{2}$$

Note that the assumption  $\lambda \leq 1 - \alpha$  ensures that  $r < h$ .

We proceed by backward induction, with the second-period decision on whether to run for reelection. When an incumbent seeks reelection, she earns  $l = 0$  or  $h$ , depending on her revealed political type. If she opts for the private market instead, she earns  $m > 0$ . Therefore, low-ability political types do not seek reelection. Conversely, high-ability political types seek reelection if  $m \leq h$ . We now turn to the first-period decision. An individual with  $m > h$  knows that if she decides to enter politics, she stays in office for one period only. If she runs for office, her return is  $r + m$ , which she compares with the outside option  $2m$ . The outside option is always better, since  $m > h > r$ . An individual with market type  $m \leq h$  remains for a further period in office with probability  $\alpha + \lambda m$ , while she joins the private market otherwise. Therefore, her expected return from running for office is

$$r + (\alpha + \lambda m)h + (1 - \alpha - \lambda m)m$$

which she compares to  $2m$ .

The individual runs for office if

$$r - m + (\alpha + \lambda m)(h - m) \geq 0 \quad (1)$$

Straightforward algebra allows us to establish that (1) is decreasing in  $m$ .<sup>12</sup> The net gain from running for office, given by (1), is equal to  $r + \alpha h > 0$  when  $m = 0$ , and  $r - m < 0$  when  $m = h$ . Therefore, there exists a unique  $\hat{m}(h) \in (0, h)$  such that all individuals with  $m > \hat{m}(h)$  do not run for office, and the remaining individuals do enter politics. Not surprisingly, when  $h$  increases,  $\hat{m}(h)$  also increases, and more individuals run for office.<sup>13</sup>

<sup>8</sup> A recent empirical paper uses within-party variation in close elections in the Finnish open-list proportional system to show that public employees have an information advantage over other politicians and are better able to increase spending (Hyytinen et al. 2018). Although the learning agents in that paper are public employees and not politicians per se, the evidence supports our assumption that political jobs require learning.

<sup>9</sup> Mattozzi and Merlo (2008) assume that the probability of high market returns, conditional on political ability, is  $\alpha + \lambda p$ .

<sup>10</sup> Introducing a constant political salary does not change the qualitative nature of the results.

<sup>11</sup> In a related reference, Mattozzi and Merlo (2015) discuss the role of political parties in recruiting mediocre individuals into the political market. In the decision to seek reelection, as anecdotal evidence discussed in Sect. 3 clarifies, we contend that the party's role is limited.

<sup>12</sup> Details in the "Appendix".

<sup>13</sup> Details in the "Appendix".

Finally, we look at voter behavior. Voters always reelect an incumbent who seeks reelection, since seeking reelection signals high political ability. In the first stage, the equilibrium strategy of the voters is the same as in Mattozzi and Merlo (2008). Since each candidate votes for herself, under plurality rule, all candidates' votes are canceled out. Moreover, all candidates are ex ante identical from the voters' viewpoint, so the first-period incumbent is just a random draw from the pool of candidates.

Given the discussion above, we characterize the equilibrium in the following proposition.

**Proposition 1** *There exists a unique  $\hat{m}(h) \in (0, h)$  such that*

- (i) *Individuals with market ability  $m > \hat{m}(h)$  do not run for office in the first period of their lives and opt for careers in the private market.*
- (ii) *Individuals with market ability  $m \leq \hat{m}(h)$  run for office in the first period of their lives. In the second period, they seek reelection if and only if their realized political skill is high. Otherwise, they retire from politics and enter the private market.*

Moreover,  $\hat{m}(h)$  increases with  $h$ .

We have discussed how the equilibrium of the game changes with  $h$ . Another interesting question, which motivates our empirical analysis, is an unexpected decline in the value of  $h$ , arising in the second period, when the decision to run in term 1 is fixed. In other words, an incumbent with  $m \leq \hat{m}(h^o)$  is surprised by a reduction in  $h$  from  $h^o$  to  $h'$ . If the incumbent's realized political skill is low, her decision not to seek reelection is unaltered. However, if her realized political skill is high, it may happen that she would seek reelection if  $h = h^o$ , and is better off by going to the private market if  $h = h'$ . That happens if (i) the incumbent's market skill is sufficiently high, and (ii) the shock is sufficiently strong. The outcome is illustrated in Fig. 1.

We now test our predictions using Portuguese municipal government data. We use the unexpected decline in the maximum possible property tax rate as a reduction in  $h$ . The intuition is that it is more rewarding to hold political office if the mayor has a high level of political skill and enough autonomy to implement her agenda. As suggested by Revelli (2016, p. 62), who also studies a centrally imposed local tax rate freeze, "fiscal limitations can be expected to lessen political competition and restrain potential candidates from running for office by reducing the policy space and the expected benefits from election". We use the mayor's previous occupation in the private sector to build an indicator variable for whether the candidate holds a university degree as a proxy for market skills  $m$ .<sup>14</sup>

### 3 Institutional background and the 2008 reform

Mayors are the top decision makers in Portuguese municipalities, and are as important as the party that supports them (Veiga and Veiga 2017; Castro and Martins 2013a, b). Besides presiding over town council meetings, mayors manage human resources, authorize

<sup>14</sup> A related model prediction is that the average level of education is higher in the pool of first-term mayoral candidates than in that of incumbents who seek reelection in the treated group of municipalities. However, we cannot test that prediction because of lack of data on the overall pool of candidates.

contracts and licenses, and choose projects to be implemented and their specific time-tables.<sup>15</sup> Anecdotal evidence suggests that mayors seek reelection even if their parties decide against it. For instance, in the 2005 election, at least two PSD, one PS, and one CDS-PP incumbent ran as independent candidates after being ousted by their respective parties.<sup>16</sup>

Local governments are funded by transfers from the central government and the European Union, together with local taxes, which vary in the extent of autonomy enjoyed by the local governments. The central government defines the tax base for all the local taxes. In two of these tax types (municipal corporate income tax and property tax), the municipalities can set the tax rates within a centrally established tax range. The property tax is the main source of local government revenue, as discussed by Veiga (2012). Municipalities allocate the bulk of their revenues to the provision of local public goods, such as education, healthcare, transportation, urban planning, and culture.<sup>17</sup>

In December 2003, as a result of a general reform of the Portuguese tax system, the new property tax, called IMI [Imposto Municipal sobre Imóveis], replaced the previous one.<sup>18</sup> The reform introduced new rules for assessing the fiscal value of urban properties and established a transition period of 10 years for properties to be assessed according to the new rules. All dwellings that were built or sold were reassessed automatically, and the remaining properties were required to follow a pre-established reassessment calendar. During the transition period, which ended in 2013, municipalities set two different tax rates, for reassessed and non-reassessed properties. In 2008, the government announced a reduction of the tax rate upper bound, from 0.8 to 0.7 on the non-reassessed, and from 0.5 to 0.4 on the reassessed dwellings.<sup>19</sup> The change forced 127 municipalities (out of a total of 278) to cut their property tax rates. Figure 2 depicts the steep and discontinuous shock in the per capita property tax revenue of treated versus municipalities. In addition, we show the evolution of property tax rates. Note that the tax rate is approved at the end of each year for the following year's municipal budget.

We shall concentrate on the property tax on non-assessed properties. While no official data are available on the pace at which the reassessment was implemented, official documents issued in 2012—1 year after the onset of the Portuguese bailout by the European Commission, European Central Bank, and International Monetary Fund—reveal that only around one-third of the properties had been reassessed.<sup>20</sup>

Portuguese municipal elections have several advantages for use in empirical analysis. First, election dates are fixed exogenously every 4 years, on the same day for all municipalities. Second, during the two election periods considered in the present paper, no term

<sup>15</sup> The political spectrum in municipalities is dominated by the local branches of the parties that are represented in the national parliament. From right to left, Portuguese national parties are the Popular Party (CDS-PP), the center-right Social-Democrats (PSD), the Socialists (PS), the Communist Party (PCP), and the Left Bloc (BE). In addition, lists of organized independent citizens may contest the elections.

