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Working Paper

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FZID discussion papers, No. 43-2012

Provided in cooperation with:
Universität Hohenheim

Suggested citation: Foremny, Dirk; Riedel, Nadine (2012) : Business taxes and the electoral cycle, FZID discussion papers, No. 43-2012, urn:nbn:de:bsz:100-opus-6834 , http://hdl.handle.net/10419/55267

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Discussion Paper 43-2012

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Universität Hohenheim | Forschungszentrum Innovation und Dienstleistung

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ISSN 1867-934X (Printausgabe)
ISSN 1868-0720 (Internetausgabe)

Business Taxes and the Electoral Cycle

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January 31, 2012

Abstract

The purpose of this paper is to assess whether politicians manipulate the timing of tax rate changes in a strategic way to maximize reelection prospects. To do so, we exploit the German local business tax as a testing ground which is set autonomously by German municipalities. As election dates vary across local councils, the data allows us to disentangle effects related to the timing of elections from common trends. Using a rich panel data-set for German municipalities, we assess the impact of elections on local business tax choices. The findings support the notion of a political cycle in tax setting behavior as the growth rate of the local business tax is significantly reduced in the election year and the year prior to the election, while it jumps up in the year after the election. This pattern turns out to be robust against a number of sensitivity checks.

Keywords: local business tax choice, political economy, election cycle
JEL Classification Numbers: H25, H71, D72

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1. Introduction

The last decades have seen a strong and rising interest in identifying the determinants of corporate tax setting behavior. Recent theoretical and empirical papers stress that corporate tax rate choices are influenced by the size and structure of the economy, the government's budgetary situation and tax competition behavior (see e.g. Bucovetscy, 1991; Wilson, 1999; Buettner, 2003; Devereux et al., 2007). One aspect that has been rather neglected though is the impact of political economy determinants on the corporate tax rate choice. One key question in this area is whether politicians engage in opportunisitc behavior and deliberately manipulate government policies over the course of the electoral cycle in order to increase their reelection prospects.

Traditional papers in this area suggest that, in a world with asymmetric information, incumbent politicians have an incentive to signal their competency by increasing public spending prior to elections in order to boost the economy (see e.g. Nordhaus, 1975). Empirical evidence for this type of spending cycles has been rather mixed though (see e.g. Alesina et al. (1997) and Drazen (2000) for an overview). In response, a more recent strand of the theoretical literature has suggested that politicians may use adjustments of short-run policy instruments, like tax policy choices, to demonstrate their competency to the electorate rather than through spending-induced changes of the economic conditions (see e.g. Persson and Tabellini, 2001). This predicts a political business cycle in tax rate choices in the sense that tax increases tend to be delayed until after the election, while the probability for tax decreases is increased in the election year and the year prior to the election. Empirical evidence for this type of systematic tax setting behavior is, however, scarce at best.

The present paper aims to contribute to this literature and tests for political cycles in tax rate adjustments. Our empirical analysis uses the German local business tax as a testing ground which is set autonomously by German municipalities. The analysis is based on a unique and rich panel data base on around 8000 German municipalities and their political, social and budgetary situation and comprises data for the time period between 2000 and 2008. As election dates vary across local councils, the data allows us to disentangle effects related to the timing of elections from common trends.

Descriptively, our data suggests a strong trend to increase the local business tax rate within our time period. While more than half of the communities in our sample raise their local business tax rate once or more within our sample period, only a small fraction of around 5% of the communities enact a tax decrease. This descriptive pattern largely reflects a number of expenditure shocks at the local level within our sample period driven by rising costs for the provision of social services and a number of reforms that shifted public responsibilities to the local level. In consequence, communities were forced to adjust their local business tax rate as the major revenue instrument at their own discretion.

The purpose of this paper is to assess the timing of these local business tax rate changes and to test whether it follows a systematic pattern induced by the electoral cycle. To do so, we estimate panel models which determine the effect of election timing on the growth rate of the local business tax. In robustness checks, we also use logistic models to determine the impact on the probability that a municipality increases or decreases its local business tax rate. Our results provide strong evidence in favor of an electoral cycle. Precisely, we find that tax rate growth and the probability to observe an increase in the local business tax rate are significantly reduced in the election year and in the year prior to the election, while they jump up in the post election years. The effects are also quantitatively important. Our preferred estimates suggest that, relative to other years, the growth rate of the local business tax rate is, evaluated at the sample mean, reduced by around 40% in the election year and increased by around the same amount in the year after the election. This result is robust to controlling for a large number of economic, social and budgetary characteristics as well as municipality fixed effects.

As briefly described above, our paper relates to the empirical literature on political business cycles. The majority of papers in this literature focuses on spending cycles and reports rather mixed evidence (see Alesina et al., 1997). We are aware of only three previous papers which assess political cycles in tax setting behavior. Precisely, Mikesell (1978) and Nelson (2000) analyze the effect of elections on the adjustment of US state taxes in the post-war period. While they do find patterns which are in line with the notion of political tax cycles, their identification approach is purely descriptive and does not account for any type of heterogeneity between US states. Thus, problems related to omitted variables may clearly affect their qualitative and quantitative findings. A recent paper by Dahlberg and Mörk (2011) provides evidence for effects related to election timing on tax rate choices by combining Swedish and Finish data on local governments. In their study, variation in election dates arises only between the two groups of Swedish and Finish municipalities which differ in their institutional characteristics and may be subject to heterogeneous shocks. Our estimation approach tackles these problems by exploiting variation in election timing across federal states within the same country and by controlling for both, time-constant and time-varying heterogeneity in the social, political, and budget situation of municipalities.

The remainder of the paper is structured as follows: Section 2 provides a brief theoretical motivation for our analysis, Section 3 presents our data set and gives a brief overview over the institutional background for the German local business tax. Our estimation strategy is described in Section 4. Section 5 presents the results and Section 6 concludes.

2. Theory and Related Literature

One of the main elements of fiscal policies are politics themselves. The main reasoning is, as Tufte (1978) summarizes, that "*as goes politics, so goes economic policy and performance. This is the case because, as goes economic performance, so goes the election.*" This relationship has been studied extensively by theoretical and empirical motivated scholars in the literature on political business cycles and political budget cycles. The central idea of a political business cycle is that politicians have an incentive to implement demand-increasing policy measures prior to the election in order to boost the economy which then affects key macroeconomic variables, such as unemployment, output, and inflation (Nordhaus, 1975; Lindbeck, 1976). The empirical evidence for such a political cycle in macroeconomic performance is, however, rather mixed (see Alesina et al. (1997) and Drazen (2000) for an overview). On theoretical grounds these models were criticized for their assumption of non-rational and myopic voters, which are easy to fool by such means.

Recent papers drop the irrationality assumption and focus on information asymmetries between voters and politicians. The models by Rogoff and Sibert (1988) and Rogoff (1990) for example investigate fiscal choices in a game where politicians signal their level of competence. As a result, fiscal policies are distorted in election years. An important difference to the earlier papers is that these models predict distortions in main budgetary concepts, such as spending, revenues, deficits, and taxes rather than in macroeconomic indicators. It has been argued that politicians may want to implement expansionary politics in election and pre-election periods to signal their competency to the electorate by a higher level of public good supply at constant levels of taxation or by implementing low-tax policies for a given public good provision. Beyond these signaling considerations, incumbents may moreover, in a very general sense, want to implement political actions in pre-election years which are likely to be appreciated by the electorate and which might thus increase their reelection probability. Analogously, as voters face high costs of ousting unpopular politicians from office in non-election years and "unpopular actions in nonelection years may be heavily discounted by election time" (Nelson, 2000, p.544), politicians have an incentive to implement unpopular decisions at the beginning of the election period when the time span to the next election is as large as possible.

As most of the subsequent empirical literature, we do not aim at providing an explicit test of political budget cycle models. As noted by Kneebone and McKenzie (2001), a direct test of those models is difficult to implement since a measure for government competency would be needed. However, we read the signaling type of models as indicative for the variables we should take into account to explain tax rate changes, namely the electoral cycle. There is a large and still growing literature testing for election effects in public policy. Alesina et al. (1997) provides an exhaustive overview. Recent work of Schuknecht (2000), Persson

and Tabellini (2003) and Shi and Svensson (2006) report results which are in line with a political spending cycle at the national level. However, using data collected at the country level obviously has a number of limitations, first and foremost that it commonly does not allow to perfectly control for all other institutional and monetary differences across countries. Using a panel at the sub-national level with data for several regions or local governments which operate under similar regulations in one country can solve this problem. Empirical contributions using subnational data commonly find election effects in budgetary components. Among others, Dahlberg and Mörk (2011) suggest that elections impact on public employment using data for Sweden and Finland. Veiga and Veiga (2007) provide evidence for political expenditure cycles for Portuguese municipalities, as does Kneebone and McKenzie (2001) for Canadian provinces. Some of these studies simultaneously investigate electoral effects in revenues, in particular the share of revenues generated by taxation. However, it is not obvious why these revenue shares should be a signal of competence to voters. Lower revenues at a given tax rate for instance could be seen as exactly the opposite, the government's inability to administer the tax collection.[1]

Apart from that, the effect of electoral cycles on tax setting behavior is rather unexplored. We are aware of only two studies which, in a descriptive way, assess the effect of elections on the tax policy choice of US states. Precisely, Mikesell (1978) investigates how electoral cycles impact on the changes in tax rates and the adoption of new taxes for US states. He reports evidence for a strong political cycle as tax increases occur with a higher frequency the larger the time until the next election. Nelson (2000) updated the dataset to more recent years, and reports similar results. Both papers, however, use a purely descriptive approach to test for political cycles in tax policy choices and do not account for cross-sectional or longitudinal heterogeneity which may be correlated with the states' tax policy and confound the results.

