The impact of formula apportionment on business activity: Evidence from the German local business tax

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Abstract

This paper analyzes how German two-jurisdictional entities (MJE) react to corporate taxes under a payroll formula apportionment regime. We identify three reaction channels (employees, working hours and wage per hour). Using panel data of German two-establishment MJE and the German local business tax, we identify MJEs' reactions. We find that, according to our expectations, MJEs react to local tax rate changes by shifting payroll away from (tax rate increases) or to (tax rate reductions) the local establishments. We do not find that MJEs shift employees, but we find significant adjustments of working hours and wage rates in establishments that face tax rate changes. Additionally, we find corresponding significant shifts of working hours and wage rates in establishments if the opposite establishment of the two-establishment firm faces a tax rate change. We also find corresponding adjustments of sales (with lower magnitudes) and investments. We discuss possible explanations for these results, including book tax planning.

Keywords: Tax planning, formula apportionment, labor allocation

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1. Introduction

Many countries organize tax collection on local levels (regions, states, municipalities), and some of them allow for tax rate competition between local units. Local taxation requires profit allocation between establishments or affiliates of multi-jurisdictional enterprises (MJE), which is mostly discussed in an international context. The "true" allocation of tax liabilities of MJE onto different jurisdictions is a major problem of tax policy affecting issues like tax competition, business investment and tax planning. The two main instruments of tax base allocation are separate accounting (SA) and formula apportionment (FA). Under SA, profits are calculated for each business unit using transfer prices for commodities and services. Under FA, the aggregate profit of the business group is apportioned according to a formula that contains measurable proxies for inputs and/or outputs. While SA is mainly relevant for international taxation, FA is primarily used for local taxes and state taxes (Riedel, 2010). In the U.S. and Canada, there is typically a mix of three different allocation factors (sales, wages and capital stock).

While there is comprehensive empirical research measuring SA effects on tax planning (e.g. Devereux and Maffini, 2007) and foreign direct investment (see Heckemeyer, Feld and Overesch, 2011 with further references), much less studies have focused on the impact of formula apportionment regimes on business activity. As a result, attempts to assess the budgetary and firm-specific consequences of reforms of FA taxation are typically based on the assumption that there are no behavioral responses (Shackelford and Slemrod, 1998; Devereux and Loretz, 2008; Hines, 2010; Clausing and Lahav, 2011). Thus, there seems to be a need for further empirical research in that area.

From a theoretical perspective, it has been argued that a corporate income tax levied on the basis of formula apportionment is a composite of different taxes raised on the apportionment formula factors (i.e. capital stock, wage payroll, McLure, 1981). Therefore, the apportionment formula should have a negative impact on the corresponding formula factors (Gordon and Wilson, 1986) and affect tax competition between jurisdictions (Anand and Sansing, 2000; De Waegenaere and Sansing, 2008) as well as tax revenues and welfare (Nielsen et al. 2010).

In line with that argument, Klassen and Shackelford (1998) report a negative relation between manufacturing shipments as a measure for the location of sales and the apportionment tax rate applied to sales. This relation is consistent with companies reporting sales in less heavily taxed states by shipment shifting. Goolsbee and Maydew (2000) find a negative correlation between the relevance of payroll as part of the formula factor and wage payments in U.S. states. Lowering the payroll weight from one third to one quarter increases manufacturing employment in this state by approximately 1.1%.

Recent studies provide evidence that the German local business tax – a communal local business tax with payroll expenses as exclusive allocation factor – affects the allocation of payroll expense between German establishments (Riedel, 2010; Thomsen et al., 2014) as well as inbound investment of multinationals (Becker et al., 2014). Riedel (2010) finds that MJE react by adjusting their payroll to capital ratio in favor of low-tax locations. The average reaction to a 1-percentage-point increase in the tax rate differential between an affiliate and the weighted average of the other firm affiliates is a decrease in the affiliate's payroll to capital ratio of 1.9%. However, she finds no evidence that the firm-level weighted tax rate affects the firm-level payroll to capital ratio.

Thomsen et al. (2014) demonstrate that establishments with lower local business tax rates inhibit relatively higher payroll shares. The larger the difference between the lowest and the highest tax rate in a firm, the larger the payroll difference between the establishment with the lowest and the highest tax rate. Using the panel structure of their data, they get mixed results concerning whether firms react to local tax rate changes by adjusting payroll shares in the establishments in this municipality. These existing empirical studies generally interpret any correlation between tax rates, formula factors and wage payments as evidence for real effects on business activity like the allocation of investment and employment. Correspondingly Clausing and Lahav (2011) argue: "While accounting manipulations can easily shift profits of low-tax countries under a separate accounting system, that is not the case under a formulary system."

On the contrary, there are recent reports from tax researchers and (German) tax practitioners documenting a considerable scale of tax strategies to tamper the allocation of wage payments in business units (Dietrich and Krakowiak, 2009; Urbahns, 2010; Scheffler, 2011). If these arguments hold true, correlations between wage payments (as formula factor), tax rates and formula factors cannot generally be interpreted as evidence for FA affecting real business activity. For example, Klassen and Shackelford (1998) consider a negative correlation of manufacturing shipments (as measure for the location of sales) and the apportionment tax rate applied to sales as evidence for shipment structuring and income shifting. Buettner et al. (2011) identify the decision to consolidate an affiliated corporation into a tax group as a profit shifting opportunity under FA. From an accounting perspective, allocating expenses to business units can be regarded as a specific form of earnings management (for evidence on strategic cost shifting see

Eldenburg and Kallapur, 1997; Yetman, 2001; Hofmann, 2007). For that reason, there is a need for further research to analyze the nature of the correlation between FA and the allocation of wage payments.

In this paper, we analyze the German local business tax system to address these issues. The German local business tax is local form of a business income tax paid by corporations and partnerships. While the local business tax base is uniform for Germany, tax rates vary between municipalities (in recent times usually between 7 % and 17.5%). In case of a business with permanent establishments in two or more municipalities, tax revenue is allocated by FA on the basis of gross wages. Therefore, the German local business tax is especially appropriate to investigate the relationship of FA, employment and real business activity.

In a first step, we use a comprehensive panel of firm data providing information about employment and wage payments on the establishment level to test for correlations between tax rates and the allocation of wage payments. In line with Riedel (2010), and Thomson et al. (2014), we find a negative correlation between the local business tax of a municipality and fraction of employees in that municipality.