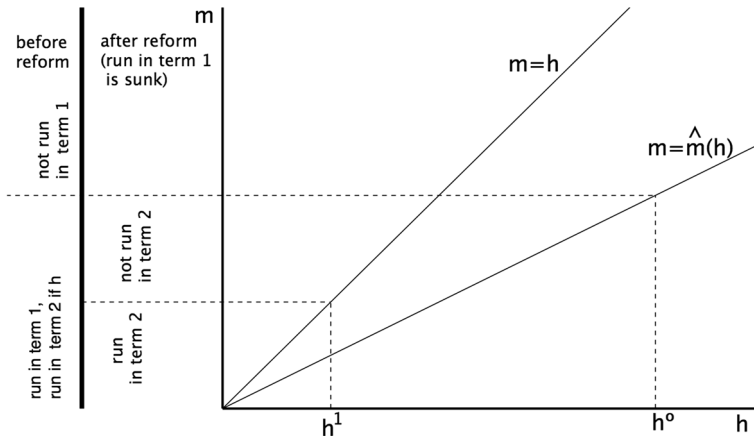
<sup>16</sup> The candidates were Isaltino Morais from Oeiras, Valentim Loureiro from Gondomar, Fátima Felgueiras from Felgueiras, and Avelino Ferreira Torres from Marco de Canavezes.

<sup>17</sup> Law no. 159/99 September 1999.

<sup>18</sup> The previous property tax was the Contribuição Autárquica, implemented in 1989.

<sup>19</sup> The minimum (unchanged) tax is 0.4 and 0.2, respectively (cf. Law 64/2008, December).

<sup>20</sup> <http://www.acis.org.pt/website/noticias/241-alteracoes-ao-imi-avaliacao-geral-dos-predios-urbanos>, <http://www.jornaldenegocios.pt/economia/detalhe/avaliaccedilatildeo-geral-de-imoacuteveis-em-risco-de-derrapagem.html>, and <http://www.jornaldenegocios.pt/economia/impostos/imi/detalhe/autoridade-tributaria-terminou-avaliacao-geral-de-49-milhoes-de-predios-urbanos.html>.



**Fig. 1** Effects of unanticipated shock to  $h$

limits were in place.<sup>21</sup> Finally, our data set is based on a single country, ensuring that all local governments operated under the same institutional framework.

## 4 Data and empirical strategy

### 4.1 Data sources and description

We use data from all 278 municipalities in mainland Portugal for two consecutive elections, immediately before (October 2005) and after (October 2009) the property tax reform.<sup>22</sup> The observations were collected mainly from Statistics Portugal (hereinafter, INE [Instituto Nacional de Estatística]), the Directorate-General of Internal Affairs (Direcção Geral da Administração Interna [DGAI]), the National Election Committee (Comissão Nacional de Eleições [CNE]), the Directorate-General for Local Authorities (Direcção Geral das Autarquias Locais [DGAL]), and direct contact with municipal governments.<sup>23</sup> Unemployment data are taken from the National Employment Agency (Instituto do Emprego e Formação Profissional [IEFP]).

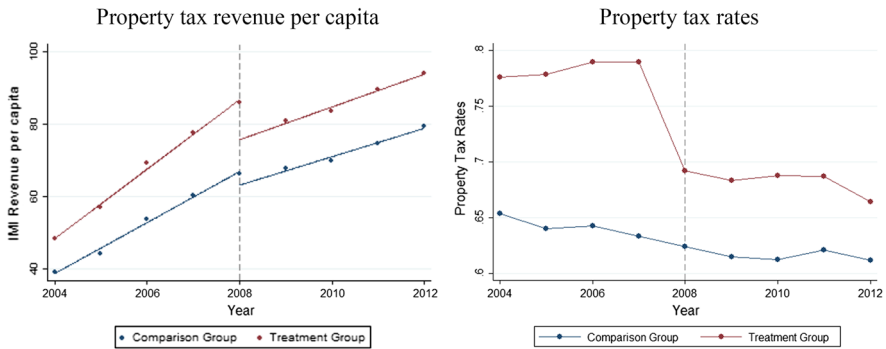
Table 1 presents descriptive statistics for 2005 and 2009. The top panel pertains to the main variables in our analysis, i.e., the binary dependent variable, which indicates individual mayors' decisions to seek reelection, the reform year and treatment indicators, and the interaction term used in the difference-in-differences strategy. We take into account observed heterogeneity using a set of covariates.

<sup>21</sup> In 2005, the Portuguese parliament issued a law limiting the number of consecutive terms to three. However, as this was not implemented retroactively, terms counts began in the 2005 local elections for all incumbents, such that the restriction became binding in 2013.

<sup>22</sup> The 30 municipalities constituting the autonomous regions of Azores and Madeira are excluded owing to their different institutional backgrounds.

<sup>23</sup> The official data contain missing observations for some mayoral characteristics, which we supplemented with information from the websites of several municipalities.





**Fig. 2** Per capita property tax revenue and property tax rates

We use the following property tax controls: yearly property tax growth rate to control for *voluntary* changes, property tax share of total municipal revenue (including own taxes and transfers from the central government).<sup>24</sup> We also control for the remaining local taxes (IRS pertains to the local personal income surtax and derrama to local corporate income tax), financial liabilities with per capita interest payments, and primary (i.e., net of interest) expenditure per capita.<sup>25</sup>

To control for the incumbent’s stock of reputation, we include two variables: an indicator of an absolute majority in the municipal assembly, and the mayor’s winning margin in the previous election (i.e., the difference between mayor’s and runner-up’s vote share). We account for local ideology with an indicator variable for mayors who belong to the same political party as the prime minister and another for mayors who are not aligned politically, as well as the fraction of mandates of left-wing parties in the municipal assembly. We include voter abstention rates, because higher turnout is likely to signal more voter involvement in monitoring of the incumbent.<sup>26</sup> We also use the following incumbent personal characteristics: gender and age.<sup>27</sup>

Since we do not observe the education level of the incumbents directly, we must rely on previous occupation as a proxy, which is shown in Table 2. We consider the following previous occupations as “high professional status”: law, economics and management, education (i.e., teaching), medicine, engineering, and entrepreneurship. As a robustness check, we exclude entrepreneurs in order to focus on a conservative measure of education, namely, that the incumbent’s former profession requires a university degree. Recall from the motivating theoretical model that the market wage is a sufficient statistic of the mayor’s market type. Therefore, previous occupation is a natural proxy for the outside option. That measure might be confounded by some mayors stepping out of the local political market to

<sup>24</sup> Bosch and Solé-Ollé (2007) find that property tax increases have a negative impact on incumbent vote share in Spanish municipalities.

<sup>25</sup> This controls for potential reelection opportunism by Portuguese mayors as found by Aidt et al. (2011). Similar results were found for Germany (Galli and Rossi 2002), Russia (Akhmedov and Zhuravskaya 2004), Brazil (Sakurai and Menezes-Filho 2008), and Italy (Padovano 2012). Brender (2003) and Drazen and Eslava (2010) show that local government debt reduces reelection chances, while Cassette and Farvaque (2014) find that pre-election debt favors incumbents.

<sup>26</sup> See Martins and Veiga (2014) for the impact of voter turnout on the incumbent mayor’s vote share.

<sup>27</sup> Fox and Lawless (2004) find that women who share the same personal characteristics and professional credentials as men express significantly weaker levels of political ambition for holding elective office.