We account for these shortcomings and use a more rigorous empirical identification strategy to test for political cycles in the context of the German local business tax. If the above theoretical incentives are relevant for political decision making, local politicians in Germany may want to signal their competency to the electorate by keeping local business taxes low, for a given amount of public good provision. Following this line of argumentation, we thus expect a reduced probability for tax increases prior to elections and a higher one once the election took place. Note in this context that, beyond the competence signal, increases in the local business tax might be unpopular with voters in a very direct sense as tax increases likely exert an effect on the inhabitants' after-tax income. Firstly, the German local business tax is levied on unincorporated as well as incorporated businesses and reduces their after-tax income. Especially with unincorporated businesses, business owners are likely to be voters in the community and are thus directly harmed by the tax increase. Several studies more-

[1] A noteable exception is the paper of Dahlberg and Mörk (2011) which also accounts for changes in statutory tax rates.

over suggest that a significant fraction of corporate and business taxes are borne by workers (see e.g. Arulampalam et al., 2007; Desai et al., 2007), which may also make business tax increases unpopular with the electorate.

Following these considerations, we will assess the existence of electoral cycles in the tax setting behavior of German municipalities. Precisely, we will investigate whether business tax rates are significantly reduced in pre-election years and significantly increased in post-election years. In doing so, we use panel estimators and exploit that local election dates in Germany vary across federal states. This allows us to separate common shocks to all municipalities from potential effects related to the electoral cycle.

3. Data

In the following, Section 3.1 will provide detailed institutional information on the local business tax legislation and the political system in Germany. Subsequently, Section 3.2 describes our data set and the variable definition.

3.1. Institutional Background

The testing ground for our empirical analysis is the local government sector in Germany. In general, the German federal system consists of three governmental tiers: the federal, regional, and local governments, whereas the regional and local level consist of sixteen states and around 12,000 municipalities respectively. Taxing powers are restricted to the federal and the local government level.

The responsibilities of local governments vary only slightly across federal states. Their main mandatory tasks comprise construction work and the maintenance of roads, sewerage, kindergardens and primary schools. Other responsibilities, such as the maintenance of cultural or sport facilities, tourism, and public transport are optional. In addition, local governments are responsible to provide certain social allowances to the unemployed, such as housing. In general, our sample period is characterized by rising expenditures at the local level due to increasing social costs and a number of federal reforms which shifted additional burdens on to the local government level. Examples are laws for the provision of additional kindergarten capacities by the local level ('Gesetz zum Ausbau der Kindergartenbetreuung') and additional social security payments for the elderly and the unemployed (see e.g. Bundesbank, 2000, 2007).

While a major fraction of the funds for the provision of these services come from grants and redistributed taxes, the local communities have discretion over two own tax instruments: the local business tax and a local property tax. In revenue terms, the local business tax is by far the more important revenue source for local jurisdictions and significantly contributes

to local government revenues. The average tax rate set by German municipalities is 16.25% and thus makes up a considerable fraction of the tax burden on firms in Germany.[2] The tax base is defined as firm profit earned within the boundaries of each municipality, town, or city. The tax applies to both, the incorporated and non-incorporated sector, whereas the tax base definition follows the corporate and income tax law. While the tax base law is set at the national level and thus applies to all municipalities in Germany, the local council of each municipality can decide autonomously upon a tax collection rate. The rate chosen is valid for at least the next entire budget year. On the local level, a budget year corresponds exactly to the calendar year. Municipalities can change their tax rate from year to year, but not in between. There is no upper bound for the tax rate, but a lower one was introduced in 2004.[3] The majority of the local business tax revenues remains directly with the municipalities. A small share has to be transferred to the central and regional level though, as an element of the German federal equalization scheme.

On the policy side, the election and legislative process in the local councils has to be in line with the so-called municipal code in the community's hosting state. Our empirical analysis exploits that the election date of the local councils differs across federal states. The election years for the eight states included in our analysis are listed in Table 1. Apart from this difference, municipal codes are similar across states. For example, in all federal states a simple majority of votes in the local council is required to enact a change in the collection rate of the local business tax. Moreover, in all states, a large number of parties tend to take part in the local elections, comprising the major parties which also operate at the regional or national level as well as numerous local parties and candidates.[4]

[Table 1 about here]

The homogeneity of the political and administrative legislation is a big advantage of our data compared to cross-country studies at the national level, where the institutional background varies between states and appropriate controls for these differences are often not availale. In the German context, municipal codes and law differ only slightly across federal states. This offers convenient features to test our hypothesis, in particular since all communities have exactly the same fiscal policy tools at hand.

[2]The current corporate tax rate at the national level is 15%.

[3]The idea was to prohibit very low tax rates chosen by a small number of "tax haven" communities before 2004.

[4]Note in this context that one important difference between elections at the local level compared to state or federal elections is that commonly a larger number of small parties is represented in the local council as with the former no minimum threshold of votes has to be passed in order to be considered for the allocation of seats.

3.2. Dataset

Our data set comprises German communities in the period between 2000 and 2008.[5] The data accounts for all municipalities in West German states (except the city states of Bremen and Hamburg[6]). We disregard communities in Eastern Germany which joined the Federal Republic of Germany in the reunification of 1990 as a major fraction of those communities was subject to mergers and local government reforms after the German reunification. Furthermore, we exclude West German municipalities which were subject to a merger and those belonging to a municipal union in Lower Saxony. Eventually, we end up with a sample of 7738 municipalities.[7] Figure 1 presents a graphical representation of our sample.

[Figure 1 about here]

As mentioned above, we observe a rising trend in local business tax rates within our sample period. A majority of communities raised their local business tax rate at least once within our 9-year-period. Within this group only a small number of municipalities observes two or more changes, see figure 2 for details. In contrast to the large number of tax hikes, declines in the local business tax rate are rare. Precisely, only around 5% of the municipalities in our data lower their tax rates at least once within our sample period.

[Figure 2 about here]

This pattern may on the one hand reflect increased funding needs of local municipalities as rising social costs and reforms which shifted additional obligations to the local level exerted pressure on community finances. On the other hand, our sample period is also characterized by two major declines in the federal corporate tax rate (in 2001 and 2008) which might - in a vertical tax competition framework - increase the communities' incentive to raise their local business tax rate. Figure 4 depicts the geographical distribution of tax rate changes, showing that tax hikes and cuts are not exclusive to particular federal states.

[Figure 4 about here]

Moreover, we augment our data set by detailed information on socio-economic and political characteristics of the communities in our data. Descriptive statistics are presented in Table 2. Firstly, we include the total number of inhabitants to capture differences in community size. The variable points to a strong heterogeneity between the municipalities in our data which includes small jurisdictions with less than 10 inhabitants as well as the

[5] Some data, like electoral results, are also collected for years prior to our sample period in order to determine whether our first sample year (the year 2000) is a post-election year and to determine the composition of the local council in the first sample years.

[6] We exclude the city states, because local and regional budgets are not easy to separate in this context.

[7] Public finance data is not available for some years in the federal state of Schleswig-Holstein.

city of Munich with 1.3 million people. Furthermore, we include a number of socio-economic variables, precisely the share of young inhabitants below the age of 15 and the share of old inhabitants above the age of 65 as the demographic structure may affect local business tax choices. To capture employment effects, we further include the local unemployment rate, defined as the number of unemployed as a share of total population.[8]

[Table 2 about here]

Furthermore, we add three indicators for the municipalities' fiscal performance and economic capacity to our dataset. First, we include public borrowing in each year, defined as the share of revenues that is generated by new credits, less amortization of debts. Second, we include the total outstanding debt in per capita terms. This value is obtained at the county level, but it also includes municipality-specific information on debt of hospitals and other city owned companies like transportation or sewage. Moreover, to control for the prosperity of a community in terms of per capita income and wealth, we also include a variable for the average private per capita income. All described variables show a considerable cross-sectional and longitudinal variation as indicated by large standard deviations.

Last, we include detailed information on the seat shares of political parties in the municipal council. We directly observe the share of the four main parties, which also run for national or regional elections. These are the center-right conservative party (CDU), the center-left social democrats (SPD), the liberal party (FDP), and the Green party (Gruene). We create aggregated values for parties at the far-left of the political spectrum (comprising Die Linke, the former PDS, and the former WASG), for parties at the far-right of the political spectrum (comprising the nationally organized extreme right parties NPD, DVU, Die Republikaner, and some local right wing parties which are only regionally active) and an aggregated value for all remaining political parties which mainly comprise locally operating civil parties.

