Taxing Firm Capital: Effects on Workers and Firms

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Abstract

Using administrative plant-level data I study how the taxation of the capital stock affects firms and workers. Before a reform in 1998, the German local business tax was levied on two bases: profits and the capital stock. I exploit this unique setting to identify the effects of capital stock taxation. Businesses that experienced a larger tax cut increased investment and wages. However, aggregate employment was not affected in the long run. More exposed firms also earned higher profits. Comparing the estimates to the literature on corporate income taxation, I find slightly larger investment effects and similar effects on wages. In line with theoretical predictions, the tax cut also triggered increased firm entry, in particular by lower productivity firms. This resulted in lower average productivity. In contrast, I find that lower profit taxes are associated with higher productivity. This highlights the differences between taxing profits and capital.

Keywords: capital taxation, corporate taxation, investment, labor demand

JEL-Classification: D22, H25, H32, J23, J31, O33

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1 Introduction

Current economic discussions often focus on the fairness and efficiency of tax systems. A fundamental issue in the design of capital taxation systems is distinguishing between capital stock (or wealth) and profit (or capital income) taxation. The recent empirical literature has focused on the effects of corporate income taxation or depreciation rules.[1] The effects of capital stock taxation (or wealth taxation) on firm outcomes have received much less attention. Theoretically, both forms of taxation are equivalent under homogeneous returns. In practice, firm profitability varies widely, leading to distinctions between capital stock and capital income taxation. Guvenen, Kambourov, Kuruscu, et al. (2023) and Guvenen, Kambourov, Ocampo, et al. (2022) have recently studied the trade-off between wealth and capital income taxes in theoretical and quantitative models, but there is no reduced form evidence for the effects of wealth taxation on firms.[2]

This paper fills this gap in the literature by estimating the effects of a tax on firm capital. I exploit the unique setting of the German business tax system. Prior to 1998, the German local business tax (LBT) was levied on two distinct tax bases: profits and capital stocks. While the tax base and liability criteria were set at the federal level, each of the more than 10,000 municipalities had autonomy to determine the local tax rate. In 1998 the LBT was reformed, and the tax on the capital stock was removed, making it solely based on profit thereafter. Since tax rates varied widely, firms across Germany experienced substantially different tax cuts after the reform. I use this variation in tax cut exposure to estimate a difference-in-differences specification. I combine this fine-grained municipality-level variation with administrative data on establishment-level investment, profits, employment and wages. This approach makes it possible to estimate the effects of capital stock taxation on firm outcomes before and after the tax reform.

My results show that firms that experienced larger tax cuts responded by increasing investment in machinnery and equipment. A 0.1 percentage point larger tax cut (about a standard deviation) led to an increase in investment by about five percent in the manufacturing sector. This implies a very large semi-elasticity. It is important to note that the tax base for the capital stock tax is much larger than the profit tax base, while tax rates are much lower. Therefore, semi-elasticities for the capital stock tax are very large. I use a basic cost of capital framework to compare the size of the estimates to the literature. I find that a one percentage point reduction in the capital stock tax reduces the cost of capital (CoC) by almost 14 percent. A one percentage point reduction in the profit tax reduces the CoC by only 1.23%. I then scale all estimated semi-elasticities by these CoC-elasticities to obtain elasticities with respect to CoC.

[1] See for example: Curtis et al. (2021), Ohrn (2018), Fuest, Peichl, and Siegloch (2018), Link et al. (2022), and Giroud and Rauh (2019)

[2] Gaillard and Wangner (2022) is another paper studying optimal wealth taxation in a general equilibrium model. Becker (2021) has analyzed the theoretical implications of capital stock taxation for corporate tax avoidance.

These CoC-adjusted semi-elasticities are comparable across different policies affecting the cost of capital.[3] The CoC-adjusted semi-elasticity for the capital stock tax is approximately 4.5 for investment. This estimate is relatively high and close to the upper end of the recent estimates. Link et al. (2022) find an investment semi-elasticity of three in the German local business tax setting. Ohrn (2018) finds a semi-elasticity of 4.7 when studying a specific deduction for the manufacturing sector in the US. My CoC-adjusted estimate falls within this range.

The firms that experienced larger tax cuts also increased their wages after the reform. A 0.1 percentage point larger tax cut led to about 0.3% to 0.5% higher wages. Adjusting this effect by the CoC, it is similar to the elasticity estimated by Fuest, Peichl, and Siegloch (2018). There are no statistically significant effects on aggregate employment in the long-run. Workers were able capture some of the gains from the tax cut through higher wages, but employment did not expand differentially in more affected regions. This could be due to German labor market institutions or because of substitution between capital and labor. Finally, I estimate the effect of the tax cut on profits. I find that gross profits increased by about 0.1% for a 0.1 percentage point larger tax cut, while net profits increased by 0.3%. Hence, most of the effect is due to the lower tax burden, but there is also a significant effect on gross profits.

Next, I move from the level of the individual firm to the level of the district to investigate the effect of the tax cut on entry and the composition of plants. I confirm the results on wages and employment also on the aggregate level. Furthermore, I find that entry by new plants increases in response to the tax cut. The number of new plants entering in a district increases by 2% for a 0.1 percentage point larger tax cut. Further analysis reveals that this increased entry is mostly driven by firms in the bottom two quintiles of the productivity distribution (as measured by plant specific wage premia (Abowd, Kramarz, and Margolis, 1999)). Accordingly, average productivity declines in more exposed districts. This finding is in line with the main mechanism in Guvenen, Kambourov, Ocampo, et al. (2022) and Guvenen, Kambourov, Kuruscu, et al. (2023). Capital stock taxes reduce the return to capital more for lower productivity entrepreneurs than for higher productivity entrepreneurs. This leads to a different selection of entrepreneurs who actually start and grow a business. I find the opposite effect for profit taxation: lower profit taxes actually increase productivity. This is not driven by differences in the composition of entering firms. Instead, it is likely due to the fact that under lower profit taxes more productive firms can accumulate more capital and therefore grow more quickly. This finding highlights that corporate taxation can shape the productivity composition which lends support to the theoretical model in Guvenen, Kambourov, Ocampo, et al. (2022) and Guvenen, Kambourov, Kuruscu, et al. (2023).

The identifying assumption underlying my approach is that, in the absence of the tax reform, firms in the municipalities with higher tax rates would evolve similarly to firms in municipal-

[3] Such as corporate income taxation, bonus depreciation, investment subsidies and capital stock taxation.

ities with lower tax rates. I provide support for the identification approach in multiple ways. First, I show that the estimates are stable in the presence of a variety of control variables and fixed effects. Second, event study estimates show that higher and lower tax municipalities exhibited a parallel pre-trend before the reform in 1998. Third, I run placebo tests. I use the institutional feature that the implementation of the LBT in the former East German states differed from the West German states. While the LBT on profits was implemented in the exact same way, the introduction of the LBT on the capital stock was delayed after reunification and then never implemented. Hence, East German firms were not exposed to the 1998 tax reform and serve as a placebo group. Similarly, there are certain sectors that are not covered by the LBT, even in West Germany. I find no differential developments between higher and lower tax municipalities in East German and non-liable firms, validating the identification approach. Finally, I check the investment response for building investments, which were not affected by the capital stock tax. There are no detectable differences for building and land investment between low and high tax municipalities.

Contribution to the Literature: This paper mainly contributes to two broad parts of the literature. First, it relates to the literature studying the effects of corporate taxation on firms and workers (Fuest, Peichl, and Siegloch (2018); Link et al. (2022); Giroud and Rauh (2019); Suárez Serrato and Zidar (2016); Lichter et al. (2021); Auerbach (2006)). It also connects to the adjacent literature studying the effects of accelerated depreciation policies on investment (Curtis et al. (2021); Ohrn (2018); Zwick and Mahon (2017); Criscuolo et al. (2019); Eichfelder and Schneider (2018)). I contribute to both strands of the literature by providing new evidence on the effect of capital stock taxation on investment, wages, employment and profits. Second, this paper relates to the (theoretical) literature on the differences between the taxation of wealth and capital income (Guvenen, Kambourov, Ocampo, et al. (2022); Guvenen, Kambourov, Kuruscu, et al. (2023); Gaillard and Wangner (2022)). I contribute to this literature by providing empirical reduced-form evidence on the effects of a capital stock tax on firms and workers. Most importantly, I show that the tax cut led to more entry of lower productivity firms, while lower profit taxes are associated with higher productivity. This provides evidence for the mechanism outlined in Guvenen, Kambourov, Kuruscu, et al. (2023) and shows that corporate taxation can shape the productivity distribution.