**Table 1** Descriptive statistics

| Variable                          | Mean    | SD      | Min     | Max      |
|-----------------------------------|---------|---------|---------|----------|
| Seek reelection                   | 0.86    | 0.34    | 0       | 1        |
| Year 2009                         | 0.50    | 0.50    | 0       | 1        |
| IMI reform                        | 0.46    | 0.50    | 0       | 1        |
| Year 2009 × IMI reform            | 0.23    | 0.42    | 0       | 1        |
| <i>Reform controls</i>            |         |         |         |          |
| IMI growth rate                   | -0.004  | 0.13    | -0.5    | 1        |
| IMI share                         | 10.80   | 7.20    | 1.23    | 34.65    |
| IRS tax rate                      | 2.29    | 2.42    | 0       | 5        |
| Derrama tax rate                  | 2.86    | 3.99    | 0       | 10       |
| <i>Political + mayor controls</i> |         |         |         |          |
| Primary expenditure PC            | 982.36  | 479.59  | 353.90  | 3 497.79 |
| Debt interest expenditure PC      | 16.86   | 16.85   | 0       | 188.56   |
| Majority dummy                    | 0.89    | 0.31    | 0       | 1        |
| Winning margin                    | 19.33   | 13.74   | 0.03    | 60.28    |
| Same political party dummy        | 0.43    | 0.50    | 0       | 1        |
| Leftist mandates                  | 0.54    | 0.25    | 0       | 1        |
| Abstention rate                   | 34.21   | 7.66    | 17.70   | 54.60    |
| Party-independent mayor           | 0.02    | 0.14    | 0       | 1        |
| Mayor age                         | 53.81   | 7.66    | 32      | 76       |
| Mayor age squared                 | 2954.05 | 825.17  | 1024    | 5776     |
| Female mayor                      | 0.06    | 0.23    | 0       | 1        |
| High-professional-status mayor    | 0.72    | 0.45    | 0       | 1        |
| No. of mandates dummies           |         |         |         |          |
| 1                                 | 0.28    | 0.45    | 0       | 1        |
| 2                                 | 0.27    | 0.44    | 0       | 1        |
| 3                                 | 0.20    | 0.40    | 0       | 1        |
| 4                                 | 0.10    | 0.31    | 0       | 1        |
| 5                                 | 0.06    | 0.24    | 0       | 1        |
| 6                                 | 0.04    | 0.19    | 0       | 1        |
| 7                                 | 0.02    | 0.15    | 0       | 1        |
| 8                                 | 0.01    | 0.09    | 0       | 1        |
| 9                                 | 0.01    | 0.09    | 0       | 1        |
| Monthly mayoral wage              | 4760.53 | 480.78  | 4053.94 | 6155.13  |
| <i>Socioeconomic controls</i>     |         |         |         |          |
| Population density                | 0.31    | 0.85    | 0.01    | 7.38     |
| Dependency ratio                  | 0.59    | 0.12    | 0.39    | 1.09     |
| Graduates                         | 0.07    | 0.03    | 0.02    | 0.29     |
| Total urban area                  | 11.35   | 14.76   | 0       | 91.279   |
| Electricity consumption PC        | 4266.66 | 4540.57 | 1446.64 | 62984.48 |
| Unemployment rate                 | 6.86    | 2.30    | 1.52    | 15.46    |

Number of observations: 556

PC per capita, SD standard deviation

**Table 2** High-professional-status and low-professional-status mayors

|                              | High professional status | Low professional status   |    |
|------------------------------|--------------------------|---------------------------|----|
| Law                          | 78                       | Blue-collar workers       | 88 |
| Economics and management     | 73                       | Low-skilled workers       | 21 |
| Education                    | 109                      | Undefined retired workers | 26 |
| Medicine                     | 34                       | Other                     | 23 |
| Engineering and architecture | 84                       |                           |    |
| Entrepreneurship             | 20                       |                           |    |

Law includes notaries, jurists, and magistrates. Economics and management includes accounting. Blue-collar workers include public servants. Low-skilled workers include electricians and factory workers. Other includes politicians

join the central government. However, amongst affected mayors in 2009, none took a position as minister or secretary of state. In the spirit of Revelli (2016), in the remainder of the paper we refer to mayors with previous occupations that require university degrees as having *high professional status* and to the others as having *low professional status*.

Evidence of popularity erosion over time in office was documented in a seminal paper by Mueller (1970) and later confirmed for Portugal (Aidt et al. 2011). We thus control for the number of consecutive years in power by adding a full set of indicator variables for each possible number of terms that an incumbent mayor has served (ranging from one to nine). Lastly, we add the monthly wage—which depends on the municipal population—in 2009 real terms.<sup>28</sup>

Finally, we use a set of municipal economic and demographic controls: population density, old-age dependency ratio, share of municipal labor force with tertiary education, share of urban areas in the municipal zoning laws, per capita electricity consumption, and unemployment rate.<sup>29</sup>

## 4.2 Identification strategy and discussion

We estimate the following linear probability model, where our coefficient of interest is the interaction between the treatment group indicator (IMI reform) and that of the treatment period (year 2009), i.e.,  $\alpha_3$ :

$$\begin{aligned} \text{Seek Re-election}_{it} = & \alpha_1 \text{Year 2009}_{it} + \alpha_2 \text{IMI Reform}_i + \alpha_3 \text{IMI Reform}_i \times \text{Year 2009}_{it} \\ & + \alpha_4 \text{Reform controls}_{it} + \alpha_5 \text{Political} + \text{Mayor controls}_{it} \\ & + \alpha_6 \text{Socioeconomic controls}_{it} + \alpha_7 \text{Regional dummies}_{it} + \epsilon_{it}, \end{aligned} \quad (2)$$

<sup>28</sup> Some models predict that higher salaries attract better-quality individuals (with college education as proxy) to run for office (Besley 2004; Caselli and Morelli 2004), while others predict the opposite outcome (Messner and Polborn 2004; Mattozzi and Merlo 2008).

<sup>29</sup> Akhmedov and Zhuravskaya (2004), in their study of opportunistic business cycles in Russian regions, measure voter awareness using education and urbanization. For Portugal, Martins and Veiga (2013) find that national and subnational economic conditions have an impact on municipal electoral outcomes.

where  $i$  is municipality,  $t$  is election year ( $t = 2005; 2009$ ) and regional time-invariant effects are considered at the Nomenclature of Territorial Units for Statistics (NUTS) 3 level. The presence of heteroscedasticity and spatial correlation is controlled for using robust standard errors clustered by municipality, since treatment varies at that level (Bertrand et al. 2004).

Equation (2) is a simple difference-in-differences specification, in which outcomes are observed for two groups for two time periods. The treatment group contains the 127 municipalities that had a tax rate above the new maximum (i.e., between 0.7 and 0.8) in 2007 and were hit by the surprise announcement in the following year.<sup>30</sup> The comparison group contains the remaining 151 municipalities. The tax choice in the comparison group remained stable throughout the period (an average tax rate of 0.63 in the previous year, and 0.62 in the first treatment year). In the treatment group, when forced to reduce the upper bound, 93% chose the new maximum tax rate (0.7).<sup>31</sup>

The identification strategy relies on three assumptions that we now discuss: (i) there is no manipulative sorting into the treatment; (ii) municipal characteristics must be balanced around the new threshold; and (iii) municipalities must be on parallel trends in the pre-treatment period.

We tackle the first issue by excluding municipalities with tax rates below 0.6 (treated municipalities have a tax rate above 0.7), whose preferences for public goods tax rates are more similar to the treated ones. Moreover, the shock was exogenous and unexpected, and, as shown in Table 10, there is no evidence that the prime minister was aiming at a particular set of mayors politically with the reform.

As regards the second issue, we provide evidence in the “Appendix” (Table 10) that the treated municipalities are, on average, more populous, more densely populated, and more urban than the comparison ones, which is confirmed by the map in Fig. 3. They also spend less, in per capita terms, which rules out a possible confounding effect that would work via the signaling of worse managers, if the mayors hit by the reform spent more.<sup>32</sup>

We tackle these concerns with two different but complementary strategies. Firstly, we sequentially introduce vectors of observables as controls in the regression, without changing our results. Altonji et al. (2005) point out that this underscores the stability of the statistical relationships and validates their robustness to selection, not only to observed explanatory variables, but also to unobservables. Secondly, we introduce NUTS 3 fixed effects. Finally, we show in the “Appendix” that our results are not driven by some sort of “urban” bias or geographical clustering, by running our specification for a subsample that excludes, in turn, the Lisbon and Oporto metropolitan areas, coastal municipalities, and the subgroup of municipalities belonging to each of the five NUTS 2 regions of mainland Portugal.<sup>33</sup>

As regards the pre-treatment trends, a simple inspection of the share of mayors who sought reelection in previous elections in (see Table 11 in the “Appendix”) shows no substantive differences between the two groups in the local elections before the reform.