In second step, we test for the hypothesis that wage payments (and employees) are shifted between municipalities rather than the total activity volume is affected by those tax rules. Third and last, we decompose our dependent variable (wage payments) to obtain better information about the nature of this relationship. While we find a strong correlation of tax rates and wage payments, the impact of local business taxes on the number of employees is generally not significant and the corresponding sales revenue reaction is lower than the payroll reaction. These results raise some doubt that the impact of FA wage formula factors are exclusively driven by taxation and not by “expense allocation”. We find some preliminary evidence “expense management” may be an important strategy for tax planning under FA regimes. Additionally, we show that payroll shifting has spillover effects to investment.

Our paper is organized as follows: Section 2 includes the empirical setting, our theoretical considerations and our hypotheses for the empirical analysis. Section 3 presents the data and the regression model. Regression results are reported by Section 4. The paper is concluded by Section 5.

2. Empirical setting and theory

2.1. The German local business tax

Domestic business profits of the majority of German firms[2] are subject to a local business tax. While the uniform tax code is concluded by the German parliament (Bundestag) and the Federal Council of Germany (Bundesrat), the local tax rate is settled by each German municipality. The high number of 12,266 municipalities guarantees a strong variation of tax rates that may be used for economic analysis. The local tax rate is calculated by a uniform scale number (*German: Messzahl*) and a variable local business tax multiplier (*German: Hebesatz*). In 2004, a minimum local business tax multiplier of 200% was introduced, being equivalent to a minimum tax rate of 9.1%. The German business tax reform 2008/2009 slightly reduced scale number and local tax rates. Current tax rates lie typically in a range from 7% to 17.15%. However, there exist also higher tax rates (e.g. 31.5% in Dierfeld). The local business tax base of a MJE is the sum of its German establishments' profits plus a share of interests, leases and rents paid. In addition, there are exemptions for distributed profits of taxable entities.

An important feature of the local business tax is the formula apportionment (FA) system. Therefore, the local business tax base of a MJE is usually apportioned to municipalities according to the establishments' payroll share. The relevant payroll per employee is limited to 50.000 € for FA purposes. Tainees' wages, tax-exempt payments and profit dependent bonuses are neglected. The local business tax base has to be declared to the central tax authorities who calculate and allocate the local business tax and perform random tax audits. Usually, tax auditors are not authorized by the municipalities but by higher level tax authorities. For that reason, they have no incentive to audit the local business tax payroll allocation (Becker and Fuest, 2010; Gresik, 2010).

From an empirical perspective, the German local business tax has a number of notable advantages to test the impact of FA systems. First of all, the local business tax code is uniform in all German municipalities. Therefore, we may simply focus on the variation of tax rates to identify the impact of FA on the allocation of labor. Second, about 8% of the 12,266 municipalities change their local tax rate per year (Siegloch 2013), providing a wide variation in tax rates over time. As mentioned before, tax rates range from 0% (before 2004) to 31.5% (Dierfeld after 2008). Third, the German FA system is exclusively

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[2] Exceptions exist for sole proprietorships and partnerships with earnings from agriculture, forestry and learned academic professions (e.g. self-employed doctors, tax advisers, architects, engineers, etc.).

based on payroll as allocation factor. Therefore, the identification of FA effects should be easier compared to alternative FA systems with more complex allocation factors (e.g. the U.S.). Fourth, Germany is a country with relatively uniform legal conditions and relatively small geographic dimensions. Therefore, it will be easier to control for other economic factors affecting the allocation of labor and capital in a company. Fifth and finally, the German single factor system allows us to test spillover effects between the allocation factor (payroll expenses) and other input and output factors like capital investment or sales revenue.

2.2. A simple theoretical model

Following existing research (Riedel, 2010; Nielsen et al. 2010), we develop a simple model on optimal firm behavior. We assume a firm with two establishments $i = a, b$. Both establishments generate sales S_i driven by labor L_i and other input factors I_i (e.g. capital). The costs of these input factors are deductible from the tax base. We focus on labor costs as this is the only relevant input factor for FA in case of the German local business tax. Thus, the average tax rate on profits τ is the weighted average of the regional tax rates τ_i with labor costs as weighting factor. In the following, we will assume $\tau_b > \tau_a$.

In contrast to the previous literature we also consider a tax planning technology that allows book shifting of labor expenses Δ_{ba} from establishment b to establishment a in order to change the average tax rate τ. Corresponding strategies have been discussed by the German literature on tax planning (Krakowiak and Dietrich, 2009; Urbahns, 2010; Scheffler, 2011). These include the allocation of expenses for employees working for more than one establishment (e.g. managers, construction supervisors, lawyers, drivers, etc.), the lending of employees between different firm units, and the outsourcing of employees to additional business subunits.

In addition, it is an open secret of the German tax system (Scheffler, 2011) that the allocation of employee expenses in local business tax returns is typically not checked in detail by German tax authorities. The main reason is that German tax audits are usually managed by the German states, which are interested in higher corporate income taxes and but not in the formula apportionment of the German local business tax. For that reason, German firms may misallocate labor costs in order to manage the FA of the German local business tax. We assume that corresponding book shifting strategies come with costs $C(\Delta_{ba})$ (e.g. tax planning costs, audit risk). We assume that book shifting costs depend on the absolute value of Δ_{ba}, which may be either positive (shifting from b to a) or negative (shifting from *a* to *b*). In line with the literature we assume $C' > 0$, $C'' > 0$, and we assume that $\Delta_{ba} < L_a$ (interior solution). For convenience, we do not account for a potential deductibility of such costs from the tax base.

We normalize the cost of each unit of L_i and I_i to 1. Defining the pre-tax profit of each establishment *i* as sales revenue minus the cost of input factors $\left(\Pi_i = S_i\left(L_i;I_i\right) - L_i - I_i\right)$ and the average tax rate of the firm as $\tau = \tau_a \cdot \frac{L_a + \Delta_{ba}}{L_a + L_b} + \tau_b \cdot \frac{L_b - \Delta_{ba}}{L_a + L_b}$, the profit after taxes Π_τ can be written as

$$\begin{aligned}\Pi_\tau &= \left(\Pi_a + \Pi_b\right)\cdot\left(1-\tau\right) - M\left(\Delta_{ba}\right)\\ &= \left(S_a\left(L_a;I_a\right) - L_a - I_a + S_b\left(L_b;I_b\right) - L_b - I_b\right)\cdot\left(1 - \frac{\tau_a\cdot\left(L_a+\Delta_{ba}\right)+\tau_b\cdot\left(L_b-\Delta_{ba}\right)}{L_a+L_b}\right)\\ &\quad - C\left(\Delta_{ba}\right)\end{aligned} \tag{1}$$