Section 2 describes the German business tax system. Section 3 discusses the data on investment and employment. Section 4 describes the empirical strategy and Section 5 shows the main results and validity tests. Section 6 discusses effects on the composition of firms. Section 7 concludes.

2 Institutional Setting

I estimate the effects of capital stock taxation by exploiting the unique institutional setting of the German local business tax. In the following subsection 2.1 I will summarize the main features of the German business tax system. In subsection 2.2 I will discuss the 1998 reform of the local business tax. Subsection 2.3 outlines a simple model of capital stock taxation based on Guvenen, Kambourov, Ocampo, et al. (2022).

2.1 Business Taxation in Germany before and after 1998

German firms are potentially subject to three different taxes: the corporate tax (CIT), the personal income tax (PIT) and the local business tax (LBT). Which taxes apply depends on the legal form of the firm. Corporate firms (Kapitalgesellschaften) are subject to the CIT while non-corporate firms (Personengesellschaften) are subject to the PIT. Both legal forms are liable for the LBT.[4] The tax rates for the CIT and the PIT are set at the federal level. For the LBT, tax bases and liability criteria are also set at the federal level, while tax rates are set autonomously by the municipalities. For firms present in multiple municipalities, profits are distributed according to formula apportionment based on the wage sum.

Currently, the CIT, the PIT and the LBT are all based on firm profits. In 1997 the CIT generated a revenue of 17 billion Euro, while the LBT raised almost 25 billion Euro. Accordingly, the LBT is the most important tax on businesses in Germany. Before 1998 the LBT included the firm capital stock as a secondary tax base in West Germany. For the purpose of this tax the capital stock was defined as equity adjusted by certain additions and deductions. The full computation can be found in Table A.1 in Appendix A. [5] The goal was to tax the capital that is available to the firm in the longer-term. In the following I will refer to the LBT on profit as LBTP and the LBT on capital as LBTC. The local tax rates are set in the following manner: The municipal government sets the local scaling factor (LSF). In the next step the LSF is multiplied with the basic rate which is set by the federal government. It was 5% for the LBTP (lowered to 3.5% in 2008). For the LBTC is was 0.2% before 1998 and 0% after the tax was abolished in 1998. Multiplying the LSF and the basic rate yields the local business tax rate. The following equations illustrates the calculation of the tax rates:

$$\text{LSF} \times \text{Basic Rate LBTP} = \text{LBTP Rate} \tag{1}$$

[4]The public sector and many agricultural firms are exempted from the LBT. In addition, specific professions such as lawyers, pharmacists, accountants, doctors or journalists are also exempted under certain conditions.

[5]In general, this calculation equals the sum of capital assets and current assets for a firm financed by equity. For debt-financed firm, the tax base will be lower, because debt is not fully added to the tax base. As an example consider two firms A and B. A is fully financed by equity and has assets of 1 million EUR. Then the tax base will be 1 million EUR. Firm B is 50% debt-financed and also has assets of 1 million EUR. Equity for firm B is 500 000 EUR. To calculate the tax base equity and half of long-run debt is summed up. Firm B's tax base is then 750 000 EUR. Hence, debt financing is preferable from a tax perspective, as is the case in most corporate tax systems in the world.

$$\text{LSF} \times \text{Basic Rate LBTC} = \text{LBTC Rate} \quad (2)$$

Table 1 demonstrates the LBT system before and after 1998 using the example of Munich. For Munich the LSF was set at 490% in 1997 and 1998. The LBTP does generally not feature an allowance, but the LBTC had an allowance of 120,000 DM (about 61,000 EUR). Taking a firm with a capital stock of 1 million EUR and 100,000 EUR in profit one can calculate effective tax rates (total LBT payments as a share of profit). The effective tax rates depend strongly on the ratio of profit to capital and they can even exceed 100%. This is not uncommon for a tax on stocks instead of flows.

Table 1: Calculation of LBT in Munich 1997 and 1998

	1997		1998	
Local Scaling Factor	490%		490%	
Tax base	Profit	Capital	Profit	Capital
Basic Rate	5%	0.2%	5%	0%
Tax rate	24.5%	0.98%	24.5%	0%
Tax base (Amount)	100,000	1,000,000	100,000	1,000,000
Tax Payment	24,500	9200	24,500	0
ETR	33.7%		24.5%	

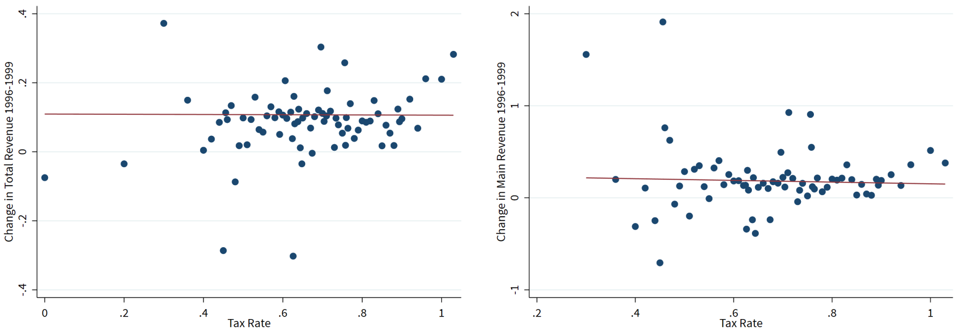
The LBT system in the former East German states differed slightly from the West German system. While the taxation of profits was the same in East and West after reunification, the LBTC was not collected in the former East German states.[6] Hence, the basic rate on capital in the East German states was 0% throughout the whole period and the tax reform of 1998 did not affect them.

2.2 Abolition of LBT on the capital stock

The capital stock component of the LBT was last collected in 1997. The law to abolish the tax was passed in early 1997 by the conservative/liberal coalition government. The last assessment date of the capital stock was January 1st 1997. I consider 1997 as the year when treatment starts, since firms could begin responding to the tax change then, even though the tax was formally abolished on January 1st 1998. The tax was abolished because it was considered harmful for growth and employment (Bundesministerium der Finanzen, 1999). In terms of revenue the LBT is the most important tax on business income in Germany. In 1997 it generated a revenue of almost 25 billion Euro. The LBTC was responsible for 18.8% of the total revenue in West Germany. This underlines that the LBTC was an important part of the business tax system in Germany.

[6] They did, however, receive compensation for the reduced revenue collected through the LBT. The tax was not introduced in East Germany because policymakers were worried that it would burden the East German economy too much.

Figure 1: Correlation between the Change in Revenue between 1996 and 1999 and the LBTC tax rate in 1996



Data: Statistical Offices of the Federal States. *Notes:* The left panel refers to total municipal tax revenue consisting of LBT, property tax, VAT and income tax. The right panel only refers to the LBT and the VAT.

Accordingly, the municipalities were compensated for the lost revenue by receiving a share of VAT revenue. In aggregate, this actually overcompensated them for the lost revenue (Bundesministerium der Finanzen, 1999). Figure 1 displays the correlation between the LBTC rate in 1996 (on the horizontal axis) and the change in municipal tax revenue (on the y axis). The left figure shows total local tax revenue and the right figure focuses only on LBT and VAT revenue, as these two revenue sources were the only ones affected by the reform. Both figures show that there was no correlation between the size of the tax cut and the subsequent development of tax revenue (the point estimates are close to zero and very insignificant). This suggests that the compensation of municipalities was successful and changes in tax revenue should not confound the estimated effects of the reform. Figure 3 also shows that there were no strong adjustments in LBT rates around the reform. As there were no strong effects on revenue, there was also little pressure on municipalities to change their tax rates.