<sup>30</sup> A change in the local tax range (in their case, an increase in the lower bound) was used as a quasi-experimental setup by Lyttikäinen (2012).

<sup>31</sup> Revelli (2016) also defines the treated municipalities as those facing a local tax freeze by the central government.

<sup>32</sup> There are minor differences in the following observables: local corporate tax surcharge (“derrama”), abstention rate, and age dependency ratio, and rate of property tax increase. The last is a direct consequence of the treatment.

<sup>33</sup> NUTS 2 areas comprise five regions in mainland Portugal (North, Center, Lisbon, Alentejo, and Algarve), while the NUTS 3 level comprises 28 smaller groups of local authorities.

Finally, there are two reforms that are worth discussing as possible sources of bias. The first is the introduction of term limits in 2005, the first effects of which were not seen until the 2013 election. The second contemporaneous reform was the 2007 introduction of a personal income tax surcharge of up to 5% of residents' personal income tax bill.<sup>34</sup> After our main results and robustness checks, we devote a subsection to each of these reforms in order to dismiss the possible vulnerability of our identification strategy to these institutional changes.

## 5 Results

### 5.1 Baseline results

Table 3 shows the baseline results for the linear probability models, with seeking reelection as the dependent variable. Column (1) presents the simplest difference-in-differences specification with fixed effects at the NUTS 3 level and no additional controls. To rule out other possible confounding mechanisms, vectors of time-varying variables are introduced sequentially, as follows: fiscal, then political and mayor controls, and finally, socioeconomic characteristics of the municipality.

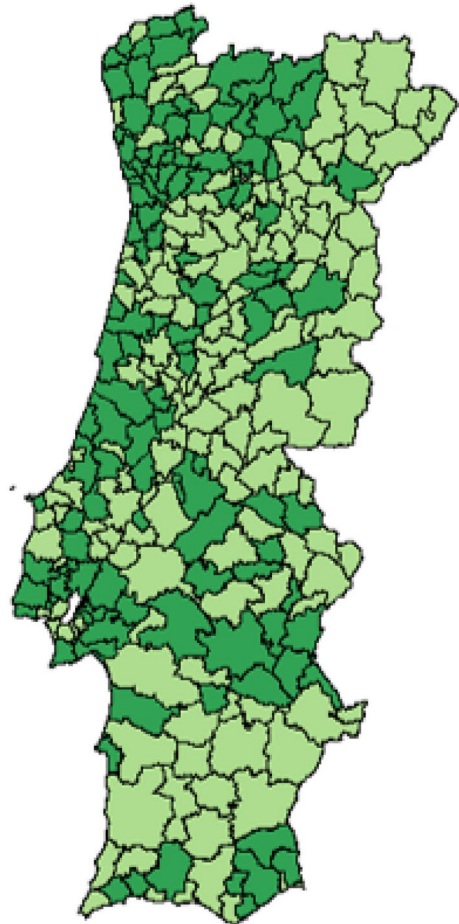
Our findings show that when the mayors' favored tax policy is removed from their strategy set, they are less likely to run for office again.<sup>35</sup> However, the coefficient of interest, that of the interaction of the treatment group (IMI reform) with the year 2009, is not statistically significant in columns (3) or (4). Therefore, when all mayors are considered, the effect of the reform does not seem to be robust. In order to deepen our analysis, we test the theoretical implication of our model, namely, that mayors with higher market skills will retire, whereas those with lower market skills will remain in the political market. We do so using two different specifications. Firstly, we include a triple interaction between the 2009 election, the treated group, and the high-professional-status dummy. Secondly, we run separate regressions based on whether municipalities are governed by a mayor whose previous occupation did or did not require a university degree, respectively, in Tables 4 and 5. There are 196 high-professional-status mayors in 2005 (94 in the treatment, and 102 in the comparison group), and 202 in 2009 (evenly split between the two groups). In line with our theoretical prediction, the triple difference and the difference in differences on the subsample of mayors with high professional status both have the expected sign, confirming that the effect of the reform on the decision to seek reelection is driven by the subset of mayors with higher market skills. Conversely, we find no statistically significant impact of the reform on the subsample of mayors with low professional status. Therefore, for the remainder of this paper, we will focus our attention on high-professional-status incumbent mayors.

Using our preferred estimates in column (4) of Table 4, the differential effect of the reform is given by  $0.1 \times (101 - 94) - 0.16 \times 101 + 0.192 \times (102 - 101) = 15.652$ , i.e., around 16 high-professional-status mayors who would, in the absence of the tax reform, seek reelection, do not when faced with the unexpected lowering of the property tax upper bound. To

<sup>34</sup> Bordignon et al. (2017) studies a similar reform in Italy.

<sup>35</sup> It could be that mayors are discouraged from seeking reelection because they are forced to enact an unpopular measure. This is not the case in our setting, where the tax is set to decrease. For evidence that higher taxes reduce reelection prospects, see Bosch and Solé-Ollé (2007).

**Fig. 3** Spatial distribution of the Portuguese municipalities affected by the reform of 2008



Dark: Treatment group

Light: comparison group

give some idea of the magnitude of the effect, note that this amounts to around 7.7% of the 202 high-professional-status incumbents in the 2009 election. This magnitude is fairly stable across all specifications.

Table 6 shows that the results are unchanged when we restrict our sample to municipalities that set a property tax rate of between 0.6 and 0.8 in 2007; this is similar to a difference-in-discontinuity design (Gamalerio 2017) and tackles a possible concern with manipulative sorting into the treatment.

Table 6 also presents the *intensity of treatment* specification, obtained by interacting the 2009 election dummy with a variable that measures the exogenous reduction in each municipality's tax rate, i.e., letting  $IMI_{i,2007}$  denote the property tax rate that municipality  $i$  set in 2007, we define the following variable:

$$\text{Intensity}_i = \max\{IMI_{i,2007} - 0.7, 0\}$$

**Table 3** Results: all mayors

|   | Seek reelection    |                    |                   |                   |                     |
|---|--------------------|--------------------|-------------------|-------------------|---------------------|
|   | (1)                | (2)                | (3)               | (4)               | (5)                 |
| Year 2009   | 0.093**<br>(0.044) | 0.126<br>(0.089)   | 0.149<br>(0.092)  | 0.140<br>(0.095)  | 0.024<br>(0.111)    |
| IMI reform  | 0.096**<br>(0.045) | 0.096**<br>(0.046) | 0.077*<br>(0.045) | 0.080*<br>(0.045) | -0.016<br>(0.093)   |
| IMI reform × year 2009                            | -0.108*<br>(0.061) | -0.110*<br>(0.062) | -0.074<br>(0.058) | -0.081<br>(0.059) | 0.112<br>(0.122)    |
| High professional status                          |                    |                    |                   |                   | -0.041<br>(0.067)   |
| Year 2009 × high professional status              |                    |                    |                   |                   | 0.174*<br>(0.091)   |
| IMI reform × high professional status             |                    |                    |                   |                   | 0.134<br>(0.107)    |
| IMI reform × year 2009 × high professional status |                    |                    |                   |                   | -0.299**<br>(0.140) |
| Reform controls                                   | No                 | Yes                | Yes               | Yes               | Yes                 |
| Political + mayor controls                        | No                 | No                 | Yes               | Yes               | Yes                 |
| Socioeconomic controls                            | No                 | No                 | No                | Yes               | No                  |
| NUTS 3 dummies                                    | Yes                | Yes                | Yes               | Yes               | Yes                 |
| Number of observations                            | 556                | 556                | 556               | 556               | 556                 |
| Adjusted $R^2$                                    | 0.018              | 0.012              | 0.070             | 0.086             | 0.060               |

All columns include NUTS 3 fixed effects (28 regional dummies). Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

and estimate

$$\begin{aligned} \text{Seek Re-election}_{it} = & \alpha_1 \text{Year 2009}_{it} + \alpha_2 \text{IMI Reform}_i + \alpha_3 \text{Intensity}_i \times \text{Year 2009}_{it} \\ & + \alpha_4 \text{Reform controls}_{it} + \alpha_5 \text{Political + Mayor controls}_{it} \\ & + \alpha_6 \text{Socioeconomic controls}_{it} + \alpha_7 \text{Regional dummies}_{it} + \epsilon_{it}, \end{aligned}$$

As expected, mayors with high professional status are more likely to leave the political market when they face a sharper tax decrease.<sup>36</sup>

<sup>36</sup> While the heterogeneous effect along previous occupation is motivated by the theoretical model and is the main focus of our paper, we include in the “Appendix” results of heterogeneous effects along ideology (left vs. right—Tables 12, 13) and mayor age (above and below the median age—Tables 14, 15). Neither yields significant results, which reinforces the mechanism of the outside option that our theoretical model puts forward.