We assume symmetric establishments and convex production technology, $\frac{\partial S_i}{\partial L_i} > 0, \frac{\partial^2 S_i}{\partial L_i^2} < 0.$ The first order conditions regarding the optimal choice of labor inputs and tax planning effort can be described by

$$\begin{aligned}\frac{\partial \Pi_\tau}{\partial L_a} &= \left(\frac{\partial S_a}{\partial L_a} - 1\right)\cdot\left(1-\tau\right) + \frac{\left(\tau_b - \tau_a\right)\cdot\left(L_b - \Delta_{ba}\right)}{\left(L_a+L_b\right)^2}\cdot\left(\Pi_a+\Pi_b\right) = 0\\ &\left(\frac{\partial S_a}{\partial L_a} - 1\right) + \underbrace{\frac{\left(\tau_b - \tau_a\right)\cdot\left(L_b - \Delta_{ba}\right)}{\left(1-\tau\right)\cdot\left(L_a+L_b\right)^2}\cdot\left(\Pi_a+\Pi_b\right)}_{\text{Apportionment distortion } AD_a} = 0,\end{aligned} \tag{2a}$$

$$\begin{aligned}\frac{\partial \Pi_\tau}{\partial L_b} &= \left(\frac{\partial S_b}{\partial L_b} - 1\right)\cdot\left(1-\tau\right) - \frac{\left(\tau_b - \tau_a\right)\cdot\left(L_a + \Delta_{ba}\right)}{\left(L_a+L_b\right)^2}\cdot\left(\Pi_a+\Pi_b\right) = 0\\ &\left(\frac{\partial S_b}{\partial L_b} - 1\right) - \underbrace{\frac{\left(\tau_b - \tau_a\right)\cdot\left(L_a + \Delta_{ba}\right)}{\left(1-\tau\right)\cdot\left(L_a+L_b\right)^2}\cdot\left(\Pi_a+\Pi_b\right)}_{\text{Apportionment distortion } AD_b} = 0, \text{ and}\end{aligned} \tag{2b}$$

$$\frac{\partial \Pi_\tau}{\partial \Delta} = \left(\Pi_a + \Pi_b\right)\cdot\frac{\left(\tau_b - \tau_a\right)}{L_a + L_b} - C' = 0 \tag{3),}$$

When a firm increases its labor input in establishment *a*, it does not only earn an additional marginal profit (first term of derivative 2a), but it also changes the average tax rate on the firm profits by changing the profit allocation to the two establishments (second term of derivative 2a, AD_a). As we assumed that the local tax rate for establishment b exceeds the local tax rate for establishment a ($\tau_b > \tau_a$), the additional labor input in establishment a has a positive tax effect. The larger the tax rate differential and the larger the labor input in establishment b, the larger is the marginal tax advantage.

Therefore, firms will increase their labor input in establishment a (b) until the sum of the marginal profit (term 1 of the derivatives 2a and 2b) and the marginal apportionment distortion tax advantage (the marginal tax disadvantage) will add up to zero. Consequently, the optimal marginal profit for establishment a will be negative (due to the additional tax advantage), whereas the optimal marginal profit for establishment b will be positive. This is the well-known formula apportionment tax distortion (e.g. Riedel 2010). It is worth noting that in our model this distortion is mitigated by the amount of book payroll shifting (Δ_{ba}): The larger Δ_{ba}, the smaller the second terms in the derivatives 2a and 2b. In the extreme case of $\Delta_{ba} = L_b$ (full book payroll shifting), the distortion vanishes.

Firms will spend resources in the management of the average tax rate by book payroll shifting (Δ_{ba}) as long as marginal tax savings exceed the marginal shifting costs including tax planning costs, detection risks of illegal activities and reputational risks. The larger the tax rate differential, the larger the optimal book payroll shifting.

The effect of tax rate changes can be analyzed by comparative static analysis. A higher tax rate in one of the establishments increases the average tax rate of the firm. Using the envelope theorem, the effect of a local tax rate change on the optimal after-tax profit v is negative:

$$\max_{L_a, L_b, \Delta_{ba}} \Pi_\tau \left(L_a, L_b, \Delta_{ba}, \tau_a, \tau_b\right)$$

$$v(\tau_a, \tau_b) = \Pi_\tau \left(L_a^*(\tau_a, \tau_b), L_b^*(\tau_a, \tau_b), \Delta_{ba}^*(\tau_a, \tau_b), \tau_a, \tau_b\right)$$

$$\begin{aligned} \frac{\partial v}{\partial \tau_a} &= \left.\frac{\partial \Pi_\tau}{\partial \tau_a}\right|_{L_a^*(\tau_a,\tau_b), L_b^*(\tau_a,\tau_b), \Delta_{ba}^*(\tau_a,\tau_b), \tau_a} \\ &= -\left(\Pi_a + \Pi_b\right) \cdot \frac{L_a + \Delta_{ba}}{L_a + L_b} < 0 \\ \frac{\partial v}{\partial \tau_b} &= \left.\frac{\partial \Pi_\tau}{\partial \tau_b}\right|_{L_a^*(\tau_a,\tau_b), L_b^*(\tau_a,\tau_b), \Delta_{ba}^*(\tau_a,\tau_b), \tau_b} \\ &= -\left(\Pi_a + \Pi_b\right) \cdot \frac{L_b - \Delta_{ba}}{L_a + L_b} < 0 \end{aligned} \tag{4a}$$

For simplicity, we concentrate on the cross derivatives in establishment a and do not consider interaction effects between the optimal choice of L_a, L_b and Δ explicitly. An increase in the tax rate τ_b in establishment b and therefore in the tax rate differential ($\tau_b - \tau_a > 0$) will decrease L_b because the absolute value of the negative tax distortion term in derivative (2b) increases:

$$\frac{\partial AD_b}{\partial \tau_b} = -\left(L_a + \Delta_{ba}\right) \cdot \left(\Pi_a + \Pi_b\right) \cdot \frac{1 + \frac{\tau_b - \tau_a}{1-\tau} \cdot \frac{L_b - \Delta_{ba}}{L_a + L_b}}{\left(1-\tau\right) \cdot \left(L_a + L_b\right)^2} < 0 \tag{4b}$$