2.3 Modelling Capital Stock Taxes

To illustrate the potential effects of capital stock taxation relative to profit taxation I rely on a simplified version of the framework developed by Guvenen, Kambourov, Ocampo, et al. (2022) and Guvenen, Kambourov, Kuruscu, et al. (2023). The model consists of entrepreneurs who hire labor and borrow or save through a bond market at interest rate r. The entrepreneurs differ in their productivity z and their wealth a. Entrepreneurs face the borrowing constraint $k \leq \lambda a$ and choose capital k and labor n to maximize their profits:

$$\Pi_{ic}^{\star}(z, a) = \max_{k \leq \lambda a, n \geq 0} (1 - \tau_c^k) \left[(z_i k_i)^{\alpha} n_i^{1-\alpha} - r k_i - w_c n_i - \tau_c^a a_i \right] \quad (3)$$

where τ_c^k represents the tax on profits and τ_c^a is the tax on the capital stock. The entrepreneurs differ in their marginal returns to capital. Those with a marginal return greater than $r + \frac{\tau_c^a}{\lambda}$ will borrow as much as possible, while those with lower returns will invest their wealth on the bond market. The optimal profit can be expressed as $\Pi^{\star}(z, a) = \pi^{\star}(z) a_i$, where

$$\pi_i^\star(z) = \begin{cases} (1-\tau_c^k)\left(f_k - r - \frac{\tau_c^a}{\lambda}\right)\lambda & \text{if } f_k > r + \frac{\tau_c^a}{\lambda} \\ 0 & \text{if } f_k \leq r + \frac{\tau_c^a}{\lambda} \end{cases} \tag{4}$$

is the excess return the entrepreneurs achieves exceeding the interest rate r. f_k denotes the marginal return to capital $\alpha\left(\frac{1-\alpha}{w_c}\right)^{\frac{1-\alpha}{\alpha}} z_i$. The next expressions show the effects of tax changes on the log net excess return of the entrepreneurs:

$$\begin{aligned} \frac{\partial \ln \pi_i^\star}{\partial \tau_c^k} &= -\frac{1}{1-\tau_c^k} \\ \frac{\partial \ln \pi_i^\star}{\partial \tau_c^a} &= -\frac{1}{\lambda(f_k - r - \frac{\tau_c^a}{\lambda})} \end{aligned} \tag{5}$$

The effect of τ_a decreases in f_k which implies that lower productivity entrepreneurs are more affected by a tax on the capital stock. The effect of τ_k does not depend on f_k. Profits of lower and higher productivity entrepreneurs are affected in the same way. Hence, the choice of profit or capital stock taxation affects the productivity composition of active entrepreneurs.[7] Capital stock taxes mainly inhibit low productivity entrepreneurs from starting a business, while profit taxes inhibit entrepreneurs more broadly.[8]

Because the two taxes affect net profits in different ways, they also lead to differences in capital accumulation. Higher τ_a make it harder for low productivity entrepreneurs to accumulate capital, while they have smaller effects on higher productivity entrepreneurs. Therefore, the type of tax used does not just affect the composition of entrepreneurs who start a business, but it also affects the allocation of capital between active entrepreneurs. Hence, it affects productivity through both channels, the choice to become an entrepreneur and the dynamic accumulation of capital by different types of entrepreneurs.[9]

3 Data

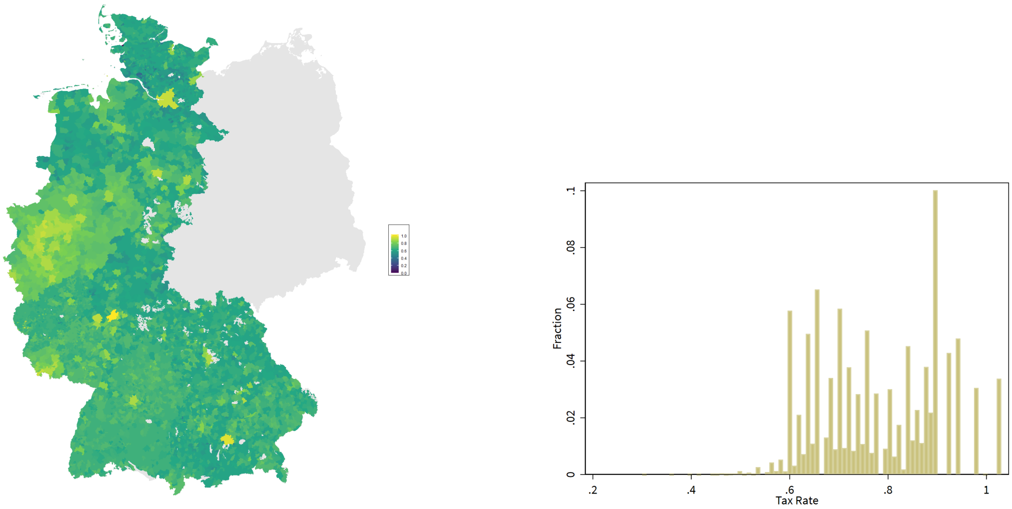
I combine data on the LSFs with administrative firm-level data on investment, employment and wages. I present the data in detail in the following subsections.

[7] Even more if entrepreneurs have the outside option of working in addition to passively earning the return r on the bond market. If the productivity on the labor market also depends on z, τ_a shifts the productivity distribution even further away from low productivity entrepreneurs.

[8] These results assume that wages are not affected by the tax changes. If wages react, a part of the incidence of the capital stock tax is borne by the workers. If the the effect of the tax change on wages is the same in high and low productivity firms, the inclusion of wage effects strengthens the conclusion of Equation 5: The reaction of wages reduces the effect on profits, but more so in high productivity than in low productivity firms. This strengthens the conclusion that low productivity firms are more affected by changes in τ_a

[9] The second channel also leads to the "Use it or lose it"-Effect studies by Guvenen, Kambourov, Kuruscu, et al. (2023). Higher τ_k and lower τ_a make it easier (harder) for low (high) productivity entrepreneurs to accumulate capital. A switch from wealth to capital income taxation can reduce the overall productivity of capital in the economy.

Figure 2: Local business capital tax in 1996



Data: Statistical Offices of the Federal States. *Notes:* The left panel displays the geographical variation of the LBTC rate across Germany in 1996. The right panel presents the same variation in a histogram.

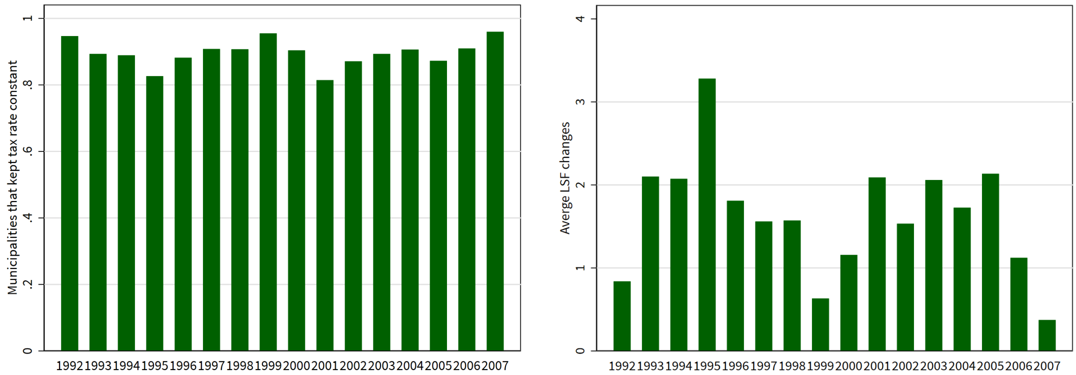
3.1 Data on Municipalities

In the empirical section I use the variation of the LSF and the abolition of the capital stock component in the LBT to identify the effects of capital stock taxation. The data from the Statistical Offices of the 16 German States contains information on the local tax rates and revenues of the municipalities. Figure 2 shows the tax rates for the LBTC in 1996, one year before the tax was abolished. The left panel displays the geographical variation and the right panel displays the variation in a histogram. In West Germany the tax rate varied mostly between 0.6% and 1%, although there are some outliers with tax rates around 0.2%. The average tax rate in West Germany was 0.78% (weighted by the tax base) with a standard deviation of 0.12%. In contrast, the tax was not collected in East Germany, represented by the greyed out part in the map. The left part of Figure 2 shows the variation across West Germany. In the empirical section I will mainly use the variation across West Germany. I exploit the fact that the tax was never collected in East Germany for placebo tests. Figure 3 shows the fraction of municipalities that kept their LSF constant in each year. It shows that there was no disproportionate reaction around the abolition of the LBTC in 1997. Around 90% of municipalities keep their LSF constant each year, while 10% of municipalities change them. The right subfigure in Figure 3 shows the average size of the change in the LSF. Once again, the years 1997 and 1998 are no outliers with an average increase of 1.5 percentage points. Nevertheless, I control for tax changes in all empirical specifications.