**Table 4** Results: high-professional-status mayors

|                            | Seek reelection     |                     |                     |                     |
|----------------------------|---------------------|---------------------|---------------------|---------------------|
|                            | (1)                 | (2)                 | (3)                 | (4)                 |
| Year 2009                  | 0.140***<br>(0.050) | 0.180*<br>(0.102)   | 0.202*<br>(0.112)   | 0.192*<br>(0.116)   |
| IMI reform                 | 0.127**<br>(0.054)  | 0.117**<br>(0.054)  | 0.100*<br>(0.053)   | 0.100*<br>(0.053)   |
| IMI reform × year 2009     | -0.180**<br>(0.070) | -0.172**<br>(0.070) | -0.153**<br>(0.068) | -0.160**<br>(0.067) |
| Reform controls            | No                  | Yes                 | Yes                 | Yes                 |
| Political + mayor controls | No                  | No                  | Yes                 | Yes                 |
| Socioeconomic controls     | No                  | No                  | No                  | Yes                 |
| NUTS 3 dummies             | Yes                 | Yes                 | Yes                 | Yes                 |
| Number of observations     | 398                 | 398                 | 398                 | 398                 |
| Adjusted $R^2$             | 0.033               | 0.037               | 0.096               | 0.093               |

All columns include NUTS 3 fixed effects (28 regional dummies). Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

**Table 5** Results: low-professional-status mayors

|                            | Seek reelection   |                  |                   |                   |
|----------------------------|-------------------|------------------|-------------------|-------------------|
|                            | (1)               | (2)              | (3)               | (4)               |
| Year 2009                  | -0.027<br>(0.087) | 0.051<br>(0.139) | 0.190<br>(0.142)  | -0.014<br>(0.165) |
| IMI reform                 | 0.013<br>(0.103)  | 0.039<br>(0.123) | -0.021<br>(0.121) | 0.022<br>(0.121)  |
| IMI reform × year 2009     | 0.066<br>(0.132)  | 0.029<br>(0.150) | 0.120<br>(0.150)  | 0.031<br>(0.146)  |
| Reform controls            | No                | Yes              | Yes               | Yes               |
| Political + mayor controls | No                | No               | Yes               | Yes               |
| Socioeconomic controls     | No                | No               | No                | Yes               |
| NUTS 3 dummies             | Yes               | Yes              | Yes               | Yes               |
| Number of observations     | 158               | 158              | 158               | 158               |
| Adjusted $R^2$             | -0.013            | -0.017           | 0.046             | 0.165             |

All columns include NUTS 3 fixed effects (28 regional dummies). Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

## 5.2 Robustness

We have also discussed the fact that treatment municipalities are more populous and urban in nature than the comparison municipalities. Moreover, it may be that mayors with high professional status are spatially concentrated in these areas. Tables 16, 17,



**Table 6** Robustness: high-tax municipalities and intensity of treatment

|                        | Excluding taxes < 0.6 | Intensity of treatment |
|------------------------|-----------------------|------------------------|
| Year 2009              | 0.168<br>(0.129)      | 0.153<br>(0.128)       |
| IMI reform             | 0.097*<br>(0.053)     | 0.095*<br>(0.049)      |
| IMI reform × year 2009 | − 0.149**<br>(0.069)  | −                      |
| Intensity × year 2009  |                       | − 1.565**<br>(0.693)   |
| Controls               | Yes                   | Yes                    |
| NUTS 3 dummies         | Yes                   | Yes                    |
| Number of observations | 377                   | 377                    |
| Adjusted $R^2$         | 0.079                 | 0.077                  |

All columns include NUTS 3 fixed effects (28 regional dummies) for the subsample of high-professional-status mayors. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity. Reform, political + mayor, and socioeconomic controls included

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

**Table 7** Falsification results (2001 and 2005 elections)

|                        | Seek reelection    |                     |                      |
|------------------------|--------------------|---------------------|----------------------|
|                        | (1)                | (2)                 | (3)                  |
| Year 2005              | − 0.038<br>(0.048) | − 0.137*<br>(0.073) | − 0.199**<br>(0.095) |
| IMI reform             | 0.007<br>(0.047)   | − 0.001<br>(0.047)  | 0.010<br>(0.047)     |
| IMI reform × year 2005 | 0.081<br>(0.066)   | 0.105<br>(0.066)    | 0.089<br>(0.068)     |
| Political controls     | No                 | Yes                 | Yes                  |
| Socioeconomic controls | No                 | No                  | Yes                  |
| Number of observations | 553                | 553                 | 553                  |
| Adjusted $R^2$         | 0.005              | 0.004               | 0.002                |

All columns include NUTS 3 fixed effects (28 regional dummies). We lose three observations for 2001 because the municipalities of Trofa, Odivelas, and Vizela elected mayors for the first time in those elections, and therefore they had no incumbent. Unfortunately, the list of available controls is smaller in 2001 than in 2005. Political controls include primary expenditure per capita (PC), debt interest expenditure PC, majority dummy, same political party dummy, leftist mandates, and abstention rate. Socioeconomic controls include population density, dependency ratio, electricity consumption PC, and unemployment rate. Standard errors are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

and 18 in the “Appendix” present the results for a subsample that excludes municipalities

in the metropolitan areas of Lisbon and Oporto, coastal areas, and each of the NUTS 2 regions in turn, respectively. The coefficient of interest is still negative, is statistically significant, and has about the same magnitude as before.

We now consider the assumption that municipalities must be on parallel trends in the pre-treatment period. We present the regression results for the subsample of mayors who would be term-limited in 2013, if reelected in 2009, in the “Appendix” (more details below). The results are not statistically significant. Second, we run a falsification test using a fake treatment year, i.e., previous elections of 2001 and 2005, in Table 7. As expected, the results for the interaction term are nonsignificant, and hence our result is specific to the natural experiment used to implement the difference-in-differences strategy, dismissing remaining concerns of possible selection bias.

Finally, we focus on a conservative alternative by removing from our “high-professional-status” sample those mayors who were previously “entrepreneurs”, since we cannot ensure that these mayors hold a university degree. The results in Table 19 in the “Appendix” show that our findings are robust.

### 5.3 Contemporaneous introduction of term limits

Although we do not deal with the 2013 election here, the introduction of term limit reform implies that some mayors who run in 2009 know that, if they are elected for another term, it will be their last. The knowledge that they are going to face a binding term limit in the next election, i.e., in 2013, could lead them to anticipate their retirement decision, exacerbating their reaction to the forced tax decrease. Even if this were the case, however, Table 10 shows that there is no statistically significant difference between the average number of terms served by incumbents in the treatment and comparison groups.

Although our baseline regressions already deal with this issue, since they include an indicator variable for each possible number of terms that an incumbent mayor has served (ranging from one to nine), we also run a linear probability model, inspired by Veiga and Veiga (2017), including an interaction term between the indicator of being term-limited in 2013 and being hit by the new property tax upper bound. Veiga and Veiga (2017) show that incumbents who will be term-limited in 2013 are not less likely to seek reelection than their less experienced counterparts. Our results further show that mayors who are hit by the reform do not react differently when they expect to be term-limited in 2013, reinforcing the evidence in Veiga and Veiga (2017). This is shown in Table 8.

Despite the fact that incumbents do not change their decision to seek reelection, they may set different fiscal policies. This would imply selection into treatment, undermining our identification strategy. Fonseca (2016) analyzes the period between 2009 and 2013, i.e., the last term of incumbents who are forced to retire in 2013, and shows that these are more fiscally conservative, i.e., they spend less than their non-treated (i.e., not facing binding term limits) counterparts. This does not imply that they also behaved differently in the previous 2006–2009 term. Table 20 in the “Appendix” shows that neither the property tax rate nor per capita primary spending in the period 2006–2009 is set differently by incumbents (if reelected) who will be term-limited in 2013. Therefore, this evidence mitigates possible concerns of selection into treatment.