The impact of an increase in the local tax rate τ_b on the optimal labor input in the opposite establishment a, L_a, can be analyzed by deriving the apportionment distortion AD_a with respect to τ_b:

$$\frac{\partial AD_a}{\partial \tau_b} = \left(L_b - \Delta_{ba}\right) \cdot \left(\Pi_a + \Pi_b\right) \cdot \frac{1 - \frac{\tau_b - \tau_a}{1-\tau} \cdot \frac{L_b - \Delta_{ba}}{L_a + L_b}}{\left(1-\tau\right) \cdot \left(L_a + L_b\right)^2} \tag{4c}$$

The sign of this expression depends on the numerator of the last term on the right-hand side. It is positive if

$$1 - \frac{\tau_b - \tau_a}{1-\tau} \cdot \frac{L_b - \Delta_{ba}}{L_a + L_b} > 0$$

$$1 > \frac{\tau_b - \tau_a}{1-\tau} \cdot \frac{L_b - \Delta_{ba}}{L_a + L_b}$$

For tax rates below 50% and nonnegative Δ_{ba}, this inequality is fulfilled:

$$1 > \underbrace{\frac{\tau_b - \tau_a}{1-\tau}}_{<1} \cdot \underbrace{\frac{L_b - \Delta_{ba}}{L_a + L_b}}_{<1}$$

$$\Rightarrow \frac{\partial AD_a}{\partial \tau_b} > 0$$

This means that the firm reacts to an increase in τ_b not only by reducing labor input in establishment b, but also by increasing labor input in establishment a.

An increase in the tax rate τ_b in establishment b will furthermore, by increasing the tax rate differential, provide the firm with an additional incentive for book payroll shifting to establishment a. The following increase in the optimal Δ_{ba} can be shown by the corresponding cross derivative:

$$\frac{\partial \Pi_\tau}{\partial \Delta_{ba} \partial \tau_b} = \frac{\left(\Pi_a + \Pi_b\right)}{L_a + L_b} > 0 \tag{4d}$$

Altogether, the results show that in our model the firm reacts to an increase in the local tax rate τ_b by decreasing labor input in establishment *b*, increasing labor input in establishment *a*, and increasing book payroll shifting from establishment *b* to *a*. All three reactions together lead to the predictions that the observed payroll share of establishment *b* (establishment *a*) should decrease (increase) if the local tax rate τ_b increases:

$$\frac{\partial \frac{L_b - \Delta_{ba}}{L_a + L_b}}{\partial \tau_b} < 0 \tag{5a}$$

$$\frac{\partial \frac{L_a + \Delta_{ba}}{L_a + L_b}}{\partial \tau_b} > 0 \tag{5b}$$

An important implication of the model is that tax rate changes might also affect the allocation of sales and other input factors. In the case of sales, this is quite obvious as Π_i is equal to $S_i\left(L_i; I_i\right) - L_i - I_i$ and $\frac{\partial S_i}{\partial L_i}$ is positive. Note that an increase in τ_i reducing real labor input L_i, will generally reduce sales revenue S_i in the establishment *i*. As this should not be the case for book payroll shifting strategies, we may use the correlation of τ_i and S_i as an empirical strategy to identify real effects. If the reaction of S_i to local tax rate changes is smaller than the reaction of L_i, this may be a hint for book payroll shifting strategies.

In case of other input factors I_i like capital, changes in L_i will also have an indirect effect if the cross derivative between labor input and the other input factors $\frac{\partial S_i}{\partial L_i \partial I_i}$ is nonzero. Depending on the sign of this cross-derivative, there are two possible outcomes. If both inputs are complements like in a Cobb-Douglas production function $\left(\frac{\partial S_i}{\partial L_i \partial I_i} > 0\right)$, a reduction of L_i, will reduce I_i as well. By contrast, if both inputs are substitutes $\left(\frac{\partial S_i}{\partial L_i \partial I_i} < 0\right)$, a reduction of L_i will increase I_i. For that reason, it will be also an important empirical question if and how local tax rates in a formula apportionment system will affect investment behavior on the establishment level.

2.3. *Hypotheses*

Our theoretical model implies a negative correlation between local tax rates and the allocation of payroll expenses among establishments of a given firm. This is in line with existing empirical studies finding a negative correlation between tax rate differentials (differences of tax rates in different establishments) and the allocation of payroll expenses (Riedel, 2010; Thomsen et al., 2014). Therefore, our first step of the empirical analysis will be to replicate this outcome for the German local business tax with a different data base and a different estimation strategy. In line with Riedel (2010), we focus on the differential between the local business tax of establishment *i* and the firm average tax rate.

The observable payroll share of an establishment *i* is defined as $\frac{Payroll_i}{Payroll_i + Payroll_j}$. It includes the unobservable amount that a firm may have shifted between establishments, so it relates to $\frac{L_i + \Delta_{ji}}{L_i + L_j}$ in our model. The reader is asked to keep in mind that we analyze two-establishment firms only. If payroll shifting happens in this setting, as we hypothesize, payroll has to be shifted from (to) one establishment to (from) the other (opposite) establishment. This follows directly from (5a) and includes real shifting as well as book payroll shifting.

H1: *The payroll share of an establishment is negatively correlated with the tax rate differential between the establishment and the opposite establishment.*

While the existing literature generally assumes that such a correlation should be interpreted as shifting real resources between different establishments (Riedel, 2010; Thomsen et al., 2014), this is not necessarily true. Taking into account tax competition between the two firm locations and other locations, it might be the case as well that an increase in τ_i does not only reduce L_i, but also aggregate labor input. Therefore, a negative correlation between τ_i and the payroll share of an establishment *i* might be driven by a reduction of $Payroll_i$ without a corresponding increase in $Payroll_j$. Since we look at two-establishment MJEs, we can test this by directly analyzing the opposite establishment as the shifting target. (5b) implies that the impact of a local tax rate change in establishment *b* on labor input in establishment *a* is positive. Accordingly, we test if an increase in local tax rate of an establishment increases the payroll expense in the opposite establishment.

H2: The payroll share of an establishment is negatively correlated with the local tax rate of the establishment and positively correlated with the local tax rate of the opposite establishment.

It has been hypothesized in the existing literature that negative correlations of tax rates and payroll expenses on the establishment level are exclusively driven by real effects (Riedel, 2010; Thomsen et al., 2014). As stated by Thomsen et al. (2014), "(…) wages paid cannot realistically be shifted without actual changes in headcount (…)". On the contrary, it has been argued by Scheffler (2011) as well as by German practitioners that payroll accounting might be subject to tax management in order to optimize the average business tax rate. Such a planning technology is also considered by our theoretical model in Section 2.1.