3.2 Data on Investment

To study the firm investment response I use data on firm investment from the ifo Investment Survey (IVS-IND, 2020). The ifo Investment Survey (IVS) is a representative survey of incor-

Figure 3: Local Business Tax changes around the reform



Data: Statistical Offices of the Federal States. *Notes:* The left panel displays fraction of municipalities that keep their LSF constant each year. It shows that the fraction of municipalities is not different in the years around the reform than in other years. The right panel presents the average change of the LSF in each year. The changes in the years from 1996 to 1998 are very comparable to other years.

porated firms in the German manufacturing sector and has a panel structure, which makes it possible to track firms over time. The survey is conducted biannually (spring and fall) since 1955. Among other variables the firms report their realized investment for the previous year. I average the values reported in spring and fall if they differ. Link et al. (2022) use the IVS to study the effect of LBT changes on investment. They show that the data is representative of the German manufacturing sector.

3.3 Data on Employment and Wages

To analyse the effects on the labor market I use the establishment history panel of the Institute for Employment Research (Ganzer et al., 2022a; Ganzer et al., 2022b).[10] It is a panel data set of a 50% sample of all establishments in Germany based on administrative social security data. Civil servants and self-employed individuals are therefore not observed. Marginal workers are not observed consistently throughout the whole sample. All other categories of workers are fully covered by the data, corresponding to about 80% of all employed individuals in Germany. It includes very detailed information on employment and wages. It can therefore be used to study the impact on the labor market in more detail. The wage data is censored at the social security contribution limit. Hence, I cannot observe very high wages as these wages are set to the contribution limit. I show in Appendix Table C.3 that my results are robust to using the median instead of mean wage (as the contribution limit is always far above the median wage). My sample starts in 1992 for West Germany and 1993 for East Germany. My sample ends in 2006. The lowest level of the geographic identifier in the data is the district level. Therefore, all analysis based on the employment data is on the district level (i.e. using the weighted average of the LBTC rate on the district level).

The data also contain measures for plant-specific wage premia (AKM plant fixed effects).

[10]The data access was provided via remote data access.

These premia are estimated following the methodology developed by Abowd, Kramarz, and Margolis (1999). In the German context Card, Heining, and Kline (2013) use the data to analyze the role of wage premia for the development of inequality and Dauth et al. (2022) use it to study the role of assortative matching between high-quality workers and plants on spatial inequality. The AKM effects represent a measure of productivity that is consistent with a variety of models of the labor market. I use these plant specific wage premia as a measure of plant productivity.

3.4 Data on Profits and Tax Payments

Finally, I use the data base on the local business tax statistics (Gewerbesteuerstatistik) to estimate effects on profits and tax payments. The data cover the universe of tax payers liable to the LBT and include variables on gross profits, deductions and (before the abolition of the LBTC) business capital (Forschungsdatenzentrum der Statistischen Ämter der Länder, 2015). The universal coverage and accurate data on profits and capital is the great asset of this data set. Unfortunately, it also has some disadvantages. The data is only available starting in 1995 and it is only available triennially. Additionally, it is impossible to follow tax paying units over times, because there are no consistent identifiers in the data. Hence, I adjust my empirical strategy to reduce the impact of these disadvantages (more details in Section 4).

3.5 Sample Restrictions

This section briefly describes the steps taken to obtain a comparable sample over time and across different data sets. I establish three main sample restrictions.

Balanced Sample: First, baseline regressions are always run on a balanced panel of establishments that are present throughout the whole observation period (1992-2007). This makes it possible to track plants for five years before the reform and to measure effects ten years after the policy change. A balanced panel also avoids concerns about changes in the composition of the sample of plants. The estimates based on the balanced panel should be interpreted as the effect on existing firms. Effects on firm entry and exit are outside of the scope of this paper. Unbalanced panels will be used in robustness checks.

Location Changes: Second, baseline regressions are run on samples of establishments that do not change their location between 1992 and 2007 and located in West Germany. Again, this is done to avoid concerns about changes in the composition of plants and sorting of plants. Even though plant identifiers remain the same, it is often unclear if the plant is actually a continuation of the previous plant. By removing location changing plants I sidestep these concerns. The estimates are focused on incumbent firms that do not move in response to the tax. Empirically location changes are relatively infrequent at less than 3% of plants over the whole period of 1992 to 2007.

Non-liable Firms: Third, I remove all plants that operate in sectors that are generally not liable to the LBT. These are mining, energy, agriculture, the public sector and certain types of (professional) services. These firms are not affected by the reform. A sample including these plants will be used as a placebo test in Section 5.6.

3.6 Descriptive Statistics

This section presents descriptive statistics for the municipality and firm data. Table 2 shows descriptive statistics for West German municipalities. Panel A shows unweighted estimates. The mean LSF in 1996 was 325%, which corresponded to a mean LBTC rate of 0.65% and a mean LBTP rate of 16.3%. The LBTC rate ranged from 0.2% to 1.03%. On average municipalities received €2.9 million in revenue from the LBT, ranging from negative 23 000 Euro (because of loss carry-over) to more than 1 billion Euro. On average municipalities had a population of 8400, ranging from 11 to 3.4 million (Berlin). In Panel B the statistics are weighted by the tax base of the LBT to give a larger weight to more economically significant municipalities. The average LSF in 1996 was 389%. This LSF yielded a LBTC rate of 0.78% and a LBTP rate of 19.4%. The average LBT revenue was €197 million.

Table 2: Descriptive Statistics - Municipalities

Municipality characteristics - West German sample				
Panel A: Unweighted				
N = 8,003	Mean	SD	Minimum	Maximum
LSF 1996	325.06	30.18	100	515
LBTC rate 1996	.6501	.0604	.2	1.03
LBTP rate 1996	16.25	1.5090	5	25.75
LBT revenue 1996 (in 1000€)	2917.658	26631.39	-23.86	1255781
Population 1996	8444.81	53100.95	11	3425759
Panel B: Weighted by LBT tax base				
N = 8,003	Mean	SD	Minimum	Maximum
LSF 1996	388.85	60.99	100	515
LBTC rate 1996	.7777	.1220	.2	1.03
LBTP rate 1996	19.44	3.05	5	25.75
LBT revenue 1996 (in 1000€)	196692.2	345737.5	-23.86	1255781
Population 1996	260929.2	418996.8	11	1704731

Data: Statistical Offices of the Federal States. *Notes:* LSF: Local Scaling Factor, LBTC: Local Business Tax on Capital, LBTP: Local Business Tax on Profit. LBT revenue is in 2015 Euros.

Table 3 displays the descriptive statistics of the establishments. Panel A presents the statistics for the investment data based on the IVS-IND (2020).[11] The firms included in the IVS-IND (2020) data have an average of almost 1,800 employees and invest approximately 22 million

[11] As noted in Section 3.2, the results based on the administrative data have not yet been released by the Statistical Offices.

Euro per year. The IVS is generally representative of the German manufacturing sector (Link et al., 2022). Panel B presents the descriptive statistics for the labor market data. My baseline sample includes almost 2.5 million establishment-year observations. The average establishment has 25 employees and pays an average daily wage of 88 Euro. The sample is distributed relatively evenly across industries. 29% of establishments are in manufacturing. 26.5% operate in retail and wholesale trade. 28.5% are in services and the remaining establishments operate in construction and restoration. Hence, the labor market data covers a much wider part of the economy than the investment data. In particular, it covers many smaller firms and firms outside of manufacturing. Panel C displays the descriptive statistics for the local business tax statistics in 1995. The tax statistics cover the largest number of plants since it also covers plants without any employees in the social security system. This yields more than one million plants in 1995. On average these plants had gross profits of almost 85 000 €. The average effective LBT rate was slightly above 10.33 %. About 90% of taxes paid were for the LBTP and 10% were due to the LBTC.