## 5.4 Contemporaneous introduction of personal income surtax

The second contemporaneous reform was the 2007 introduction of a personal income tax surcharge of up to 5% of residents' personal income tax bill. This revenue source accounts for 2.9% of municipal revenue, and is thus much less important than the property tax, which accounted for 12.3% in 2008. Therefore, it is unlikely that this fiscal policy can compensate for the constrained property tax. Moreover, as shown in Table 4, the average income surtax rate is the same in both treated and comparison municipalities. Given that treated municipalities are wealthier on average, the income surtax generates greater revenue for the treatment group and accounts for higher revenue share of 3.4%, compared with 2.5% for comparison municipalities. If anything, this latter fact would play against our result. Indeed, we find that high-professional-status mayors in richer (i.e., treated) municipalities are more likely to withdraw from the political market. The fact that they enjoy more leeway to collect tax revenue should make them less likely to retire. Even if this reform plays against our result, we control for this by including the personal income tax surcharge rate in the year before the election (0 in 2005, 2008 tax rate for 2009 election).

In order to rule out any possibility that the property tax reform we are analyzing has an effect on the way mayors use this tax, we run a difference-in-differences specification where the outcome variable is the income surtax rate for the years 2008 and 2009, with the treated municipalities defined as in our main regressions. The results in Table 21 in the “Appendix” show that the introduction of the new property tax ceiling has no impact on the income surtax.

## 5.5 Does less autonomy lead to fewer high-professional-status mayors?

So far we have shown that the shock to local autonomy leads mayors with high professional status to refrain from seeking reelection. In this subsection we test whether the newcomers' professional status offsets the negative impact of the selection decisions of the incumbents. We do this by implementing a simple difference-in-differences estimation of the form:

$$\begin{aligned} \text{High Professional Status}_{it} = & \beta_1 \text{Year 2009}_{it} + \beta_2 \text{IMI Reform}_i + \beta_3 \text{IMI Reform}_i \times \text{Year 2009}_{it} \\ & + \beta_4 \text{Reform controls}_{it} + \beta_5 \text{Political + Mayor controls}_{it} \\ & + \beta_6 \text{Socioeconomic controls}_{it} + \beta_7 \text{Regional dummies}_{it} + \epsilon_{it}, \end{aligned}$$

where  $i$  is municipality and  $t$  is year for the 7 years between 2006 and 2012. We estimate the equation using municipal fixed effects or, as an alternative, the full set of municipal controls used in Sect. 5.1. The presence of heteroscedasticity and spatial correlation is controlled for using robust standard errors clustered by municipality, since treatment varies at that level (Bertrand et al. 2004). Table 9 shows the regression results. We observe that the difference-in-differences coefficient is significant and negative, suggesting that the newcomers do not offset the negative selection impact of the decision not to seek reelection by high-professional-status incumbents in treated municipalities. However, the point estimates are significant only at the 10% level, which can be explained by the relatively low number of withdrawing incumbents (12% in total).

**Table 8** Term limit reform and the decision to seek reelection in 2009

|                                   | Seek reelection   |                   |                   |                   |
|-----------------------------------|-------------------|-------------------|-------------------|-------------------|
|                                   | (1)               | (2)               | (3)               | (4)               |
| Term-limited in 2013              | -0.063<br>(0.054) | -0.066<br>(0.054) | -0.037<br>(0.059) | -0.047<br>(0.057) |
| IMI reform                        | -0.109<br>(0.081) | -0.114<br>(0.083) | -0.100<br>(0.073) | -0.103<br>(0.076) |
| IMI reform × term-limited in 2013 | 0.119<br>(0.094)  | 0.118<br>(0.096)  | 0.102<br>(0.084)  | 0.109<br>(0.087)  |
| Reform controls                   | No                | Yes               | Yes               | Yes               |
| Political + mayor controls        | No                | No                | Yes               | Yes               |
| Socioeconomic controls            | No                | No                | No                | Yes               |
| NUTS 3 dummies                    | Yes               | Yes               | Yes               | Yes               |
| Number of observations            | 278               | 278               | 278               | 278               |
| Adjusted $R^2$                    | 0.030             | 0.023             | 0.028             | 0.025             |

All columns include NUTS 3 fixed effects (28 regional dummies). Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

## 6 Concluding remarks

Local democracy is the primary venue in which most people practise politics. The aftermath of a reform introducing a lower maximum rate of a property tax is the perfect laboratory in which to study whether having less financial independence is a factor in an incumbent's decision to seek reelection. The analysis is based on a difference-in-differences design that allows for credible inference of the effects of being constrained in the choice of the tax rate and the mayor's decision to run again.

This paper presents a stylised political career model that highlights the mechanism of the outside market option in the incumbent's decision not to seek reelection and tests its predictions using a panel of 278 Portuguese mainland municipalities, exploiting the quasi-natural experiment provided by the central government's surprise announcement in 2008 of a decrease in the upper bound of the municipal property tax range, which created a quasi-experimental treatment group—the municipalities with a property tax rate above the new upper bound. We analyze the decisions by incumbent mayors of whether to seek reelection in the 2009 elections, which took place around 1 year after the surprise reform. Our main finding is that the mayors who are hit by the reform measure are more likely than their non-affected counterparts to refrain from seeking reelection, if they had a previous *high-status* profession in the spirit of Revelli (2016). Our results are robust to a number of alternative specifications, including a triple difference (where the high-professional-status dummy is interacted with the indicator variables of the 2009 election and the treated municipalities), splitting the sample across the professional status of incumbent mayors, restricting the analysis to municipalities with more homogeneous tax

**Table 9** High-professional-status mayors: incumbents and newcomers

|                            | High professional status |                     |
|----------------------------|--------------------------|---------------------|
|                            | (1)                      | (2)                 |
| Year 2009                  | – 0.023<br>(0.056)       | – 0.020<br>(0.046)  |
| IMI reform                 | 0.097*<br>(0.054)        |                     |
| IMI reform × year 2009     | – 0.121*<br>(0.068)      | – 0.114*<br>(0.068) |
| Reform controls            | Yes                      | No                  |
| Political + mayor controls | Yes                      | No                  |
| Socioeconomic controls     | Yes                      | No                  |
| NUTS 3 dummies             | Yes                      | No                  |
| Fixed effects              | No                       | Yes                 |
| Number of observations     | 1946                     | 1946                |
| Adjusted $R^2$             | 0.135                    | 0.025               |

All columns include NUTS 3 fixed effects (28 regional dummies). Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

levels, and eliminating different regions from the sample. We also run falsification tests on the previous 2001 and 2005 elections and, as expected, find no statistically significant results.

We look carefully at the possible confounding effects of two contemporaneous reforms, namely, the introduction of a local personal income tax surcharge in 2007, and the announcement of term limits in 2005, the effects of which would only come into play with the 2013 local election (i.e., one that we do not deal with in this paper).

This research contributes to the understanding of what motivates politicians to seek reelection. Our theoretical model and empirical tests confirm the idea that rational politicians weigh costs and benefits of running for office, suggesting that the institutional setup in which they perform the political job is important for political careers.

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**Data availability** The data sets analyzed in the current study are available from the corresponding author on reasonable request.

## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

## Appendix 1: Model results

Recalling (1), the individual runs for political office if

$$r - m + (\alpha + \lambda m)(h - m) \geq 0$$

We now show that (1) is decreasing in  $m$ . Note that (1) is a concave quadratic function of  $m$ . Using the fact that  $\lambda < 1 - \alpha < 1$ , the slope of (1) ranges between

$$-1 + \lambda - \alpha(1 + \lambda) < 0, \text{ when } m \rightarrow 0$$

$$\text{and } -1 - (\alpha + \lambda h) < 0, \text{ when } m = h$$

Therefore, the function is strictly decreasing in the relevant range  $m \in (0, h]$ .