4. Identification

Our baseline analysis focuses on investigating the determinants of tax rate changes in the form of the annual percentage change or growth rate.

$$\tau_{i,t}^{growth} = \frac{tax_{i,t} - tax_{i,t-1}}{tax_{i,t-1}} \tag{1}$$

Alternative specifications use binary dependent variables $\overline{\tau}^{binary}$ and $\underline{\tau}^{binary}$ to assess the determinants of the general probability that a community increases and decreases its tax

[8]Due to confidentiality reasons, this variable is censored if less than three people are unemployed. In this case the variable is set equal to zero.

rate. The variable $\overline{\tau}$ is coded one if the statutory tax rate increased from the previous to the current year, and zero otherwise. Formally,

$$\overline{\tau}_{i,t}^{binary} = \begin{cases} 1 & \text{if} \quad tax_{i,t} - tax_{i,t-1} > 0 \\ 0 & \text{otherwise} \end{cases} \tag{2}$$

$\underline{\tau}^{binary}$ is defined analogously for tax decreases. Furthermore, the generic model estimated for the various definitions of τ is specified as

$$\tau_{i,t,s} = \mathbf{t}'_{\mathbf{t,s}}\boldsymbol{\delta} + \mathbf{x}'_{\mathbf{i,t}}\boldsymbol{\beta} + \varepsilon_t + \mu_{i,s} + \epsilon_{i,t} \tag{3}$$

where the vector $\mathbf{t}$ is a set of time period specific dummies, which we relate to election dates to test for an electoral cycle. In our main analysis, we include dummy variables for the year before an election is held, the election year, and the year after the election.

$$\mathbf{t}' = \begin{bmatrix} t_{t-1} \\ t_t \\ t_{t+1} \end{bmatrix} \text{ and } \begin{cases} =1 \text{ in the pre-election year, 0 otherwise} \\ =1 \text{ in the election year, 0 otherwise} \\ =1 \text{ in the post-election year, 0 otherwise} \end{cases} \tag{4}$$

These variables vary across federal states s. Individual municipalities i within the borders of one state share common election dates, but variation arisis across the German states.

In addition, the estimations include a full set of year fixed effects ε to capture common shocks over time which affect all our sample communities. As election dates vary across communities in different states, both, election effects captured by the vector $\mathbf{t}$ and the time fixed effects are identified. Thus, the approach resembles a difference-in-difference framework in which communities with no election in a particular year act as a control group to identify the effect of elections on the tax setting behavior in the treatment group of communities with an election (and on those communities in a pre- and post-election year respectively).

In terms of control variables, $\mathbf{x}$ depicts a vector which gathers other determinants that are related to the decision whether or not to change the tax rate and vary across municipalities i and over time t. In some specifications the vector $\mathbf{x}$ moreover includes political variables. Most importantly, we include information on the seat share of parties in the local council to assess potential effects related to partisan policies. Additionally, we add a control variable for community size (as measured by the number of inhabitants) as spending needs and benefits related to economies of scale may vary across jurisdictions of different size and affect tax policy choices. The model moreover controls for demographic information on the age structure of the community's inhabitants and the unemployment rate, as local governments provide public schools as well as social assistance for the unemployed and the elderly which affects expenditures and revenue needs. Moreover, we add detailed budgetary information

on deficits and the debt level which also may impact on the communities' funding needs and thus eventually on the communities' tax rate choice.

Furthermore, we include community fixed effects μ_i in the baseline model which absorb time-constant heterogeneity between jurisdictions or a full set of state fixed effects μ_s which absorb potential effects related to institutional differences between states.

The baseline model is estimated with usual panel data estimators. To estimate the models where our dependent variable comes in a binary form, we use a logit transformation and report the average marginal effects. Due to the nature of our data, serial correlation of errors is not a major problem. However, we cluster standard errors at the municipal level. We also present standard errors clustered at the state-year level to capture potential correlation of residuals at these units. Note that clustering at the state level is infeasible since the number of groups is small. Nevertheless, Bertrand et al. (2004) show that standard errors might be underestimated in the presence of serial correlation when clustering is conducted at the state-year rather than state level. Therefore, we also make use of two-way clustering at the state-year and individual level (Cameron et al., 2006). We spent particular attention to this when it comes to the presentation of our result.

5. Results

Table 3 presents the result of the estimation model outlined in equation (1). In specifications (a) to (d) we regress the annual growth rate of the local business tax on the set of dummy variables for the pre-election, election and post-election year as well as a full set of community fixed effects and time-varying community characteristics.[9] Model (a) assumes independence of the errors across observations. In models (b) and (c) standard errors are clustered at the community level (model (b)) and state-year level (model (c)) respectively. Model (d) accounts for two-way clustering of the standard errors at the state-year level and community level as described above. Additional to coefficient estimates and standard errors, the table reports the p-values and 95% confidence intervals for the coefficient estimates.

The specifications confirm the hypothesis of an electoral cycle in tax setting behavior. Precisely, the coefficient estimates for the dummy variables t_{t-1} and t_t show a negative sign, while the coefficient estimate for the post-election year is positive. In specifications (a) and (b) all three coefficient estimates turn out statistically significant, indicating that the growth rate in the business tax is reduced by 0.09 in the year prior to the election and by 0.16 in the election year. Evaluated at the sample mean (=0.37, cf. Table 2), this corresponds to a drop in the growth rate by 24% and 43% respectively. In the post election year, the estimation suggests that the growth rate is significantly increased by 0.17, or evaluated at

[9]The table depicts the coefficient estimates for the electoral dummies only. The coefficient estimates for the control variables are reported in Table 10 in the appendix.

the sample mean, by 47%. Models (c) and (d) equally derive a significant election year and post election year effect, while the coefficient estimate for the pre-election year loses its statistical significance. Taken together, this pattern confirms the theoretical considerations in Section 2 and suggests that politicians indeed tend to keep local business taxes low prior to elections and implement tax increases in post-election years when the time gap to the next election is maximized.

[Table 3 about here]

Models (e) and (f) of Table 3 moreover reestimate these baseline regressions replacing the community fixed effects by a full set of state fixed effects. Again, the models account for clustering of the standard errors at the state-year level and for two-way clustering at the state-year and community level respectively. This modification leaves both, the qualitative and quantitative results unchanged.

Further note that the control variables exhibit the expected signs (see Table 10 in the appendix for results). Most importantly, the coefficient estimate for the community's newly issued debt relative to revenues ('credits') is positive and statistically significant in all specifications, indicating that those communities with high financing needs, as proxied by new debt issues, tend to observe higher tax rate growth than other jurisdictions. The coefficient estimates for all other control variables turn out insiginificant in the specifications that control for community fixed effects and hence absorb any time-constant heterogeneity between jurisdictions. The specifications which include state-fixed effects further suggest that large and high-income communities tend to observe lower growth rates of the local business tax within our sample period. This may be related to the fact that communities receive a fixed share of the lagged personal income tax paid by their residents.[10] Rich communities with high average incomes thus receive higher tax revenues and may be less affected by reforms within our sample period that shifted additional tasks and spending obligations to the community level.

[Table 4 about here]

Moreover, as described in Section 3.1, our sample period was characterized by a strong upward trend in local business taxes. While every second community increased its local business tax rate at least once within our sample period, only a minor fraction of communities opted for a tax rate reduction. To assess whether the impact of election dates on tax rate increases differs from its impact on tax rate decreases, we transform our dependent variable to capture positive growth rates ($\overline{\tau}^{\text{growth}}$) and negative growth rates ($\underline{\tau}^{\text{growth}}$) separately. Thus, in the construction of $\overline{\tau}^{\text{growth}}$ ($\underline{\tau}^{\text{growth}}$), community-year observations with negative (positive) tax rate growth are treated as zero. Specifications (a) to (d) of Table 4 reestimate

[10] Note, however, that the personal tax instruments are set at the national level.

our baseline model accounting for the modified dependent variables. Standard errors are clustered at the state-year level and specifications (a) and (c) ((b) and (d)) include a full set of community fixed effects (state fixed effects). We find the baseline results confirmed in specifications (a) and (b) that investigate the impact of the electoral cycle on positive growth rates in the local business tax measure. Thus, increases in local business tax rates tend to be significantly reduced in the election year and significantly increased in the post election year. Repeating the same exercise for the negative business tax growth $\underline{\tau}^{\text{growth}}$ derives statistically insignificant coefficient estimates for all three election dummies. As the number of business tax reductions observed in our data is tiny (less than 1% of the community-year observations), this likely reflects imprecisions in the estimated effects due to limited variation in the data.

[Table 5 about here]

The fact that many communities do not observe a tax rate change within our sample period further suggests that a binary regression model may fit the data well. Thus, we additionally run estimation models that test for a potential impact of the election cycle on the community's probability to increase or lower the local business tax rate. Table 5 presents the results for the marginal effects of a logit model including state level and year fixed effects.[11] Model (a) assesses the effect of the election cycle on a community's probability to increase its tax rate while model (b) assesses the effect on the probability for a tax decrease. In line with the previous results, our findings are confirmed in the former specification while the coefficient estimate for all election dummies turn out insignificant in most instances of the latter one. Again, we consider the latter finding to reflect the too low number of community-year observations with a tax decrease. Further note that the findings of model (a) also quantitatively correspond to our baseline estimates. Calculating marginal effects suggests that the probability to observe a tax increase is reduced by 3.1 percentage points in the election year and jumps up by 3.5 percentage points in the post election year. Relative to the unconditional probability for a tax increase/decrease, this corresponds to a change by 38% and 43%.