In order to analyze the payroll shifting technology, we decompose payroll expense in its different components. In general, payroll is a composite of the number of employees, the number of working hours per employee and the average wage rate per working hour $P_i = e_i \cdot t_i \cdot w_i$. Here, P_i is the payroll of establishment i, e_i is the number of employees, t_i are the hours per employee and w_i is the establishment's average wage rate.

If correlations between payroll expenses and local tax rates are exclusively driven by a shifting of real labor inputs, we should observe a strong and significant impact on the number of employees and/or on the number of working hours per employee. However, shifting real labor inputs from one establishment to another should not necessarily affect the average wage rate per working hour in a given establishment. For that reason, we presume that w_i may contain potential tax shelters affecting the average tax rate without affecting real business activity. On the contrary, the number of working hours and the number of employees might be considered as proxy variables for the shifting of real investment. We test for the following hypotheses:

H3a: The employee share of an establishment is negatively correlated with the tax rate differential between the establishment and the opposite establishment.

H3b: The ratio of the number of working hours per employee in an establishment to the average number of working hours per employee is negatively correlated with the tax rate differential between the establishment and the opposite establishment.

H3c: The ratio of the wage per hour in an establishment to the firm average wage per hour is negatively correlated with the tax rate differential between the establishment and the opposite establishment.

Note that we will also test as a cross check if the three components of the payroll are driven by shifting between the two establishments. To do so, we rely on corresponding tests as in the hypotheses 2a and 2b.

An alternative identification strategy to test whether the firm behavior is consistent with real shifting only is to regress establishment level sales revenue on tax rate differentials. Corresponding to our theoretical model in Section 2.1., shifting labor inputs from establishment *j* to establishment *i* should also increase sales revenue of establishment *i* compared to sales revenue of establishment *j*. Accounting for the possibility to shift or to reduce labor inputs and sales revenue, we will test:

H4: The sales revenue share of an establishment is negatively correlated with the tax rate differential between the establishment and the opposite establishment.

Concluding, we will also test for correlations between local tax rates and gross investment on the establishment level. From a theoretical perspective, the sign of a corresponding correlation is not obvious. As exemplified by the theoretical model, capital and labor may be either substitutes or complements of a production function. As a result, there could be a positive as well as a negative correlation of investments and the local tax rate of an establishment. In the following, we will assume a limitational production function with labor and capital as input factors. Under these assumptions, we will test:

H5: The gross investment share of an establishment is negatively correlated with the tax rate differential between the establishment and the opposite establishment.

3. Data and empirical strategy

3.1. Data

Our analysis is based on the German AFID panel (*German: Amtliche Firmendaten in Deutschland*) for the manufacturing and mining industries, which includes a number of mandatory business surveys conducted by the German Federal Statistical Office and can be accessed by remote data processing (Malchin and Voshage, 2009). The surveys in question, conducted between 1995 and 2008, are the Investment Survey and the Monthly Report of Manufacturing and Mining Enterprises.[3] We used the cumulative values for payroll, the number of employees and the number of working hours from the Monthly

[3] German titles are as follows: Investitionserhebung bei Betrieben des Verarbeitenden Gewerbes sowie der Gewinnung von Steinen und Erden and Monatsbericht bei Betrieben des Verarbeitenden Gewerbes sowie der Gewinnung von Steinen und Erden.

Report and added investments from the yearly Investment Survey. Using the German statistics of tax multipliers (*German: Statistik der Hebesätze*), we complemented this data by local tax rates on the municipality level. In addition, we collected data on the district level (GDP per capita, population, unemployment rate) from the Regio-Stat data base to control for regional economic conditions in the regression analysis. Hence, we have a unique firm panel covering the period between 1995 and 2008.

Compared to other firm panels like Compustat or AMADEUS, AFiD has a number of major advantages for our analysis. Unlike public accounting data, the Investment Survey and the Monthly Report provide very detailed information on the volume and the composition of payrolls, investments and sales revenue on the establishment level. Complementing the data by information on local tax rates, we are therefore not only able to test for correlations between payroll and tax rates, but also to analyze correlations with alternative proxy variables like the number of employees, the number of working hours and the average payroll per working hour. Up to our knowledge, this is a unique feature allowing us more detailed analysis as in previous research.

Both surveys are conducted as a mandatory census for all domestic establishments in the manufacturing and mining industries with at least 20 employees. Therefore, non-response and sample selection issues are not a problem. An additional advantage emanates from the fact that the data has been anonymized and is only available for political and scientific usage. Therefore, there should be a smaller incentive for survey participants to "brighten their numbers" as in balance sheet information. However, we cannot rule out measurement error.

A potential disadvantage of the dataset lies in the fact that it does not provide information on complex holding structures. Thus, we obtain knowledge on different establishments of one company, but not for complex group structures of different companies. Thus, while the data should be excellently suited to analyze factor allocations within a firm, it does not enable us to address other forms of tax planning within a holding company (e.g. profit shifting between different legal entities).

The original data include 691,822 observations of business establishments between 1995 and 2008, which participated in the Investment Survey and the Monthly Report, and provide both firm and establishment IDs. In a first step, we exclude all firms with only one single establishment, as these firms are not able to shift payroll expenses between different establishments and are, therefore, not relevant for our question of research. In a second step, we focus exclusively on firms with two establishments. Thus, we also exclude firm-year observations with more than two establishments. The main reason for this data cleansing step is that tax incentives of FA seem to be most easily to identify for this firm group. Furthermore, it should be interesting to test in future if the impact of FA on factor allocation in small firms with a limited number of establishments differs from large firms with a high number of establishments.

Our final sample thus comprises 69,045 establishment-observations of firms in the German manufacturing industry. Due to mergers and acquisitions and other forms of restructuring, a single establishment may in rare cases change ownership during the time period studied. To avoid misclassifications in these cases, we identified establishments by a combined identifier that includes the firm ID and the establishment ID. Table 1 summarizes the establishment data. The data have been price-adjusted using the German producer price index for the manufacturing industry (cf. German Council of Economic Experts 2011, p. 409).