Finally, we show that  $\hat{m}(h)$  is increasing in  $h$ . In order to check this, note that  $\hat{m}(h)$  is a zero of (1), and the partial derivative of the expression is negative with respect to  $m$ , and positive with respect to  $h$ . A straightforward application of the implicit function theorem establishes the comparative statics result.

## Appendix 2: Additional tables

See Tables 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, and 21.

**Table 10** Balance tests (mean differences in 2006–2007)

| Variable                          | Treatment | Comparison | Difference            |
|-----------------------------------|-----------|------------|-----------------------|
| <i>Reform controls</i>            |           |            |                       |
| IMI growth rate                   | 13.892    | 9.263      | 4.629*** (0.803)      |
| IMI share                         | 0.012     | 0.004      | 0.008 (0.008)         |
| IRS tax rate                      | 4.622     | 4.556      | 0.066 (0.131)         |
| Derrama tax rate                  | 0.01      | 0.007      | 0.003*** (0.001)      |
| <i>Political + mayor controls</i> |           |            |                       |
| Primary expenditure PC            | 799.296   | 979.356    | − 180.060*** (47.955) |
| Debt interest expenditure PC      | 20.015    | 18.174     | 1.842 (2.194)         |
| Majority dummy                    | 0.898     | 0.907      | − 0.010 (0.036)       |
| Winning margin                    | 20.249    | 18.895     | 1.354 (1.611)         |
| Same political party dummy        | 0.394     | 0.338      | 0.056 (0.058)         |
| Leftist mandates                  | 0.549     | 0.543      | 0.005 (0.030)         |
| Abstention rate                   | 35.228    | 33.146     | 2.082** (0.905)       |
| Party-independent mayor           | 0.031     | 0.02       | 0.012 (0.019)         |
| Mayor age                         | 53.354    | 52.715     | 0.639 (0.880)         |
| Mayor age squared                 | 2888.425  | 2845.47    | 42.955 (93.799)       |
| Female mayor dummy                | 0.055     | 0.06       | − 0.004 (0.028)       |
| Mayor mandates (no.)              | 2.654     | 2.556      | 0.097 (0.206)         |
| Monthly mayoral wage              | 5113.747  | 4857.087   | 256.66*** (52.70)     |
| <i>Socioeconomic controls</i>     |           |            |                       |
| Population density                | 0.444     | 0.202      | 0.242*** (0.105)      |
| Dependency ratio                  | 0.55      | 0.622      | − 0.072*** (0.014)    |
| Graduates                         | 0.069     | 0.063      | 0.006 (0.004)         |
| Total urban area                  | 14.866    | 8.187      | 6.679*** (1.770)      |
| Electricity consumption PC        | 4836.572  | 3872.912   | 963.660 (593.325)     |
| Unemployment rate                 | 6.023     | 5.841      | 0.182 (0.243)         |

The values for the IRS tax rate are from 2008. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity)

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

**Table 11** Reelection candidate mean differences for treatment and comparison groups

| Year       | 1989 | 1993 | 1997 | 2001 |
|------------|------|------|------|------|
| Treatment  | 82.4 | 77.6 | 79.2 | 84.8 |
| Comparison | 81.3 | 78   | 74.7 | 84   |

**Table 12** Results: left-wing party mayors

|                            | Seek reelection    |                    |                    |                    |
|----------------------------|--------------------|--------------------|--------------------|--------------------|
|                            | (1)                | (2)                | (3)                | (4)                |
| Year 2009                  | 0.100<br>(0.062)   | 0.270**<br>(0.108) | 0.247*<br>(0.141)  | 0.307**<br>(0.146) |
| IMI reform                 | 0.117*<br>(0.060)  | 0.118*<br>(0.061)  | 0.144**<br>(0.062) | 0.151**<br>(0.064) |
| IMI reform × year 2009     | − 0.133<br>(0.085) | − 0.127<br>(0.087) | − 0.069<br>(0.080) | − 0.071<br>(0.081) |
| Reform controls            | No                 | Yes                | Yes                | Yes                |
| Political + mayor controls | No                 | No                 | Yes                | Yes                |
| Socioeconomic controls     | No                 | No                 | No                 | Yes                |
| NUTS 3 dummies             | Yes                | Yes                | Yes                | Yes                |
| Number of observations     | 271                | 271                | 271                | 271                |
| Adjusted $R^2$             | 0.029              | 0.020              | 0.122              | 0.123              |

All columns include NUTS 3 fixed effects (28 regional dummies). Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity. Party-independent mayors are not included

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

**Table 13** Results: right-wing party mayors

|                            | Seek reelection    |                    |                    |                    |
|----------------------------|--------------------|--------------------|--------------------|--------------------|
|                            | (1)                | (2)                | (3)                | (4)                |
| Year 2009                  | 0.058<br>(0.063)   | 0.046<br>(0.123)   | 0.177<br>(0.113)   | 0.100<br>(0.123)   |
| IMI reform                 | 0.067<br>(0.062)   | 0.068<br>(0.066)   | 0.023<br>(0.065)   | 0.021<br>(0.067)   |
| IMI reform × year 2009     | − 0.039<br>(0.090) | − 0.045<br>(0.094) | − 0.015<br>(0.090) | − 0.017<br>(0.092) |
| Reform controls            | No                 | Yes                | Yes                | Yes                |
| Political + mayor controls | No                 | No                 | Yes                | Yes                |
| Socioeconomic controls     | No                 | No                 | No                 | Yes                |
| NUTS 3 dummies             | Yes                | Yes                | Yes                | Yes                |
| Number of observations     | 274                | 274                | 274                | 274                |
| Adjusted $R^2$             | 0.007              | 0.018              | 0.098              | 0.113              |

All columns include NUTS 3 fixed effects (28 regional dummies). Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity. Party-independent mayors are not included

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)



**Table 14** Results: younger mayors (below median age)

|                               | Seek reelection   |                   |                   |                   |
|-------------------------------|-------------------|-------------------|-------------------|-------------------|
|                               | (1)               | (2)               | (3)               | (4)               |
| Year 2009                     | 0.047<br>(0.056)  | 0.003<br>(0.152)  | 0.074<br>(0.150)  | 0.091<br>(0.161)  |
| IMI reform                    | 0.077<br>(0.050)  | 0.077<br>(0.050)  | 0.084*<br>(0.049) | 0.077<br>(0.049)  |
| IMI reform $\times$ year 2009 | -0.117<br>(0.076) | -0.124<br>(0.079) | -0.055<br>(0.079) | -0.053<br>(0.081) |
| Reform controls               | No                | Yes               | Yes               | Yes               |
| Political + mayor controls    | No                | No                | Yes               | Yes               |
| Socioeconomic controls        | No                | No                | No                | Yes               |
| NUTS 3 dummies                | Yes               | Yes               | Yes               | Yes               |
| Number of observations        | 273               | 273               | 273               | 273               |
| Adjusted $R^2$                | 0.012             | 0.011             | 0.088             | 0.071             |

All columns include NUTS 3 fixed effects (28 regional dummies). Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

**Table 15** Results: older mayors (above median age)

|                               | Seek reelection   |                    |                   |                   |
|-------------------------------|-------------------|--------------------|-------------------|-------------------|
|                               | (1)               | (2)                | (3)               | (4)               |
| Year 2009                     | 0.135*<br>(0.069) | 0.241**<br>(0.107) | 0.233*<br>(0.123) | 0.184<br>(0.130)  |
| IMI reform                    | 0.105<br>(0.080)  | 0.128<br>(0.087)   | 0.090<br>(0.091)  | 0.120<br>(0.094)  |
| IMI reform $\times$ year 2009 | -0.078<br>(0.097) | -0.095<br>(0.101)  | -0.007<br>(0.100) | -0.046<br>(0.099) |
| Reform controls               | No                | Yes                | Yes               | Yes               |
| Political + mayor controls    | No                | No                 | Yes               | Yes               |
| Socioeconomic controls        | No                | No                 | No                | Yes               |
| NUTS 3 dummies                | Yes               | Yes                | Yes               | Yes               |
| Number of observations        | 283               | 283                | 283               | 283               |
| Adjusted $R^2$                | 0.016             | 0.007              | 0.049             | 0.108             |