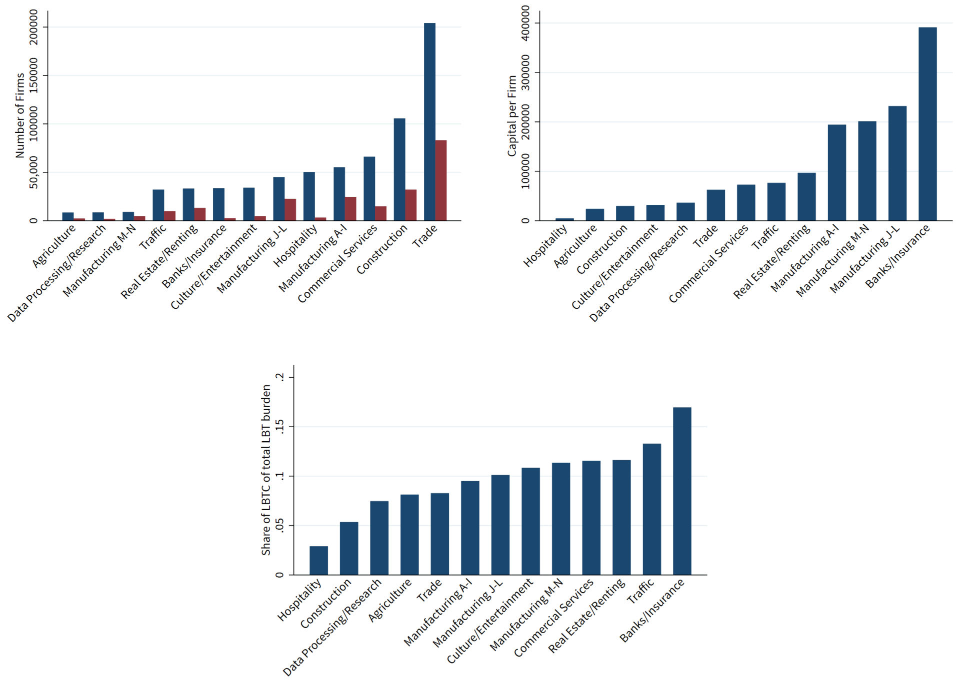
Figure 4 shows additional descriptive statistics based on the local business statistics. The figure in the top left displays the number of plants that had positive LBTC payments (in red) and LBTP payments (in blue). For both types of taxes trade (wholesale and retail) accounted for the largest number of firms paying the taxes. For the LBTC construction and the manufacturing sectors have the next largest number of affected firms. For the LBTP construction, commercial services, manufacturing and hospitality are the next largest sectors. The figure in the top right displays the average amount of capital per plant in each industry. Banking and the three manufacturing sectors had the largest capital stock per plant. Real estate, traffic, commercial services and trade had medium levels of capital, while firms in the hospitality sector had very low levels of capital. Finally, the bottom figure displays the share of the total LBT liability that is due to the LBTC. This basically combines profitability and capital intensity to derive a measure for the exposure to the LBTC for each industry. The LBTC burden accounts for between 2.5% and more than 16% of the total LBT burden. Banking, traffic, real estate and commercial services have the highest share of their tax liability due to the LBTC. The manufacturing sectors only have an intermediate exposure to the LBTC, since they have both a large capital stock and high profits. The share of LBTC in total LBT burden is the lowest in hospitality and construction. Because of the broad definition of capital used for the tax, a broad range of sectors was affected by the LBTC and not just individual industries such as manufacturing or real estate.

Table 3: Descriptive Statistics - Establishments

Panel A N = 9,990	Investment Data - Baseline Sample	
	Mean	SD
Employees	1,789	9,208
Total Investment	21,914	152,095
Investment Equipment/Machinery	19,116	135,129
LBTC rate 1996	0.74%	.10%
Panel B N = 2,462,460	Labor Market Data - Baseline Sample	
	Mean	SD
Regular Employees	25.12	206.81
Regular Employees Full Time	22.54	197.36
Average Daily Wage	88.19	35.58
P25 Daily Wage	75.99	30.16
Median Daily Wage	86.08	34.02
P75 Daily Wage	98.06	41.52
Manufacturing	.2913	.4543
Construction	.1586	.3653
Trade	.2650	.4413
Services	.2851	.4514
LBTC rate 1996	0.74%	.11%
LBTC rate 1996 (Industry)	1.82%	.75%
Panel C N = 1,201,366	Tax Statistics - 1995	
	Mean	SD
Gross Profits	84,794	819,672
Net Profits	76,037	746,487
Tax Payments Capital	963	9,763
Tax Payments Profit	7,794	73,054
Average Effective LBT Rate	10.33%	13.01%

Data: Panel A: ifo Investment survey. Panel B: Establishment History Panel. Panel C: Local Business Tax Statistics. *Notes:* Monetary variables in 2015 Euros. Investment variables in 1000 Euro. The tax payments in Panel C only include taxation through the LBT system. The federal corporate tax and income tax systems are not taken into account.

Figure 4: LBTC exposure by industry



Data: Local Business Tax Statistics 1995. *Notes:* The figure in the top left displays the number of plants that had positive LBTC payments (in red) and LBTP payments (in blue). The figure in the top right displays the average amount of capital per plant in each industry. The bottom figure displays the share of the total LBT liability that is due to the LBTC. Manufacturing A-I covers the lower-tech manufacturing sectors, J-L covers mechanical/electrical engineering and adjacent sectors. M-N covers manufacturing of vehicles.

4 Empirical Strategy

The goal of the empirical strategy is to assess the dynamic effect of the abolition of the LBTC on investment and the labor market. To this end, I use a difference-in-differences framework to estimate the effect on the outcome of interest. This effect is denoted β_t, where t $\in$ [1992,2007]. Specifically, I estimate the following baseline model:

$$y_{i,l,t} = \alpha_i + Year_t + \sum_{t \neq 1996} \beta_t \times \text{ Year }_t \times \Delta \text{ LBTC }_{l,1996} + \epsilon_{i,l,t} \tag{6}$$

where index i denotes an establishment, index l denotes a location (district or municipality) and t denotes the year. $LBTC_{l,1996}$ is the LBTC tax rate in location l in 1996. When the LBTC was abolished, every municipality's LBTC rate was effectively set to zero. Therefore, $\Delta LBTC_{l,1996}$ corresponds to the tax cut experienced in each location in 1998. The base year of 1996 is used, because the last assessment of the capital stock happened in early 1997 and the abolition of the tax was passed in 1997. Therefore, it is possible that firms already started to adjust in 1997. The specification estimates the dynamic effect of $\Delta LBTC_{l,1996}$ on the outcomes of interest. This dynamic effect is denoted by β_t. The specification also includes establishment fixed effects (α_i) and year fixed effects ($Year_t$).

Dependent variables: The main dependent variables are establishment-level employment, wages and investment. The data on employment covers regular employment at German establishments excluding the self-employed and public servants. Employment can also be dis-aggregated by education, gender and age. Average wages are calculated on a daily basis for full-time workers. The investment data covers yearly investment in property, plant and equipment, dis-aggregated by type.

Independent variable: The independent variable is the LBTC in 1996 interacted with year fixed effects. Hence, the treatment is the size of the tax cut that plants experienced in 1998 depending on their location. For robustness checks, I also use an alternative treatment variable that utilizes the variation in exposure across industries (displayed in 4). Specifically, I take the ratio of the capital tax base and the profit tax base and multiply it by the LBTC rate. This yields the ratio of tax payments to taxable profits for each industry-municipality pair. This approach makes it possible to also use the industry variation on the national level. Both treatment variables measure the size of the tax cut affecting the plant in 1998. The coefficient of interest β_t shows the dynamic effect of the tax cut on the dependent variable in each year, relative to the base year of 1996.

Control variables: The baseline regressions always include establishment fixed effects (FE), year fixed effects and district type $\times$ year fixed effects. The latter fixed effects are included to control for differential trends between the two types of districts in Germany: independent cities and districts. In independent cities the administrative levels of district and municipality coincide. Other districts are made up of multiple municipalities. By controlling for different time trends for both district types, I make sure that correlations between these administrative differences and tax rates are not driving the results. In other specifications I also control for industry $\times$ year FE, state $\times$ year FE and differential trends by pre-treatment establishment characteristics.[12]

To obtain a single Difference in Differences estimate I utilize the following variation of Equation 8:

$$y_{i,l,t} = \alpha_i + Year_t + \beta \times \text{Post} \times \Delta \text{ LBTC }_{l,1996} + \epsilon_{i,l,t} \tag{7}$$

where indices are defined as in Equation 8. The variable of interest is β denoting the average effect of the tax cut in the post-period (1997-2007) compared to the pre-period (1992-1996).