[Table 6 about here]

In a robustness check, we further assessed whether the election cycle is related to changes in the composition of the city council. In general, German local politics are characterized by a large number of parties as membership in the local city council is not tied to obtaining at least 5% of the votes like it is the case in national elections. Thus, besides the nationally

[11] The coefficent estimates are presented in Table 12 in the appendix. We also estimated conditional logit models which account for unobserved heterogeneity across jurisdictions but suffer from the shortcoming that there are no convenient possibilities to compute marginal effects. The qualitative results of the conditional logit model are in line with those of the logit model including only state dummies though.

operating parties, a number of civil parties are active at the local level which are mainly concerned with local policy issues and are thus difficult to classify in the left-right-spectrum. To nevertheless assess whether changes in the distribution of seats across parties impacts on the political business cycle determined in this paper, we classify parties in right wing parties (comprising the conservative party CDU, the liberal party FDP and a number of nationalist parties at the far right spectrum), left wing parties (comprising the social democrats SPD, the green party DIE GRUENEN, DIE LINKE and a number of other parties at the far left of the policy spectrum) and local civil parties. From this information, we define a dummy variable indicating major changes in the composition of the local council. The variable takes on the value 1 if an election destroys or brings about a majority for the left wing or right wing bloc. Since civil parties receive a significant fraction of vote shares at the local level, direct changes from a left-wing to a right-wing majority or vice versa are rather rare though. Table 6 reports the results of specifications which reestimate our baseline model augmenting the set of regressors by interaction terms between the election dummies and the dummy variable indicating major changes in the composition of the local council as defined above. As indicated in the table, the coefficient estimates for the interaction terms turn out insignificant and simultaneously do not change the pattern of our baseline estimates. This suggests that on average the election cycle in tax setting behavior is not related to elections which do or do not change city council majorities.

[Table 7 about here]

Furthermore, we assessed the robustness of our results to including a control variable for the lagged level of the local business tax rate. The results are presented in Table 7. Specification (a) reestimates our baseline model using the growth rate in the business tax as dependent variable. The coefficient estimate for the lagged level of the business tax rate turns out negative and statistically significant indicating mean reversal in the communties' business tax setting behavior. Moreover, again, the coefficient estimates for the election year and post election year dummy turn out negative and positive respectively, whereas only the former is statistically significant at conventional significance levels though. Specifications (b) and (c) augment the binary models by the lagged level of the dependent variable. Specification (b) presents the results for the election cycle on a community's probability to increase its tax rate. In line with intuition, the coefficient estimate for the lagged dependent variable turns out negative suggesting that communities with a high local business tax are less likely to observe a tax increase. The specification also confirms our baseline findings qualitatively and quantitatively whereas both, the coefficient estimates for the election and post-election dummies now turn out statistically significant. The average marginal effect in the election year is -3.0 percentage points and the marginal effect of the post-election year is also comparable to the previous findings indicating an increase in probability of 4.6 percentage points. Specification (c) reports analogous results for the binary model indicating

tax rate decreases. Here, in line with intuition, the lagged dependent variable turns out positive and statistically significant, indicating that communities with a high local business tax have a higher probability to observe tax decreases. Apart from that the results resemble our baseline findings in the sense that the coefficient estimates for electoral dummies turn out statistically insignificant.

[Table 8 about here]

Additionally, in our baseline model, the growth rate of the dependent variable is calculated based on the community's *statutory* local business tax rate. A particular feature of the German local business tax, however, is that a firm's local business tax payment is itself deductible from its tax base ('self-deductibility'), implying that the firm's effective tax burden falls short from the statutory one.[12] As a robustness check, we thus reestimate our baseline model defining the growth rate in the effective local business tax accounting for self-deductibility of the tax. The results are presented in specification (a) of Table 8 and qualitatively and quantitatively resemble our baseline findings. As an additional modification, specification (b) moreover reruns the baseline specification using the change in the local business tax rate as the dependent variable instead of the growth rate. Again, the findings are comparable to our baseline estimates.

[Table 9 about here]

Moreover, our baseline model includes three dummy variables to capture the electoral cycle: a dummy variable for the pre-election year, a dummy variable for the election year and a dummy variable for the post-election year. As elections for the local council take place every five years, the two remaining years act as baseline category. In Table 9 we reestimate our baseline model using the local business tax growth as dependent variable and including indicator variables for the election year, for the first year after the election, for the second year after the election, for the first year prior to the election and for the second year prior to the election separately. The pattern is very consistent with our theoretical considerations in the sense that we find a negative, but small and insignificant coefficient estimate in the specification (a) which includes a dummy variable for years two years prior to the election. In specification (b) we include a dummy variable for the pre-election year and find a negative effect which is larger in absolute terms than in the previous specification, although still not significant. In specification (c) which includes a dummy variable for the election year, the effect is negative and again larger in absolute terms than in the previous two specifications, which now also gains statistical significance. Including only a dummy variable for the first

[12] Self-deductibility of the local business tax implies that the corporate tax payment T is calculated as $T = t(\pi - T)$, with t denoting the local business tax rate (in percentage values) and π denoting the company profits. Rearranging derives $T = t/(1+t)\pi$. Hence, the statutory local business tax rate which is, for example, implied by a local business tax of 16.25% is 0.1625/1.1625=14%.

year after the election derives a positive and statistically significant coefficient estimate, confirming our baseline estimations (see specification (d)). Rerunning the specification with a dummy variable indicating the second post-election year again derives a positive coefficient estimate which, in line with expectation, is smaller though and does not fully gain statistical significance.

Concluding, the results in this section are in line with an election cycle in tax setting behavior. In particular, we find that the tax rate growth is significantly reduced in the election year and significantly increased in the first post-election year.

6. Conclusion

The aim of this paper was to assess whether there is an electoral cycle in the tax setting behavior of local communities. For that purpose, we exploited rich panel information on a large set of communities in Germany. Moreover, as the election dates for local councils in Germany vary across states, our data allows us to disentangle effects related to electoral cycles from common trends. Using conventional fixed effects panel methods and logit estimations, and controlling for time-constant and time-varying heterogeneity between the communities, our results provide strong evidence that tax setting is affected by election dates. Precisely, our findings suggest that compared to other years the tax rate growth is significantly reduced in the election year, while it jumps up in the year after the election. The effects turn out quantitatively important and suggest that, evaluated at the sample mean, tax rate growth is decreased and increased by around around 40% in the pre- and post-election year respectively.

Thus, concluding, our findings suggest that political economy determinants, in particular the timing of elections, exert an impact on the tax rate choice of local communities. This underpins the validity of recent theoretical claims which suggest the importance of an electoral cycle in the choice of policy instruments. In the policy arena, the findings may have implications for the design of political systems and the decision about the timing, synchronization and length of political election terms.

References

Alesina, A., Roubini, N., Cohen, G. D. 1997. Political Cycles and the Macroeconomy. The MIT Press.

Arulampalam, W., Devereux, M., Maffini, G. 2007. The direct incidence of corporate income tax on wages. Oxford University Centre for Business Taxation Working Paper, 07/07.

Bertrand, M., Duflo, E., Mullainathan, S. 2004. How much should we trust differences-in-differences estimates? The Quarterly Journal of Economics, 119 (1), 249–275.

Bucovetscy, S. 1991. Asymmetric tax competition. Journal of Urban Economics, 30, 167 – 181.

Buettner, T. 2003. Tax base effects and fiscal externalities of local capital taxation: Evidence from a panel of german jurisdictions. Journal of Urban Economics, 54, 110 – 128.

Bundesbank, D. 2000. Die entwicklung der kommunalfinanzen seit mitte der neunziger jahre. Monatsbericht Juni 2000.

Bundesbank, D. 2007. Zur entwicklung der gemeindefinanzen seit dem jahr 2000. Monatsbericht Juli 2007.

Cameron, A. C., Gelbach, J. B., Miller, D. L. 2006. Robust inference with multi-way clustering. (0327).

Dahlberg, M., Mörk, E. 2011. Is there an election cycle in public employment? separating time effects from election year effects. CESifo Economic Studies.

Desai, M., Foley, F., Hines, J. 2007. Labor and capital shares of the corporate tax burden: International evidence. mimeo.

Devereux, M., Lockwood, B., Redoano, M. 2007. Horizontal and vertical indirect tax competition: Theory and some evidence from the usa. Journal of Public Economics, 91 (3-4), 451 – 479.

Drazen, A. 2000. Political Economy in Macroeconomics. Princeton University Press.

Kneebone, R. D., McKenzie, K. J. 2001. Electoral and partisan cycles in fiscal policy: An examination of Canadian provinces. International Tax and Public Finance, 8 (5-6), 753–774.