[Table 1 about here]

3.2. Empirical strategy

In line with existing research (Riedel, 2010; Thomsen et al., 2014), we regress payroll expenses at the establishment level on tax rate differentials in order to test our hypothesis H1. Similar to Thomsen et al. (2014), we use the share of payroll expenses of establishment *i* to total payroll as our dependent variable ($Payroll\ share_i = Payroll_i/(Payroll_i + Payroll_j)$). An advantage of this scaled variable is that it should not be affected by general payroll changes on the firm level being unrelated to payroll shifting between establishments. *Payroll share* of establishment *i* in year *t* is described by

$$Payroll\ share_{it} = \beta_0 + \beta_1 \cdot TaxD_{it} + \beta_2 \cdot TaxD_{it-1} + \gamma \cdot X_{it} + \alpha_i + \lambda_t + u_{it} \quad (6)$$

with the error term u_{it}. We consider establishment fixed effects, α_i, to account for unobserved heterogeneity of the establishments. X_{it} describes a vector of additional control variables. We control for year fixed effects, as λ_t denotes.

Our major variable of interest is the tax differential *TaxD* as a measure for the incentive to shift payroll expense between both establishments. It is defined as difference of the tax rate of establishment *i* and the tax rate of establishment *j*. Thus, *TaxD* is positive (negative) if the tax rate of establishment *i* is higher (smaller) than the tax rate in the opposite establishment *j*. We use *TaxD* of the current period *t* and a lagged differential from *t-1*. Therefore, we implicitly assume that tax rate changes will affect *payroll share* within the current period or the following period.

On the establishment level, we control for the twice lagged *payroll share* (t-2). Thus, our model accounts for any payroll changes before $TaxD_t$ and $TaxD_{t-1}$ have entered into force. Furthermore, we consider twice lagged *investment share* and twice lagged *turnover share*. The basic idea is to obtain a robust set of control variables for establishment size.

In addition, the allocation of labor input might be driven by regional economic conditions. Therefore, we have enriched our data by information on the *district level*. In detail, we consider the local unemployment rate (in percentage points), the logarithm of the price-adjusted GDP per capita, and the logarithm of the population in a district. These variables account for major economic differences within the eastern and western German states. We expect a positive coefficient for GDP per capita and population, while the coefficient of the unemployment rate should be negative.

In order to test hypothesis H2, we explicitly consider local tax rates of both establishments *i* and *j* instead of the tax rate differentials $TaxD^t$ and $TaxD^{t-1}$. The regression model can be written as

$$Payroll\ share_{it} = \beta_0 + \beta_1 \cdot Tax_{it} + \beta_2 \cdot Tax_{it-1} + \beta_3 \cdot Tax_{jt} + \beta_4 \cdot Tax_{jt-1} + \gamma \cdot X_{it} + \alpha_i + u_{it} \quad (7)$$

Tax_{it} is the local tax rate of establishment *i* in period *t* and Tax_{jt} is the local tax rate of the (from establishment *i*'s viewpoint) opposite establishment *j* in period *t*. The control variables are identical to the regression model (6).

Hypothesis H3a to hypothesis H5 are tested by regression models conforming to equation (6). However, instead of *payroll share*, as dependent variable we rely on *employee share* (the share of employees of establishment *i* to the total number of employees) for H3a, *working hours ratio* (the average number of working hours in establishment *i* to the average number of working hours of the firm) for H3b, *hourly payroll ratio* (the average payroll expense per hour in establishment *i* to the average payroll expense of the firm) for H3c, *revenue share* (the share of sales revenue of establishment *i* to the total revenue) for H4 and *investment share* (the share of gross investments of establishment *i* to the total investments) for H5.

4. Results

Table 2 contains our basic regression results on payroll share corresponding to equation (6). Estimates are derived by OLS. For interference, we use heteroscedasticity-robust standard errors clustered on the establishment level. For simplicity, we focus exclusively on our main variables of interest and refrain from reporting results on the control variables (e.g. year dummies or twice lagged $payroll\ share_{t-2}$).

[Table 2 about here]

While the models (4) to (6) consider all control variables, models (1) to (3) do not consider establishment controls. Nevertheless, corresponding results are close to each other. In the following, we concentrate on the regression results including all controls. In line with H1 we find a negative and significant correlation of tax differentials and *payroll share* in establishments. That holds for $TaxD_t$ and the lagged variable $TaxD_{t-1}$. Regression coefficients are to be interpreted as changes in *payroll share* in percentage points resulting from a one percentage point change in the tax rate differential. Thus, if we combine both coefficients in model (4), the overall effect of a one percentage point increase in the local tax rate in establishment *i* is a reduction of *payroll share* in *i* by 0.642 percentage points. As the average establishment's payroll share is 50%, a one percentage point increase in the tax rate differential decreases the payroll share of the establishment by 0.642/0.5 = 1.284%.

While Table 1 clearly documents a significant negative correlation between the tax rate differential and the payroll share, this need not necessarily be caused by payroll shifting. To isolate payroll shifting, we estimate models corresponding to equation (7) including tax rates of the establishment *i* and the opposite establishment *j* in *t* and *t-1*. Within these models, we generally account for all control variables.

[Table 3 about here]

As stated by H2, we obtain negative and significant effects for Tax_i and positive and significant effects for Tax_j. This implies that a higher tax rate in establishment *i* (*j*) reduces (increases) payroll share in establishment *i*. Interestingly, Tax_j is generally significant in the current period, while the impact of Tax_i is delayed by one period. The aggregate sum of both effects is very close to each other and almost identical to the size of the tax rate differential effect documented by Table 2. Therefore, Table 3 clearly provides evidence that the correlation of Table 2 is driven by a shifting of payroll expenses from high-tax establishments to low-tax establishments.

Within the tables 4a, 4b, and 4c, we document results for regressions of the components of *payroll share* (*employee share*, *working hours ratio*, and *hourly payroll ratio*) on tax rate differentials. As stated previously, while *employee share* and *working hours ratio* are likely associated with the shifting of real labor resources, *hourly payroll ratio* is difficult to explain as real response and thus can be taken as a hint for strategic cost shifting. Coefficients are to be interpreted as a one percentage point change of the dependent variable due to a one percentage point change in the tax rate differential. Note further that while the average establishment value of *employee share* and *payroll share* is 0.5, corresponding averages are 1.0 for *working hours ratio*.

[Table 4a about here]

According to Table 4a and contradicting H3a, we cannot provide any significant evidence that the share of employees of an establishment is correlated to its local tax rate differential. This result seems to be irritating if we consider that payroll share is significantly correlated to $TaxD_t$ and $TaxD_{t-1}$. It is robust with regards to the model specification and implies that the negative correlation between payroll expense and local tax rate differential is probably not due to a change in the number of employees.