The local business tax statistics described in Section 3.4 do not allow for the construction of a plant-level panel data set. Hence, I construct a pseudo-panel on the municipality-industry level. I sum up all variables form the plant level to the level of municipality $\times$ industry for each year. I then estimate the following specification:

$$y_{i,m,t} = \alpha_{i,m} + Year_{m,t} + \sum_{t \neq 1996} \beta_t \times \text{ Year }_t \times \Delta \text{ ELBTC }_{m,1996} + \epsilon_{i,m,t} \tag{8}$$

where index i denotes an industry , index m denotes a municipality and t denotes the year. Since I observe actual exposure to the LBTC in this data-set, I calculate an effective local business tax rate (ELBTC) that corresponds to the quotient of LBTC payments and total profits on the municipality-industry level. This makes it possible to exploit the cross-industry variation of exposure to the LBTC.

4.1 Identification

As outlined in section 2, the local scaling factor (LSF) affected both the tax rate of the LBTC and the LBTP. When the LBTC was abolished in 1998, municipalities with different LSFs experienced different tax cuts, while their LBTP stayed constant. This is the main idea for identification.

Therefore, identification is based on the interplay of different LBTC rates and the abolition of the tax in 1998. Hence, I can compare establishments that experienced larger tax cuts to those that experienced smaller tax cuts. Before the abolition the LBTC increased the cost of capital (CoC or ϕ). The higher CoC then led to low investment and (potentially) low employment and

[12] In particular, I control for pre-treatment characteristics in the following way. I control for the ventile of establishment-level wages and employment (i.e. each firm belongs to one of 20 groups of equal size) in the years before treatment and interact these (time-constant) ventiles with year fixed effects. Essentially, I control for differential trends by pre-treatment employment and wages.

wages. Hence, we expect larger increases in those variables after the abolition of the LBTC in municipalities that levied a larger LBTC.

This identification approach relies on the parallel trends assumption between higher- and lower-tax municipalities. Obviously, the local scaling factors are not randomly assigned to each municipality, but depend on decisions of the municipal government. Importantly, the parallel trends assumption does not require the levels of the outcomes to be similar across treatment and control groups, but their trends. Tax rates in German municipalities are very constant over time. A regression of local scaling factors on municipality fixed effects yields an adjusted R-squared of 0.75 (see table 2). Controlling only for year fixed effects only yields an adjusted R-squared of 0.1. Controlling for both yields an R-squared of 0.85. These differences show that most of the variation in tax rates is due to cross-sectional variation across municipalities that is very constant over time. In my identification I exploit this cross-sectional heterogeneity interacted with the specific timing of the abolition of the LBTC in 1998. This allows me to use the cross-sectional variation, while still controlling for municipality fixed effects.

In addition, my estimates are conducted on the establishment level (or industry level or the tax data). I compare firms with similar characteristics, but which are located in high or low tax municipalities with each other. For instance, the focus on the establishment level makes it possible to control for establishment fixed effects, industry-specific trends and establishment level characteristics. Furthermore, I can conduct placebo test by estimating the same coefficients on a sample of firms that were not affected by the LBTC.

The logic presented above applies to single plant firms, which make up the majority of establishments (Fuest, Peichl, and Siegloch, 2017). The formula apportionment for the LBT is solely based on the wage-sum in each municipality (Riedel, 2010). The interpretation from the single-plant case carries over to the multi-plant case for employment and wages. Since the wage-sum is the apportionment factor, the LBTC discouraged higher wages and employment in higher tax municipalities.

Table 4: LSF variation across municipalities and over time

	Local Scaling Factor		
Municipality FE	✓		✓
Year FE		✓	✓
R-squared	0.772	0.105	0.863
Adjusted R-squared	0.759	0.105	0.855

Data: Statistical Offices of the Federal States. *Notes:* This table shows the R-squared and adjusted R-squared of regressions of the local scaling factors on different sets of fixed effects.

4.2 Comparing Capital Stock and Profit Taxation

In this section I explain how I compare the semi-elasticities estimated in the following sections to estimates from the literature on corporate taxation and bonus depreciation. To do this I employ the user cost of capital framework (King, 1974). This has, for instance, recently been used by Curtis et al. (2021) and Siegloch, Wehrhöfer, and Etzel (2021) to quantify their estimates. I use a similar framework, but incorporate a tax on the capital stock. The calculations reveal that a one percentage point change in the LBTC has a much larger impact on the cost of capital than a one percentage point change in the LBTP. To obtain comparable estimates I adjust semi-elasticities by their impact on the cost of capital. I present the main insights from this approach here. Additional details are provided in Section B in the appendix.

I estimate the effect of τ_k on outcome Y. This effect is the product of the effect of τ_k on cost of capital (ϕ) and the effect of ϕ on investment:

$$\frac{\partial ln(Y)}{\partial \tau_k} = \frac{\partial ln(Y)}{\partial ln(\phi)} \frac{\partial ln(\phi)}{\partial \tau_k} \tag{9}$$

The effect of ϕ on Y is comparable across different policies that affect ϕ. This is an elasticity that can be compared to the literature. To obtain this effect I divide the reduced-form estimates by the effect of the tax on ϕ. Hence, I have to obtain estimates for the effect of profit and capital stock taxation on ϕ. In Appendix B I derive these effects in a simple profit-maximization mode in the style of the model in Section 2.3. I find that a one percentage point increase in τ_k increases ϕ on average by about 13.8%. A one percentage point increase in the profit tax increases ϕ on average by only 1.23%. Hence, a one percentage point cut of τ_k reduces ϕ approximately 13.8 / 1.23 = 11.2 times more than a 1 percentage point cut of τ_p. This insight is important to interpret the semi-elasticities estimated in the empirical section of the paper and to compare the semi-elasticities of the LBTC to the LBTP. Concretely, I can divide the semi-elasticities for the LBTC by 11.2 to make them comparable to semi-elasticities estimated on corporate income tax variation. Other studies (most importantly Fuest, Peichl, and Siegloch (2018)) use an elasticity with respect to the net-of-tax rate. To also make results more comparable with these studies I also calculate elasticities. Using the same approach as above I obtain a cost of capital adjustment factor of 0.1 for elasticities. To obtain comparable estimates I divide LBTC elasticity estimates by 0.1. This implies that semi-elasticities and elasticities have to be adjusted in opposite directions. The adjusted (semi-)elasticities then make it possible to compare different policies since all of them affect ϕ. For each of those policies elasticities with respect to ϕ can be calculated.

5 Results

This section presents the main findings. I first discuss the effects of the tax cuts on capital investment. Next, I measure the effects on wages, employment and profits. Finally, I provide a variety of validity tests supporting the identification approach.

5.1 Capital Investment Response

Panel A of Figure 5 displays the effect of the tax cut on investment. It plots the coefficients β_t and their 95 percent confidence intervals. The coefficients are estimated from the model outlined in equation 8 based on the IVS-IND (2020) data. They show the effect of a 1 percentage point higher tax cut relative to the common trend. A 0.1 percentage point higher tax cut corresponds closely to the the standard deviation of tax rates. Hence, a one percentage point change is rather large (the largest LBTC rates were 1.03%). The figure shows that firms responded strongly to the tax cut and increased investment. The effect reaches its peak in 2000 before declining slightly. Since the sample is rather small, the effects in the later years are not statistically significant anymore. Nonetheless, the point estimates remain elevated compared to the pre-period.

Panel A of Table 5 displays the corresponding DiD estimates. The estimates are statistically significant for total investment and investment in equipment and machines. Adding state $\times$ year fixed effects increases the size of the estimates and their significance further. The estimates suggest a semi-elasticity of 50 to 55 for total investment, which is very large. Adjusting the semi-elasticities by the effect of τ_k on CoC I obtain a semi-elasticity of 4.5 (see Section 4.2). This estimate is still relatively high and towards the upper end of the recent estimates. Link et al. (2022) find an investment semi-elasticity of 3 in the German local business tax setting. Zwick and Mahon (2017) also report a semi-elasticity of 3 in the US-setting. Ohrn (2018) finds a semi-elasticity of 4.7 when studying a specific deduction for the manufacturing sector in the US. My CoC-adjusted estimate falls within this range.