Lindbeck, A. 1976. Stabilization policy in open economies with endogenous politicians. American Economic Review, 66 (2), 1–19.

Mikesell, J. L. 1978. Election periods and state tax policy cycles. Public Choice, 33 (3), pp. 99–106.

Nelson, M. A. 2000. Electoral Cycles and the Politics of State Tax Policy. Public Finance Review, 28 (6), 540–560.

Nordhaus, W. D. 1975. The political business cycle. The Review of Economic Studies, 42 (2), pp. 169–190.

Persson, T., Tabellini, G. 2001. Macroeconomic Policy, Credibility and Politics. Abingdon, Routledge.

Persson, T., Tabellini, G. 2003. The economic effects of constitutions. Cambridge, MIT Press.

Rogoff, K. 1990. Equilibrium political budget cycles. American Economic Review, 80 (1), 21–36.

Rogoff, K., Sibert, A. 1988. Elections and macroeconomic policy cycles. Review of Economic Studies, 55 (1), 1–16.

Schuknecht, L. 2000. Fiscal policy cycles and public expenditure in developing countries. Public Choice, 102 (1-2), 115–30.

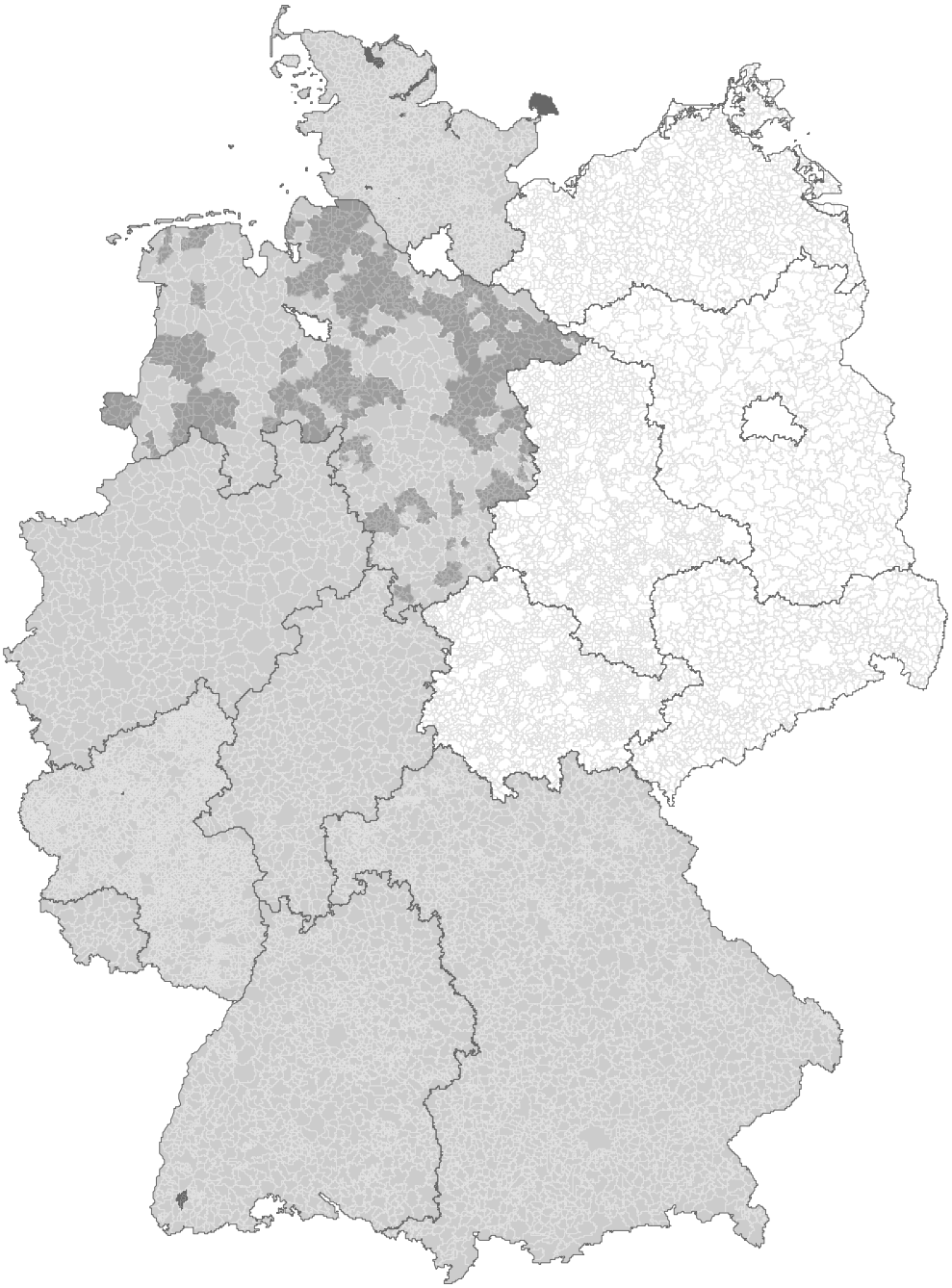
Shi, M., Svensson, J. 2006. Political budget cycles: Do they differ across countries and why? Journal of Public Economics, 90 (8-9), 1367–1389.

Tufte, E. R. 1978. Political Control of the Economy. Princeton University Press.

Veiga, L., Veiga, F. 2007. Political business cycles at the municipal level. Public Choice, 131 (1), 45–64.

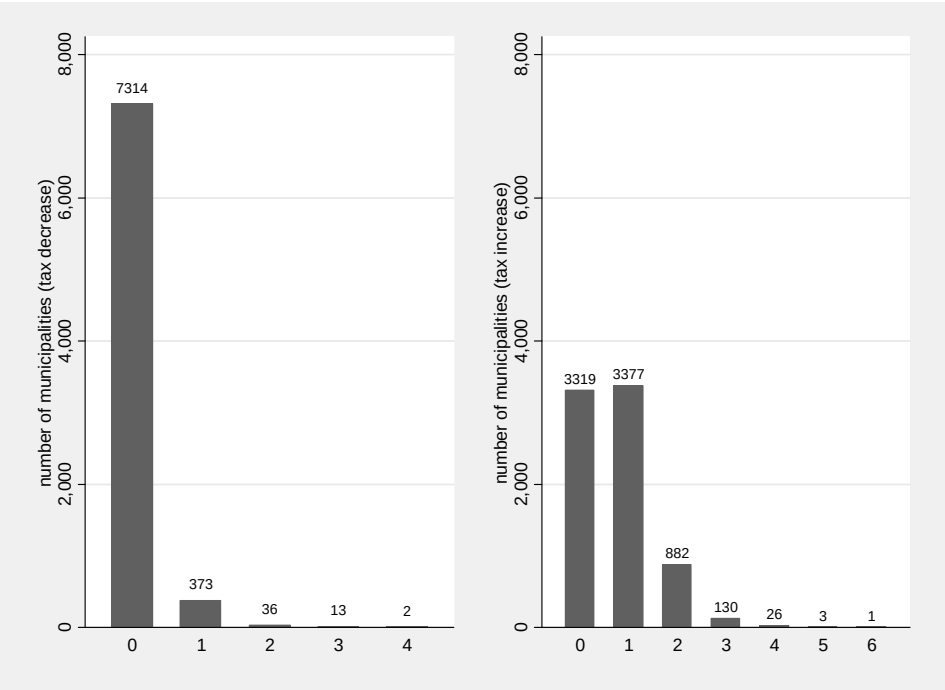
Wilson, J. D. 1999. Theories of tax competition. National Tax Journal, 52, pp. 269–304.

Graphs and Tables



Notes: All light gray shaded municipalities are included. Dark gray shaded areas in Lower Saxony belong to a joint municipality and are dropped from the sample. Black shaded municipalities were subject to a merger during our period and also dropped.

Figure 1: Sample



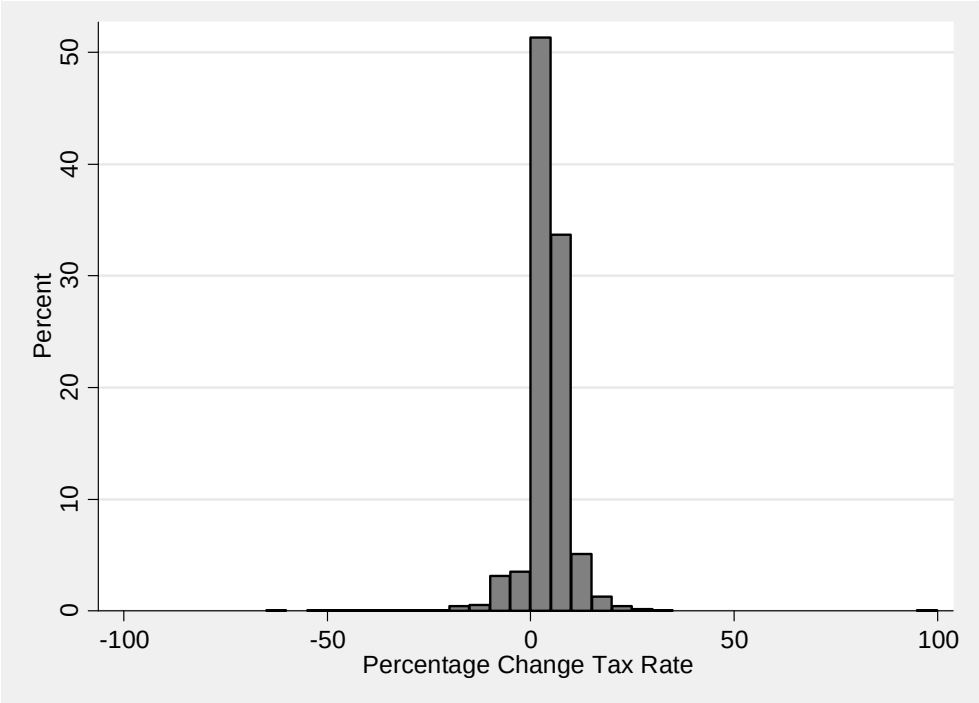
Notes: Left (right) panel shows the sum of municipalities over absolute number of negative (positive) changes. No municipality increased the tax rate more than six times or decreased more than four times within our panel.