[Table 4b about here]

[Table 4c about here]

On the contrary, we obtain significant and negative correlations for $TaxD_t$ and $TaxD_{t-1}$ regarding the number of working hours per staff member and the average payroll expense per working hour in an establishment. Corresponding to the result for *working hours ratio*, firms do adjust the number of actual working hours in an establishment in reaction to the local tax rate. While this could result in relatively small changes of the average payroll per hour (e.g. due to overtime compensation), it cannot explain the strong impact of tax rate differentials on *hourly payroll ratio*: Corresponding to Table 4b model (5), a one percentage point increase in $TaxD_t$ reduces *working hours ratio* by 0.51 percentage points (e.g. for the average establishment from 100.00% to 99.49%). Even for high overtime compensations (e.g. doubled hourly wages), the impact of this effect on the *average* payroll expense per hour in an establishment will be almost negligible. Nevertheless, we obtain also a strong reduction of *hourly payroll ratio* of 0.41 percentage points. These two reactions explain the most part (84%) of the overall payroll reaction (-0.548%) that we find in the model without logs.

An alternative explanation for such an effect could be local business tax incidence affecting wage payments to employees. Fuest et al. (2013) estimate a 1 euro increase in German local business tax liabilities to yield a 44-77 cent decrease in the wage bill, and argue that the major part of this reaction is caused by direct wage incidence. However, Siegloch (2013) finds that local tax rates in Germany do not effect local wage rates as labor is mobile between the jurisdictions and the jurisdictions are relatively small. In our setting, taking into account the tariff commitment of most German industries, corresponding effects should be small. Nevertheless, in unreported regressions we regressed absolute payroll cost for firms with one establishment (no shifting opportunity) and with two establishments (shifting opportunity) on local tax rates. Contrasting the tax incidence argument, we only find significant correlations of payroll costs and tax rate differentials for firms with shifting opportunities.

Hence, it seems unlikely that the effect on *hourly payroll ratio* is driven by overtime compensation or tax incidence effects. This fits well with our argument that the coefficient for *hourly payroll ratio* can be interpreted as hint for tax-motivated strategic cost management. Comparing the results of Table 4b and Table 4c, tax effects for *working hours ratio* and *hourly payroll ratio* have about the same size. Taking into account that the reaction of the *working hours ratio* explains a small portion of the *hourly payroll ratio* reaction, with due caution we state that a bit more than half of the payroll reaction to local tax rate changes result from the allocation of real resources. For the remaining part we consider tax-motivated strategic cost management as a possible explanation. The reader is asked to keep in mind that we do not observe tax data but mandatory surveys. Thus, as far as book payroll shifting only takes place in tax returns, our estimates for potential book payroll shifting may be downward biased.

In the following we focus on spillover effects of the shifting of real labor on sales revenue and capital stock. Table 5 contains regression results for sales revenue. We find only significant results for the lagged variable $TaxD_{t-1}$ if all controls are considered. In addition, the impact of $TaxD_{t-1}$ ($TaxD_t$ is not significant in any model) on revenue share is smaller compared to the combined effect of $TaxD_t$ and $TaxD_{t-1}$. All in all, these results imply a delayed spillover of payroll adjustments (due to tax rate changes) on sales revenue of limited size.

[Table 5 about here]

Spillover effects on capital are captured by Table 6. We obtain significant and negative coefficients implying a limitional production function. Thus, if a firm adjusts its payroll allocation in order to save taxes, it will also reduce investment and capital. We interpret this as evidence for a subsequent reaction of investment to real payroll shifting. Local tax rate increases not only shift away payroll, but also investment. Note that the coefficient estimate for *investment share* cannot be directly compared to the coefficients for *payroll share* because investment is a change in capital and not the absolute value of capital. Therefore, compared to payroll expense, the short term reaction of aggregate capital to tax rate differentials seems to be smaller.

5. Conclusion

Using the German local business tax, we identify how two-establishment firms react to local tax rate rate changes in a payroll apportionment system. We find that firms shift away payroll from the local establishment to the opposite establishment if local tax rates rise: A one percentage point increase of the local tax rate decreases the payroll share of an establishment by about 1.3%. On the other hand, a one percentage point increase of the local tax rate increases the payroll share of the opposite establishment significantly by about 1.2%.

We decompose payroll share reactions in employee share, working hours ratio and hourly payroll ratio reactions. We do not identify significant reactions for the numbers of employees. However, we find strong significant reactions of working hours ratios and hourly payroll ratios. These findings are, with all due caution, consistent with firms engaging not only in real payroll shifting but also (to a lesser amount) in strategic tax planning. Sales and investment shares of an establishment react in the same direction as the payroll share, but with lower magnitude (sales shares) or time-delayed (investment shares).

Our results show how strongly two-establishment firms react to local tax competition. Following a local tax rate increase, the payment share of the local establishment decreases, and sales and investment also decrease. As payroll, sales and investment also impact other taxes (e.g. workers' individual income tax), these effects may have important financial consequences for the municipalities setting the tax rates. The first hints for book shifting that we found are perhaps not surprising, taking into consideration that the payroll allocation a firm declares usually is not scrutinized in tax audits.

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Table 1: Descriptive statistics

Descriptive statistics	Mean	Median	Std. Dev.
Sales revenue (1,000 Euro)	21,424.33	4,298.29	127,288.22
Gross investments (1,000 Euro)	1,915.10	177.35	17,185.32
Payroll expense (1,000 Euro)	4,148.11	1,025.70	25,792.76
Number of employees	177	57	819
Monthly hours per employee	135.76	133.00	40.44
Payroll expenses per working hour	16.35	15.88	10.67

Notes: AFiD panel industrial units of the manufacturing industry; price-adjusted data; own calculations.

Table 2: Payroll share – tax differentials

MODEL	(1)	(2)	(3)	(4)	(5)	(6)
$TaxD_t$	-0.284*	-0.507***	--	-0.402**	-0.548***	--
	(0.152)	(0.165)	--	(0.159)	(0.174)	--
$TaxD_{t-1}$	-0.298***	--	-0.443***	-0.240**	--	-0.439***
	(0.105)	--	(0.143)	(0.101)	--	(0.137)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Establishment FE	Yes	Yes	Yes	Yes	Yes	Yes
District controls	Yes	Yes	Yes	Yes	Yes	Yes
Establishment controls	No	No	No	Yes	Yes	Yes
Observations	56,745	67,971	56,766	44,952	47,487	44,970
Within R^2	0.00441	0.00350	0.00421	0.0693	0.0610	0.0687
Overall R^2	0.00453	0.00513	0.00531	0.465	0.412	0.469

Notes: OLS regressions with establishment fixed effects and clustered standard errors on the establishment level (in parentheses). Significant results on the 1% (5%) [10%] level are denoted by *** (**) [*].