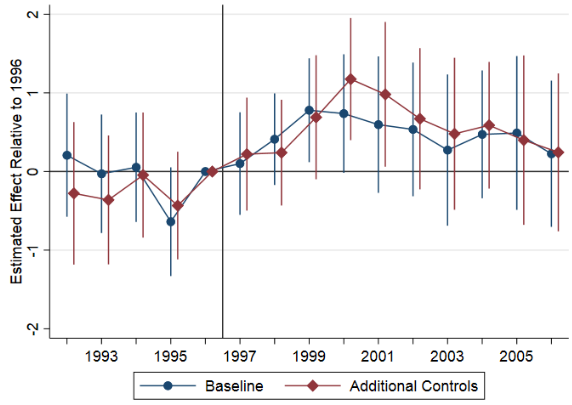
5.2 Wage response

Panel B of Figure 5 summarizes the main findings for the impact on wages. It plots the coefficients β_t and their 95 percent confidence intervals. The coefficients are estimated from the model outlined in equation 8. The figure in Panel B.1 uses the basic LBTC variation on the regional level. The figure in Panel B.2 adds the industry level variation described in Section 4. The basic specification includes establishment FE, district FE and year $\times$ district type FE. The other specification subsequently add pre-treatment controls, state-year FE and sector-year FE. The estimates shows that firms exposed to higher tax cuts increased wages relative to the pre-period and less exposed firms. The effect is not distinguishable form zero in the years from 1992 to 1996 (pre-period) and becomes immediately detectable in 1998 after the abolition of the LBTC. More and less treated establishments followed similar trends before the abolition of the LBTC. This provides support for the (un-testable) parallel trends assumption.

After the tax cuts wages increased for five years relative to less exposed firms. After five years wages remain elevated, but do not increase further. Hence, the main adjustment happens within five year. Before and after, more and less exposed firms evolve in parallel. Furthermore, the effect is economically significant: a 1 percentage point larger tax cut led to 3%-5% larger average wages after five years. This implies a long-run semi-elasticity of 3 to 5. This is large compared to existing evidence on the effects of corporate taxation, but a direct comparison of semi-elasticities is not very informative. A 1 percentage point increase in a tax on the capital stock increases the cost of capital much more than a 1 percentage point increase in the corporate income tax. The CoC adjustment described in 4.2, yields a wage elasticity of between 0.25 and 0.45. This is similar is similar to the comparable estimate from Fuest, Peichl, and Siegloch (2018). The estimates that also use the industry level variation are slightly smaller, but the insignificant pre-trend and immediate increase after the tax cut remain the same. The smaller size of the estimates can be explained by the larger mean and standard deviation of the treatment variable when also using the variation on the industry level. Panel B of Table 5 shows the corresponding difference-in-differences estimates with different combinations of control variables. I sequentially add more demanding controls and the estimates remain statistically significant and sizeable. Appendix Table C.6 shows the difference-in-differences estimates when also using the industry variation. The estimates are very stable and statistically significant for all specifications. The specification in the sixth column is particularly interesting. In this specification I control for District $\times$ Year fixed effects. This is only possible in this specification, because the industry LBTC variable generates variation both across and within each district. Hence, I am able to non-parametrically control for district-specific shocks. Even with these very demanding controls the coefficient remains very stable and highly significant.

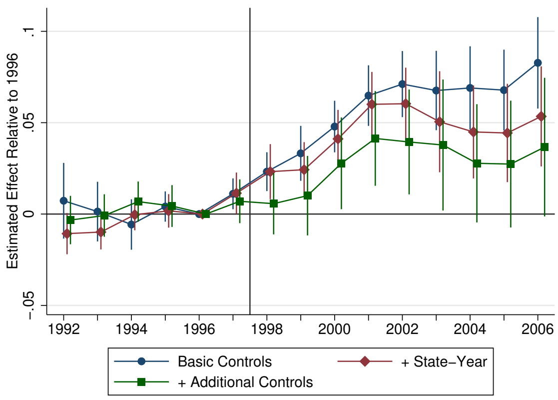
Figure 5: Dynamic effect of the tax cut on investment, wages and employment

Panel A: Effect on Investment

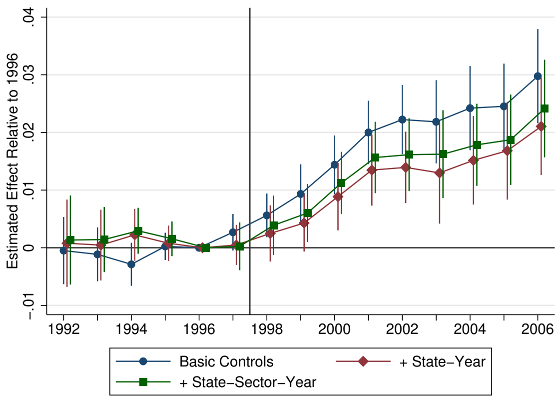


Panel B: Effect on Wages

Panel B.1: Regional Variation

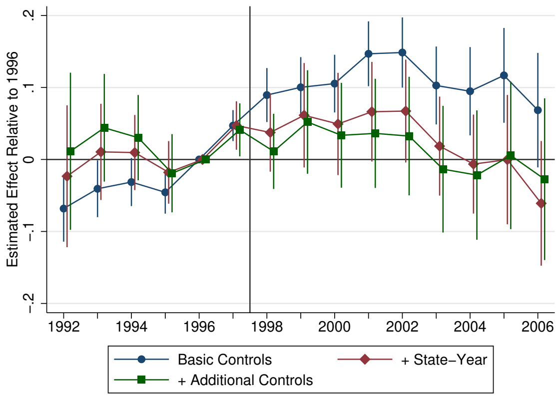


Panel B.2: Regional + Industry Variation

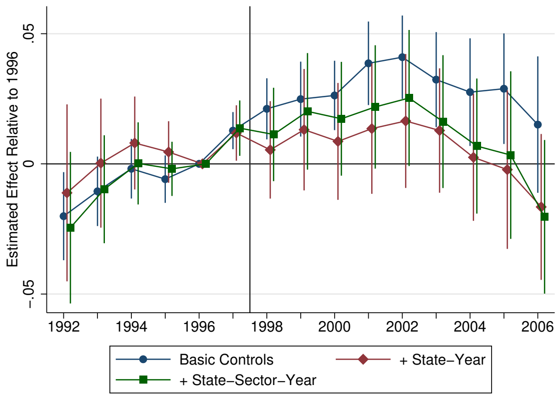


Panel C: Effect on Employment

Panel C.1: Regional Variation



Panel C.2: Regional + Industry Variation



Data: Statistical Offices of the Federal States, IVS-IND (2020) and Establishment History Panel. *Notes:* This graph plots the point estimates β_t and the corresponding 95% confidence intervals from the event study model described in Equation 8. In Panel A the dependent variable is investment in equipment and machines. The dependent variable in Panel B is the establishment-level average wage. The dependent variable in Panel C is establishment-level employment. All regressions include plant, district and district type $\times$ year fixed effects. All regressions control for changes in the LBTP rate. Standard errors are clustered on the district level.

5.3 Employment response

Panel C of Figure 5 displays the effects on full-time employment. The coefficients are again estimated from the model in equation 8. In the specifications without state-year FE, employment increases after the tax cut, but drops soon after. In the medium to long-run the effect on employment is indistinguishable from zero. After adding state-year FE employment does not increase after the tax cut and remains indistinguishable from zero for the full post-period. Table 5 also shows the DiD estimates for employment for different combinations of control variables. In the more demanding specifications there are no detectable long-run effects over the full post-period. When also including the industry level variation, results remain the same: the estimates are largely insignificant and close to zero. Hence, incumbent firms did likely not expand in response to the tax cut. Interpreting the results through the lens of the model outlined in Section 2.3, the tax cut should have mainly benefited lower productivity firms. These firms might be able to remain solvent in the regions with the larger tax cut, while they might exit the market in the regions with lower tax cuts. Such a change in the composition of firms might mask some of the effects on labor demand. I will investigate changes in composition more in Section 6. Nevertheless, workers in incumbent firms were able to capture part of the tax cut through higher wages. Because of increased investment they might have become more productive. Alternatively, the German labor market institutions might have made it possible for workers to bargain and obtain a share of the tax cut.