Figure 2: Tax changes

federal state	years		
Schleswig-Holstein	1998	2003	2008
Lower Saxony (Niedersachsen)	1996	2001	2006
North Rhine-Westphalia (Nordrhein-Westfalen)	1999	2004	2009
Hesse (Hessen)	1996	2001	2006
Rhineland-Palatinate (Rheinland-Pfalz)	1999	2004	2009
Baden-Wuerttemberg	1999	2004	2009
Bavaria (Bayern)	1996	2002	2008
Saarland	1999	2004	2009

Notes: Election years for local councils accoring to the federal state wherein the local governments are located.

Table 1: Elections at the local level



Notes: Distribution of tax rate growth rates in the sample.

Figure 3: Tax rate growth

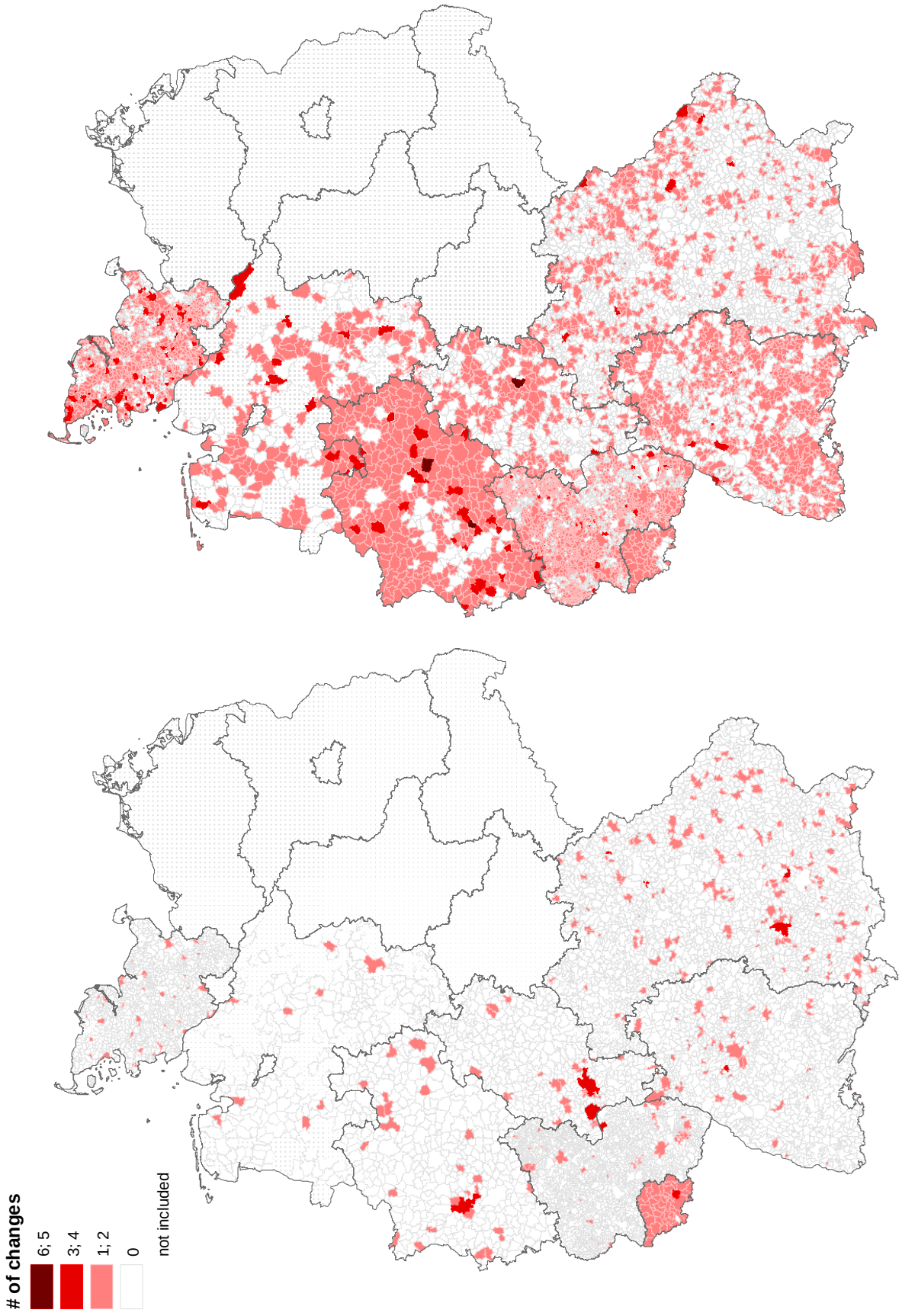


Figure 4: Number of changes (decreases/increases)

Notes: left (right) panel shows municipalities colored according to the number of tax cuts (hikes). Blank areas are not included.

Variable	Mean	Std.Dev.	Min	Max
Controls				
credits	-.002	.073	-2.828	.685
unemployment	.029	.013	0.000	.190
young	.163	.033	0.000	.600
old	.180	.042	0.000	.500
city	.183	.387	0.000	1.000
debt	2.368	1.034	.481	6.831
population	7947.075	31778.29	3.000	1326807
income	17462.470	1831.300	13222.000	29938.000
expenditures	1.008	6.323	0.000	1053.085
Party Controls - Seat Shares				
cdu	.246	.234	0.000	1.000
spd	.163	.180	0.000	1.000
gruene	.014	.035	0.000	.375
fdp	.011	.033	0.000	.583
farright	.000	.005	0.000	.226
farleft	.000	.003	0.000	.154
other	.565	.382	0.000	1.000
Raw tax data				
collection rate	336.386	31.860	0	900
diff. collection rate	1.296	6.571	-150	200
Dependent variables				
$\underline{\tau}^{binary}$	.007	.084	0.000	1.000
$\overline{\tau}^{binary}$	.081	.273	0.000	1.000
τ^{growth}	.369	1.974	-61.224	100
Changes (Dep.var excluding zeros)				
$\underline{\tau}^{binary}$ if $\neq 0$	.080	.271	0.000	1.000
$\overline{\tau}^{binary}$ if $\neq 0$	.920	.271	0.000	1.000
τ^{growth} if $\neq 0$	4.177	5.312	-61.225	100
N=69642, T=9 (2000-2008), n=7738				

Notes: credits: new credits minus repayments as share of annual revenues (public finance data is not available for the federal state of Schleswig-Holstein for the years 2000 to 2002.), unemployment: unemployed people as share of total population (data is censored if less than three people are unemployed. The share is set to zero in that case.), population: number of inhabitants, young: share of inhabitants under 15 years of age, old: share of inhabitants over 65 years of age (Population data for the year 2000 is missing and imputed through the group mean.) city: dummy varibale, debt: total municipal debt per capita (county level), income: income in Euro per capita (county level), expenditures: per capita expenditures on voluntary services. Party controls are the respective seat shares in the local council. Collection rate: statutory business tax collection rate.

Table 2: Summary statistics

Dependent Variable	Individual Fixed Effect Model				State Fixed Effect Model	
τ^{growth}	(a)	(b)	(c)	(d)	(e)	(f)
t_{t-1}			-0.091			-0.088
s.e.	0.023	0.023	0.107	0.106	0.109	0.109
p-value	**0.000**	**0.000**	0.396	0.391	0.423	0.418
95% CI	(-0.137 - -0.046)	(-0.137 - -0.046)	(-0.304 - 0.122)	(-0.300 - 0.117)	(-0.307 - 0.130)	(-0.301 - 0.125)
t_t			-0.159			-0.163
s.e.	0.024	0.027	0.08	0.08	0.079	0.079
p-value	**0.000**	**0.000**	**0.049**	**0.046**	**0.044**	**0.039**
95% CI	(-0.207 - -0.111)	(-0.212 - -0.107)	(-0.318 - -0.000)	(-0.315 - -0.003)	(-0.321 - -0.005)	(-0.318 - -0.008)
t_{t+1}			0.173			0.168
s.e.	0.024	0.026	0.089	0.089	0.091	0.09
p-value	**0.000**	**0.000**	**0.057**	**0.053**	**0.069**	**0.063**
95% CI	(0.125 - 0.220)	(0.121 - 0.224)	(-0.006 - 0.351)	(-0.002 - 0.347)	(-0.014 - 0.350)	(-0.009 - 0.345)
Time FE	yes	yes	yes	yes	yes	yes
Clustering	no	community	state-year	two-way	state-year	two-way

Notes: Dependent variable: annual percentage change in the statutory business tax rate. Coefficients for the pre-election, election, and post-election are reported. Coefficients on other controls are shown in table 10 in the appendix A. Model (a) to (d) include individual fixed effects, models (e) and (f) state fixed effects. Standard errors are clustered at the reported level. p-values in bold indicate that coefficients are significant at the 10% level.