All columns include NUTS 3 fixed effects (28 regional dummies). Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

**Table 16** Robustness: high-tax municipalities, excluding metropolitan areas

|                            | Seek re-election    |                     |                    |                    |
|----------------------------|---------------------|---------------------|--------------------|--------------------|
|                            | (1)                 | (2)                 | (3)                | (4)                |
| Year 2009                  | 0.113**<br>(0.054)  | 0.142<br>(0.113)    | 0.153<br>(0.127)   | 0.144<br>(0.133)   |
| IMI reform                 | 0.113*<br>(0.057)   | 0.106*<br>(0.057)   | 0.095*<br>(0.057)  | 0.099*<br>(0.056)  |
| IMI reform × year 2009     | -0.170**<br>(0.075) | -0.168**<br>(0.075) | -0.122*<br>(0.071) | -0.124*<br>(0.071) |
| Reform controls            | No                  | Yes                 | Yes                | Yes                |
| Political + mayor controls | No                  | No                  | Yes                | Yes                |
| Socioeconomic controls     | No                  | No                  | No                 | Yes                |
| NUTS 3 dummies             | Yes                 | Yes                 | Yes                | Yes                |
| Number of observations     | 335                 | 335                 | 335                | 335                |
| Adjusted $R^2$             | 0.024               | 0.025               | 0.103              | 0.089              |

All columns include NUTS 3 fixed effects (28 regional dummies), for the subsample of high-professional-status mayors. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

**Table 17** Robustness: high-tax municipalities, excluding coastal areas

|                            | Seek reelection     |                     |                    |                    |
|----------------------------|---------------------|---------------------|--------------------|--------------------|
|                            | (1)                 | (2)                 | (3)                | (4)                |
| Year 2009                  | 0.112*<br>(0.060)   | 0.134<br>(0.134)    | 0.196<br>(0.141)   | 0.173<br>(0.147)   |
| IMI reform                 | 0.137**<br>(0.062)  | 0.132**<br>(0.061)  | 0.115**<br>(0.057) | 0.120**<br>(0.057) |
| IMI reform × year 2009     | -0.168**<br>(0.084) | -0.165**<br>(0.083) | -0.129*<br>(0.077) | -0.136*<br>(0.077) |
| Reform controls            | No                  | Yes                 | Yes                | Yes                |
| Political + mayor controls | No                  | No                  | Yes                | Yes                |
| Socioeconomic controls     | No                  | No                  | No                 | Yes                |
| NUTS 3 dummies             | Yes                 | Yes                 | Yes                | Yes                |
| Number of observations     | 300                 | 300                 | 300                | 300                |
| Adjusted $R^2$             | 0.008               | 0.015               | 0.123              | 0.117              |

All columns include NUTS 3 fixed effects (28 regional dummies) for the subsample of high-professional-status mayors. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

**Table 18** Robustness: high-tax municipalities, excluding NUTS 2 regions

| Excluding                     | Seek reelection     |                     |                     |                    |                     |
|-------------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|
|                               | North               | Center              | Lisbon              | Alentejo           | Algarve             |
| Year 2009                     | 0.266**<br>(0.105)  | 0.149<br>(0.147)    | 0.196*<br>(0.116)   | 0.238*<br>(0.137)  | 0.179<br>(0.135)    |
| IMI reform                    | 0.080<br>(0.071)    | 0.121**<br>(0.058)  | 0.110**<br>(0.054)  | 0.081<br>(0.059)   | 0.103*<br>(0.057)   |
| IMI reform $\times$ year 2009 | -0.176**<br>(0.084) | -0.182**<br>(0.088) | -0.149**<br>(0.068) | -0.146*<br>(0.076) | -0.157**<br>(0.072) |
| Reform controls               | Yes                 | Yes                 | Yes                 | Yes                | Yes                 |
| Political + mayor controls    | Yes                 | Yes                 | Yes                 | Yes                | Yes                 |
| Socioeconomic controls        | Yes                 | Yes                 | Yes                 | Yes                | Yes                 |
| NUTS 3 dummies                | Yes                 | Yes                 | Yes                 | Yes                | Yes                 |
| Number of observations        | 267                 | 253                 | 378                 | 323                | 371                 |
| Adjusted $R^2$                | 0.087               | 0.068               | 0.104               | 0.113              | 0.098               |

All columns include NUTS 3 fixed effects (28 regional dummies) for the subsample of high-professional-status mayors. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

**Table 19** Robustness: high-tax municipalities, excluding entrepreneurs

|                               | Seek reelection     |                     |                     |                     |
|-------------------------------|---------------------|---------------------|---------------------|---------------------|
|                               | (1)                 | (2)                 | (3)                 | (4)                 |
| Year 2009                     | 0.128**<br>(0.056)  | 0.138<br>(0.114)    | 0.152<br>(0.126)    | 0.136<br>(0.133)    |
| IMI reform                    | 0.128**<br>(0.058)  | 0.122**<br>(0.057)  | 0.107*<br>(0.054)   | 0.108**<br>(0.054)  |
| IMI reform $\times$ year 2009 | -0.168**<br>(0.074) | -0.164**<br>(0.075) | -0.147**<br>(0.072) | -0.155**<br>(0.071) |
| Reform controls               | No                  | Yes                 | Yes                 | Yes                 |
| Political + mayor controls    | No                  | No                  | Yes                 | Yes                 |
| Socioeconomic controls        | No                  | No                  | No                  | Yes                 |
| NUTS 3 dummies                | Yes                 | Yes                 | Yes                 | Yes                 |
| Number of observations        | 360                 | 360                 | 360                 | 360                 |
| Adjusted $R^2$                | 0.017               | 0.015               | 0.095               | 0.095               |

All columns include NUTS 3 fixed effects (28 regional dummies) for the subsample of high-professional-status mayors. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

**Table 20** Term limit reform and possible selection into treatment

|                            | Property tax rates |                  | Primary expenditure PC |                   |
|----------------------------|--------------------|------------------|------------------------|-------------------|
|                            | (1)                | (2)              | (3)                    | (4)               |
| Term-limited in 2013       | 0.011<br>(0.010)   | 0.010<br>(0.012) | 46.067<br>(41.926)     | 5.451<br>(33.234) |
| Reform controls            | No                 | Yes              | No                     | Yes               |
| Political + mayor controls | No                 | Yes              | No                     | Yes               |
| Socioeconomic controls     | No                 | Yes              | No                     | Yes               |
| NUTS 3 dummies             | Yes                | Yes              | Yes                    | Yes               |
| Number of observations     | 1 112              | 1 111            | 1 112                  | 1 111             |
| Adjusted $R^2$             | 0.207              | 0.396            | 0.453                  | 0.745             |

All columns include NUTS 3 fixed effects (28 regional dummies). Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

**Table 21** Impact of property tax reform on income surtax rate

|                               | Income surtax rate (2008 and 2009) |                   |                   |                   |
|-------------------------------|------------------------------------|-------------------|-------------------|-------------------|
|                               | (1)                                | (2)               | (3)               | (4)               |
| Year 2009                     | -0.007<br>(0.015)                  | -0.006<br>(0.016) | 0.237<br>(0.237)  | 0.316<br>(0.243)  |
| IMI reform                    | -0.020<br>(0.129)                  | -0.051<br>(0.140) | -0.075<br>(0.135) | -0.091<br>(0.137) |
| IMI reform $\times$ year 2009 | 0.014<br>(0.017)                   | -0.032<br>(0.072) | 0.017<br>(0.094)  | 0.015<br>(0.098)  |
| Reform controls               | No                                 | Yes               | Yes               | Yes               |
| Political + mayor controls    | No                                 | No                | Yes               | Yes               |
| Socioeconomic controls        | No                                 | No                | No                | Yes               |
| NUTS 3 dummies                | Yes                                | Yes               | Yes               | Yes               |
| Number of observations        | 556                                | 556               | 556               | 556               |
| Adjusted $R^2$                | 0.123                              | 0.149             | 0.183             | 0.186             |

All columns include NUTS 3 fixed effects (28 regional dummies). Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity

Stars indicate significance levels of 10% (\*), 5% (\*\*), and 1% (\*\*\*)

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