Table 3: Payroll share – tax rates

MODEL	(1)	(2)	(3)
Tax_{it}	0.0947	-0.319	--
	(0.243)	(0.260)	--
Tax_{it-1}	-0.603***	--	-0.505**
	(0.215)	--	(0.233)
Tax_{jt}	0.612***	0.607***	--
	(0.214)	(0.213)	--
Tax_{jt-1}	0.00137	--	0.00194
	(0.00337)	--	(0.00340)
Year FE	Yes	Yes	Yes
Establishment FE	Yes	Yes	Yes
District controls	Yes	Yes	Yes
Establishment controls	Yes	Yes	Yes
Observations	47,782	47,806	47,802
Within R^2	0.0248	0.0246	0.0238
Overall R^2	0.165	0.166	0.168

Notes: OLS regressions with establishment fixed effects and clustered standard errors on the establishment level (in parentheses). Significant results on the 1% (5%) [10%] level are denoted by *** (**) [*].

Table 4a: Employee share – tax differentials

MODEL	(1)	(2)	(3)	(4)	(5)	(6)
$TaxD_t$	0.0349	-0.0823	--	0.0312	0.00952	--
	(0.137)	(0.152)	--	(0.134)	(0.146)	--
$TaxD_{t-1}$	-0.00103	--	0.0113	0.00420	--	0.0111
	(0.0892)	--	(0.127)	(0.0803)	--	(0.114)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Establishment FE	Yes	Yes	Yes	Yes	Yes	Yes
District controls	Yes	Yes	Yes	Yes	Yes	Yes
Establishment controls	No	No	No	Yes	Yes	Yes
Observations	57,535	69,045	57,556	45,642	48,246	45,660
Within R^2	0.00120	0.00112	0.00119	0.0776	0.0714	0.0773
Overall R^2	0.0112	0.00746	0.0112	0.743	0.679	0.743

Notes: OLS regressions with establishment fixed effects and clustered standard errors on the establishment level (in parentheses). Significant results on the 1% (5%) [10%] level are denoted by *** (**) [*].

Table 4b: Working hours ratio – tax differentials

MODEL	(1)	(2)	(3)	(4)	(5)	(6)
$TaxD_t$	-0.349***	-0.393***	--	-0.392***	-0.510***	--
	(0.117)	(0.116)	--	(0.132)	(0.149)	--
$TaxD_{t-1}$	-0.0674	--	-0.235**	-0.0527	--	-0.235*
	(0.0859)	--	(0.110)	(0.0989)	--	(0.125)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Establishment FE	Yes	Yes	Yes	Yes	Yes	Yes
District controls	Yes	Yes	Yes	Yes	Yes	Yes
Establishment controls	No	No	No	Yes	Yes	Yes
Observations	51,600	62,044	51,621	40,595	43,059	40,613
Within R^2	0.189	0.174	0.189	0.205	0.204	0.204
Overall R^2	0.127	0.114	0.126	0.159	0.157	0.159

Notes: OLS regressions with establishment fixed effects and clustered standard errors on the establishment level (in parentheses). Significant results on the 1% (5%) [10%] level are denoted by *** (**) [*].

Table 4c: Hourly payroll ratio – tax differentials

MODEL	(1)	(2)	(3)	(4)	(5)	(6)
$TaxD_t$	-0.253*	-0.370***	--	-0.212	-0.412**	--
	(0.142)	(0.141)	--	(0.160)	(0.180)	--
$TaxD_{t-1}$	-0.253**	--	-0.373**	-0.261**	--	-0.357**
	(0.115)	--	(0.146)	(0.132)	--	(0.167)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Establishment FE	Yes	Yes	Yes	Yes	Yes	Yes
District controls	Yes	Yes	Yes	Yes	Yes	Yes
Establishment controls	No	No	No	Yes	Yes	Yes
Observations	51,374	61,774	51,395	40,426	42,875	40,444
Within R^2	0.107	0.102	0.107	0.116	0.119	0.116
Overall R^2	0.0563	0.0550	0.0551	0.0838	0.0851	0.0826

Notes: OLS regressions with establishment fixed effects and clustered standard errors on the establishment level (in parentheses). Significant results on the 1% (5%) [10%] level are denoted by *** (**) [*].

Table 5: Revenue share – tax differentials

MODEL	(1)	(2)	(3)	(4)	(5)	(6)
$TaxD_t$	-0.0529	-0.206	--	-0.101	-0.261	--
	(0.175)	(0.195)	--	(0.178)	(0.192)	--
$TaxD_{t-1}$	-0.193	--	-0.230	-0.294**	--	-0.357**
	(0.125)	--	(0.174)	(0.121)	--	(0.162)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Establishment FE	Yes	Yes	Yes	Yes	Yes	Yes
District controls	Yes	Yes	Yes	Yes	Yes	Yes
Establishment controls	No	No	No	Yes	Yes	Yes
Observations	57,262	68,709	57,283	45,516	48,118	45,534
Within R^2	0.00174	0.00163	0.00175	0.0914	0.0828	0.0911
Overall R^2	0.00705	0.00544	0.00712	0.739	0.683	0.740

Notes: OLS regressions with establishment fixed effects and clustered standard errors on the establishment level (in parentheses). Significant results on the 1% (5%) [10%] level are denoted by *** (**) [*].

Table 6: Investment share – tax differentials

MODEL	(1)	(2)	(3)	(4)	(5)	(6)
$TaxD_t$	-0.271	-0.641***	--	-0.311	-0.562*	--
	(0.291)	(0.248)	--	(0.326)	(0.288)	--
$TaxD_{t-1}$	-0.740***	--	-0.894***	-0.603**	--	-0.773***
	(0.227)	--	(0.236)	(0.248)	--	(0.243)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Establishment FE	Yes	Yes	Yes	Yes	Yes	Yes
District controls	Yes	Yes	Yes	Yes	Yes	Yes
Establishment controls	No	No	No	Yes	Yes	Yes
Observations	50,849	60,117	50,870	42,786	45,162	42,804
Within R^2	0.00160	0.00178	0.00159	0.00267	0.00244	0.00263
Overall R^2	0.000917	0.00228	0.00108	0.0236	0.0118	0.0244

Notes: OLS regressions with establishment fixed effects and clustered standard errors on the establishment level (in parentheses). Significant results on the 1% (5%) [10%] level are denoted by *** (**) [*].