Table 3: Regression results

Dependent Variable	$\overline{\tau}^{growth}$		$\underline{\tau}^{growth}$	
	(a)	(b)	(c)	(d)
t_{t-1}	-0.099	-0.095	0.007	0.006
	(0.103)	(0.107)	(0.021)	(0.021)
t_t	-0.147*	-0.150*	-0.012	-0.013
	(0.077)	(0.078)	(0.012)	(0.012)
t_{t+1}	0.190**	0.185**	-0.017	-0.017
	(0.088)	(0.091)	(0.012)	(0.013)
Fixed Effects	individual	state level	individual	state level

Notes: Time FE included in all models. Standard errors are clustered at the state-year level. Models (a) and (c) include individual fixed effects, models (b) and (d) state dummies. For results of control variables refer to table 11 in the appendix.

Table 4: Tax cuts vs. tax hikes

Dependent Variable	$\overline{\tau}^{binary}$	$\underline{\tau}^{binary}$
	(a)	(b)
t_{t-1}	-0.013	-0.004*
	(0.017)	(0.002)
t_t	-0.031**	-0.002
	(0.012)	(0.002)
t_{t+1}	0.035**	0.001
	(0.017)	(0.002)

Notes: marginal effects for the different points of time in the electoral cycle. Underlying regressions are presented in table 12

Table 5: Marginal effects

Dependent Variable	τ^{growth}		$\overline{\tau}^{growth}$		$\underline{\tau}^{growth}$	
	(a)	(b)	(c)	(d)	(e)	(f)
t_{t-1}	-0.097	-0.096	-0.103	-0.102	0.005	0.006
	(0.117)	(0.118)	(0.113)	(0.115)	(0.022)	(0.023)
t_t	-0.146	-0.151	-0.141	-0.147*	-0.004	-0.005
	(0.093)	(0.092)	(0.088)	(0.088)	(0.012)	(0.013)
t_{t+1}	0.194*	0.189*	0.210**	0.203**	-0.016	-0.014
	(0.100)	(0.100)	(0.099)	(0.101)	(0.013)	(0.014)
$t_{t-1} \cdot change$	0.045	0.054	0.031	0.047	0.014	0.007
	(0.107)	(0.096)	(0.096)	(0.088)	(0.019)	(0.019)
$t_t \cdot change$	-0.021	-0.017	0.014	0.020	-0.035	-0.037
	(0.099)	(0.093)	(0.084)	(0.076)	(0.027)	(0.032)
$t_{t+1} \cdot change$	0.017	0.022	0.018	0.031	-0.002	-0.010
	(0.127)	(0.118)	(0.114)	(0.104)	(0.026)	(0.023)
Fixed Effects	individual	state level	individual	state level	individual	state level

Notes: All regressions include a constant and time fixed effects. Models (a), (c), (e) include individual fixed effects, remaining models include state dummies. Standard errors are clustered at the state-year level, *** p<0.01, ** p<0.05, * p<0.1. For results of control variables refer to table 13 in the appendix.

Table 6: Interaction with council changes

Dependent Variable	$\overline{\tau}^{growth}$	$\overline{\tau}^{binary}$	$\underline{\tau}^{binary}$
	(a)	(b)	(c)
tax_{t-1}	-0.106***	-0.010**	0.011***
	(0.011)	(0.005)	(0.003)
t_{t-1}	-0.063	-0.153	-0.401
	(0.083)	(0.427)	(0.355)
t_t	-0.177**	-0.512**	0.042
	(0.067)	(0.243)	(0.354)
t_{t+1}	0.054	0.539*	0.001
	(0.071)	(0.310)	(0.344)

Notes: Model (a) includes municipal fixed effects, (b) and (c) state level fixed effects. Time fixed effects always included. Standard errors are clustered at the state-year level, *** p<0.01, ** p<0.05, * p<0.1. For results of control variables refer to table 14 in the appendix.

Table 7: Inclusion of the lagged tax level

Dependent Variable	$\tau^{effective}$	$\tau^{difference}$
	(a)	(b)
t_{t-1}	-0.090	-0.271
	(0.096)	(0.391)
t_t	-0.144**	-0.505*
	(0.072)	(0.280)
t_{t+1}	0.164**	0.607*
	(0.081)	(0.326)

Notes: Time and individual FE included in all models. Standard errors are clustered at the state-year level. Dependent variable in (a) is the effective tax rate, in (b) the first difference. For results of control variables refer to table 15 in the appendix.

Table 8: Other definitions of the dependent variable

Dependent Variable	$\overline{\tau}^{growth}$				
	(a)	(b)	(c)	(d)	(e)
t_{t-2}	-0.022				
	(0.076)				
t_{t-1}		-0.081			
		(0.099)			
t_t			-0.167**		
			(0.079)		
t_{t+1}				0.229***	
				(0.086)	
t_{t+2}					0.108
					(0.117)

Notes: Time and individual FE included in all models. Standard errors are clustered at the state-year level. Dependent variable in (a) is the effective tax rate, in (b) the first difference.

Table 9: Different time points of the electoral course

A. Detailed Tables

Dependent Variable	Individual Fixed Effect Panel Model				State Fixed Effect Panel Model	
τ^{growth}	(a)	(b)	(c)	(d)	(e)	(f)
credits	0.313***	0.313***	0.313***	0.313***	0.404***	0.404***
	(0.110)	(0.111)	(0.105)	(0.111)	(0.092)	(0.090)
income	0.019	0.019	0.019	0.019	-0.433**	-0.433**
	(0.581)	(0.545)	(1.481)	(1.472)	(0.206)	(0.197)
debt	-0.019	-0.019	-0.019	-0.019	0.022	0.022
	(0.042)	(0.035)	(0.093)	(0.093)	(0.023)	(0.022)
expenditures	-0.043	-0.043	-0.043	-0.043	-0.054	-0.054**
	(0.028)	(0.081)	(0.042)	(0.071)	(0.033)	(0.023)
unemplyment	-3.060**	-3.060**	-3.060	-3.060	-0.422	-0.422
	(1.425)	(1.364)	(2.127)	(2.132)	(1.890)	(1.850)
population	0.000	0.000	0.000	0.000	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
young	0.409	0.409	0.409	0.409	0.423	0.423
	(0.694)	(1.422)	(1.313)	(1.394)	(0.393)	(0.368)
old	-0.307	-0.307	-0.307	-0.307	0.232	0.232
	(0.683)	(1.262)	(1.131)	(1.207)	(0.297)	(0.275)
city					-0.003	-0.003
					(0.025)	(0.022)
spd	0.322	0.322*	0.322	0.322	0.049	0.049
	(0.197)	(0.180)	(0.269)	(0.268)	(0.077)	(0.071)
cdu	0.392**	0.392***	0.392	0.392	0.033	0.033
	(0.156)	(0.150)	(0.333)	(0.335)	(0.053)	(0.048)
fdp	-2.039**	-2.039***	-2.039	-2.039	-0.440	-0.440**
	(0.829)	(0.707)	(1.715)	(1.698)	(0.307)	(0.220)
gruene	0.127	0.127	0.127	0.127	-0.273	-0.273
	(0.715)	(0.992)	(1.174)	(1.224)	(0.285)	(0.270)
farleft	1.228	1.228	1.228	1.228	1.647	1.647
	(4.124)	(2.482)	(2.834)	(2.825)	(2.625)	(2.971)
farright	1.404	1.404	1.404	1.404	-1.570	-1.570
	(2.698)	(1.976)	(1.704)	(1.951)	(1.139)	(1.142)
R^2	0.011	0.011	0.011	0.011	0.017	0.004
Time FE	yes	yes	yes	yes	yes	yes
Clustering	no	community	state-year	two-way	state-year	two-way

Notes: Results of control variables for the estimations presented in table 3 in the text. All models include time fixed effects, constant term not reported. n=66403, N=7738, standard errors are clustered at the reported level, *** p<0.01, ** p<0.05, * p<0.1

Table 10: Regression results

Dependent Variable	$\overline{\tau}^{growth}$		$\underline{\tau}^{growth}$	
	(a)	(b)	(c)	(d)
credits	0.287***	0.375***	0.026	0.029
	(0.086)	(0.078)	(0.040)	(0.044)
income	0.789	-0.305*	-0.770**	-0.128*
	(1.427)	(0.181)	(0.368)	(0.071)
debt	-0.021	0.023	0.002	-0.001
	(0.084)	(0.023)	(0.021)	(0.005)
expenditures	-0.013	0.009	-0.030	-0.063*
	(0.039)	(0.022)	(0.054)	(0.037)
unemployment	-3.100	-1.513	0.040	1.091**
	(2.042)	(1.789)	(0.520)	(0.458)
population	0.000**	-0.000***	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
young	-0.173	0.416	0.582	0.008
	(0.839)	(0.359)	(1.179)	(0.172)
old	0.859	0.391	-1.166	-0.160*
	(0.732)	(0.266)	(0.996)	(0.091)
city		-0.011		0.009
		(0.021)		(0.014)
spd	0.301	0.058	0.021	-0.010
	(0.242)	(0.072)	(0.077)	(0.024)
cdu	0.366	0.020	0.026	0.012
	(0.325)	(0.048)	(0.074)	(0.018)
fdp	-2.755	-0.294	0.716	-0.147
	(1.675)	(0.286)	(0.434)	(0.145)
gruene	0.308	-0.135	-0.181	-0.138
	(1.030)	(0.255)	(0.391)	(0.128)
farleft	0.543	-0.559	0.685	2.206***
	(2.812)	(2.633)	(0.507)	(0.638)
farright	0.962	-1.747*	0.442	0.177
	(1.684)	(1.031)	(0.673)	(0.408)
Fixed Effects	individual	state level	individual	state level

Notes: Results of control variables for the estimations presented in table 4 in the text. All models include time fixed effects. n=66403, N=7738, standard errors clustered at the state-year in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 11: Regression results

Dependent Variable	$\overline{\tau}^{binary}$	$\underline{\tau}^{binary}$
	(a)	(b)
t_{t-1}	-0.198	-0.622*
	(0.279)	(0.343)
t_t	-0.547**	-0.288
	(0.219)	(0.258)
t_{t+1}	0.416**	0.142
	(0.198)	(0.248)
credits	0.852***	-0.932**
	(0.212)	(0.451)
income	-0.707	1.744***
	(0.523)	(0.478)
debt	0.037	-0.018
	(0.089)	(0.088)
expenditures	0.046	0.138***
	(0.033)	(0.033)
unemployment	-0.729	-1.972
	(3.934)	(5.868)
population	-0.000***	0.000***
	(0.000)	(0.000)
young	0.876	-1.380
	(0.586)	(2.157)
old	1.341***	-0.673
	(0.474)	(1.469)
city	0.061	0.026
	(0.062)	(0.138)
spd	0.154	0.361
	(0.171)	(0.345)
cdu	0.202*	0.120
	(0.104)	(0.274)
fdp	-0.732	3.078***
	(0.564)	(0.943)
gruene	-0.946	3.391***
	(0.684)	(1.015)
farleft	9.631*	-14.588
	(5.577)	(11.078)
farright	-5.522	11.117***
	(5.469)	(3.450)
Constant	4.155	-21.715***
	(4.966)	(4.664)

Notes: Results for the logit estimations of the marginal effects presented in table 5 in the text. All models include time and state fixed effects. n=66403, N=7738, standard errors clustered at the state-year in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 12: Logit coefficient estimates

Dependent Variable	τ^{growth}		$\overline{\tau}^{growth}$		$\underline{\tau}^{growth}$	
	(a)	(b)	(c)	(d)	(e)	(f)
credits	0.309***	0.403***	0.286***	0.375***	0.024	0.028
	(0.106)	(0.093)	(0.087)	(0.079)	(0.040)	(0.045)
income	0.081	-0.430**	0.882	-0.304	-0.801**	-0.127*
	(1.545)	(0.208)	(1.497)	(0.184)	(0.379)	(0.072)
debt	0.013	0.024	0.008	0.025	0.005	-0.001
	(0.106)	(0.023)	(0.097)	(0.022)	(0.021)	(0.005)
expenditures	-0.045	-0.056*	-0.016	0.007	-0.029	-0.063*
	(0.043)	(0.033)	(0.039)	(0.022)	(0.055)	(0.037)
unemployment	-3.038	-0.398	-3.081	-1.484	0.043	1.086**
	(2.130)	(1.901)	(2.042)	(1.797)	(0.532)	(0.464)
population	0.000	-0.000***	0.000**	-0.000***	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
young	0.405	0.416	-0.178	0.413	0.583	0.003
	(1.312)	(0.394)	(0.839)	(0.359)	(1.179)	(0.173)
old	-0.313	0.225	0.860	0.389	-1.173	-0.164*
	(1.132)	(0.299)	(0.741)	(0.268)	(0.995)	(0.092)
city		-0.003		-0.013		0.010
		(0.026)		(0.022)		(0.014)
spd	0.360	0.044	0.348	0.050	0.012	-0.007
	(0.274)	(0.079)	(0.244)	(0.075)	(0.080)	(0.023)
cdu	0.425	0.034	0.395	0.022	0.030	0.012
	(0.339)	(0.055)	(0.330)	(0.050)	(0.075)	(0.019)
fdp	-1.942	-0.457	-2.675	-0.309	0.733	-0.148
	(1.761)	(0.317)	(1.719)	(0.295)	(0.444)	(0.148)
gruene	-0.009	-0.322	0.193	-0.171	-0.202	-0.151
	(1.197)	(0.294)	(1.051)	(0.263)	(0.406)	(0.130)
farleft	1.488	1.747	0.721	-0.418	0.767	2.165***
	(2.802)	(2.618)	(2.791)	(2.635)	(0.514)	(0.633)
farright	1.691	-1.548	1.109	-1.771*	0.582	0.223
	(1.663)	(1.131)	(1.624)	(1.018)	(0.719)	(0.416)
constant	-0.549	4.650**	-8.459	3.422*	7.911**	1.228*
	(14.952)	(1.994)	(14.456)	(1.765)	(3.698)	(0.695)
Fixed Effects	individual	state level	individual	state level	individual	state level

Notes: *** p<0.01, ** p<0.05, * p<0.1

Table 13:

Dependent Variable	$\overline{\tau}^{growth}$	$\overline{\tau}^{binary}$	$\underline{\tau}^{binary}$
	(a)	(b)	(c)
credits	0.048	0.708***	-1.273***
	(0.099)	(0.239)	(0.465)
income	-4.463***	-0.690	2.144***
	(1.547)	(0.596)	(0.634)
debt	0.205**	0.171**	-0.218*
	(0.093)	(0.069)	(0.112)
expenditures	-0.076*	0.022	0.158***
	(0.044)	(0.074)	(0.037)
unemployment	-2.790	3.564	-0.767
	(1.749)	(4.716)	(7.133)
population	-0.000***	-0.000	0.000***
	(0.000)	(0.000)	(0.000)
young	0.479	1.187	-3.153
	(1.290)	(1.139)	(3.045)
old	0.469	1.861***	1.510
	(1.056)	(0.675)	(1.695)
city		0.072	-0.274
		(0.070)	(0.176)
spd	-0.296	0.279	0.889
	(0.246)	(0.215)	(0.684)
cdu	-0.424	0.274	0.564
	(0.279)	(0.246)	(0.372)
fdp	1.469	2.665***	-1.706
	(1.641)	(0.890)	(2.585)
gruene	0.571	0.979	0.508
	(1.128)	(0.899)	(1.960)
farleft	-3.335	5.923	-33.096**
	(2.679)	(5.912)	(14.604)
farright	2.478	-10.363	11.282***
	(1.794)	(6.727)	(4.201)
Constant	78.364***	6.150	-29.092***
	(16.594)	(6.514)	(5.847)

Notes: Results for controls of the estimations presented in table 7 in the text. Model (a) includes municipal fixed effects, (b) and (c) state level fixed effects. Time fixed effects always included. Standard errors are clustered at the state-year level, *** p<0.01, ** p<0.05, * p<0.1. For results of control variables refer to table 14 in the appendix.

Table 14: Regression results

Dependent Variable	$\tau^{effective}$	$\tau^{difference}$
	(a)	(b)
credits	0.294***	1.123***
	(0.096)	(0.374)
income	0.082	0.606
	(1.338)	(5.226)
debt	-0.014	-0.057
	(0.083)	(0.323)
expenditures	-0.031	-0.125
	(0.032)	(0.127)
unemployment	-2.810	-10.676
	(1.912)	(7.408)
population	0.000	0.000
	(0.000)	(0.000)
young	0.086	2.000
	(0.985)	(4.498)
old	0.021	-0.410
	(0.852)	(3.878)
spd	0.283	1.185
	(0.242)	(0.973)
cdu	0.345	1.543
	(0.301)	(1.309)
fdp	-2.016	-8.063
	(1.522)	(6.680)
gruene	0.421	-0.236
	(1.119)	(4.183)
farleft	0.830	3.876
	(2.607)	(10.847)
farright	1.348	4.595
	(1.549)	(6.090)

Notes: Results for controls of the estimations presented in table 8 in the text. Time and individual FE included in all models. Standard errors are clustered at the state-year level. Dependent variable in (a) is the effective tax rate, in (b) the first difference.

Table 15: Other definitions of the dependent variable

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