5.4 Effects on Profits

Finally, I estimate the effect of the tax reform on gross and net profits. Panel C of Table 5 reports the DiD estimates for the effect on profits. Net profits increase by about 3 percent in response to a one percentage point larger tax cut. Gross profits also increase by about 1.5 percent, suggesting real economic responses in line with the investment and wage responses. These effects are robust to the inclusion of state and district level trends. Figure C.3 also shows the event study estimates for the dynamic effect of the tax cut. Panel A in Figure C.3 shows the event study estimates for the dynamic effect on average effective tax rates (AETRs) and gross and net profits. Since the data are only available every three years and only start in 1995, I can only plot the effects for the years 1998, 2001, 2004 and 2007 with 1995 as the base year. Net profits (in blue) increase by almost four percent. This effect is very stable over time as it is largely driven by the mechanical effect of lower taxes. Hence, average effective tax rates decrease by almost two percentage points. Gross profits also increase by about 1.5 percent, suggesting real economic responses in line with the investment and wage responses. Panel B shows the effect on total LBT payments. Tax payments decrease by about 15%, as the slight increase in gross profits is not enough to counteract the lower tax rates. Unfortunately, the data does not allow for an estimation of pre-trends as no pre-1995 data is available. An alternative approach to provide support for the identification strategy in this setting would be to look at

Table 5: DiD estimate investment, mean full-time wages and full-time employment

Panel A:	Log Capital Investment			
	Total		Machinery	
Post × Δ LBTC	0.510*	0.714**	0.556*	0.756**
	(0.302)	(0.334)	(0.284)	(0.314)
Municipality FE	✓	✓	✓	✓
Establishment FE	✓	✓	✓	✓
Industry × Year FE	✓	✓	✓	✓
State × Year FE		✓		✓
Observations	9,398	9,394	9,399	9,395
Panel B:	**Labor Market**			
	Log Mean FT Wage			
Post × Δ LBTC	0.0514***	0.0448***	0.0247**	0.0446***
	(0.00988)	(0.00816)	(0.0110)	(0.00766)
	Log FT Employment			
Post × Δ LBTC	0.138***	0.0325	0.00158	0.0290
	(0.0259)	(0.0451)	(0.0499)	(0.0441)
Tax Change Controls	✓	✓	✓	✓
District FE	✓	✓	✓	✓
Establishment FE	✓	✓	✓	✓
District type FE × Year FE	✓	✓	✓	✓
Pre-Treatment Controls		✓	✓	✓
State × Year FE		✓	✓	✓
Industry × Year FE	✓	✓	✓	✓
Population Category × Year FE			✓	
Industry × State × Year FE				✓
Observations	2,462,460	2,462,460	2,462,460	2,462,460
Panel C:	**Log Net Profit**		**Log Gross Profit**	
Post × Δ LBTC	0.0345***	0.0311***	0.0139***	0.0103**
	(0.00510)	(0.00477)	(0.00437)	(0.00407)
Tax Change Controls	✓	✓	✓	✓
Municipality × Industry FE	✓	✓	✓	✓
Industry × Year FE	✓	✓	✓	✓
State × Year FE	✓		✓	
District × Year FE		✓		✓
Observations	399,615	399,615	399,615	399,615

Data: Statistical Offices of the Federal States, Establishment History Panel, IVS-IND (2020) and Local Business Tax Statistics. *Notes:* This table displays estimates from DiD regressions of log investment (Panel A), log full-time wages and log full-time employment (Panel B) and log net and gross profits (Panel C) on the size of the tax cut as described in Equation 7. All regressions control for changes in the LBTP rate. LBTC refers to the Local business capital tax in 1996. Standard errors in parentheses are clustered at the municipality (Panel A and D) or district (Panels B and C) level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

post-trends. In the event studies for investment, wages and employment estimates stabilize after about 2001 and the variables evolve similarly for lower and higher tax locations. The same is true for the event studies on profits and tax payments: the estimates are extremely stable in the post period and there is not indication that higher or lower tax municipalities evolve differently. The only difference comes from the jump between 1995 and 1998. This provides support for a causal interpretation of these event study estimates. Appendix Figure C.4 also shows the results of an alternative event study specification. This specification uses only the variation in exposure within a municipality and across industries. Therefore, it can include municipality $\times$ year FE and ensure that the effect is not driven by municipality-specific trends. Even this much more demanding specification yields very similar results for net profits and AETRs. The effect on gross profits is very close to zero in this specification.

5.5 Heterogeneity

Next, I check how different types of plants were affected by the tax cut.As outlined in Section 2.3, less productive firms in particular should benefit from the removal of the capital stock tax. The data I utilize do not contain a direct measure of productivity, but the social security data includes measures for plant-specific wage premia. These premia are estimated following the methodology developed by Abowd, Kramarz, and Margolis (1999) and consistent with TFP in a range of different models.

I run three different specifications for three types of heterogeneity: size of the plant by employment, wage level of the plant and productivity of the plant. The results are shown in Table 6. It shows that wages increased mainly in smaller plants (less than 50 employees) and in plants with higher wages and TFP. Hence, the workers that gained the most were those in smaller and more productive plants. The larger effect on smaller firms is not surprising, as those plants might be the most financially constrained. Therefore, they benfit the most from the additional financial resources available after the tax cut. The larger effect in more productive firms, on the other hand, are surprising. One explanation could be that with a smaller tax cut these lower productivity firms would have exited the market and are not observed in the counterfactual. Hence, wage effects could be confounded by effect on the composition of firms.

Finally, Appendix Table C.3 shows the effect of the tax cut on wages throughout the within-plant distribution. The increase is the smallest for the 25th percentile and it is not significantly different from zero. The effect on the median is statistically significant and slightly smaller than for the average. The effect on the 75th percentile is the largest. This suggests that within each firm, higher wage workers have benefited more from the tax cut. This could, once again, be due to higher bargaining power of these workers. (Literature on Rent sharing) The finding is in contrast to Fuest, Peichl, and Siegloch (2018) who find that the effect of an LBT change is smaller for higher wage workers than for lower wage workers. These results also show that the estimates are robust to using the median wage instead of the mean wage. The censoring of wages at the contribution limit seems to have no substantial impact (as it does not affect median wages). Appendix Figure C.2 also shows the corresponding point estimates of the dynamic DiD specification when using the 25th, 50th and 75th percentile wages as dependent variables. The results are very similar to the main specification with mean wages.

Table 6: Heterogeneity

Heterogeneity:	Employment	Wages	Productivity
Dependent Variable:	Mean Log FT Wage		
Low × Post × Δ LBTC	0.0265**	-0.0135	-0.0318*
	(0.0115)	(0.0155)	(0.0185)
Low-Mid × Post × Δ LBTC	0.0498***	0.0185	0.0212*
	(0.0146)	(0.0115)	(0.0127)
Mid × Post × Δ LBTC	0.0443***	0.0120	-0.00338
	(0.0155)	(0.0111)	(0.0134)
High-Mid × Post × Δ LBTC	0.00830	0.00983	0.0205*
	(0.0177)	(0.0132)	(0.0121)
High × Post × Δ LBTC	0.00211	0.0787***	0.0683***
	(0.0204)	(0.0140)	(0.0129)
Tax Change Controls	✓	✓	✓
District FE	✓	✓	✓
District type FE × Year FE	✓	✓	✓
Pre-Treatment Controls	✓	✓	✓
State × Year FE	✓	✓	✓
Industry × Year FE	✓	✓	✓
Observations	2462340	2462340	2171025

Data: Statistical Offices of the Federal States, Establishment History Panel and Local Business Tax Statistics. *Notes:* This table displays estimates from DiD regressions of log investment (Panel A), log full-time wages and log full-time employment (Panel B) and log net and gross profits (Panel C) on the size of the tax cut as described in Equation 7. All regressions control for changes in the LBTP rate. LBTC refers to the Local business capital tax in 1996. Standard errors in parentheses are clustered at the municipality (Panel A) or district (Panels B and C) level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.6 Validity Tests

This section provides evidence for the identifying assumptions underlying the estimates in the previous section. The event study graphs in Figure 5 showed that higher and lower tax regions developed similarly before the tax cuts. This makes it plausible that these areas would also have continued to develop similarly if the tax reform did not happen. This assumption is un-testable, but I provide additional evidence through the use of two placebo treatments. There are two groups of firms that were not affected by the tax change: firms in certain sectors that are not covered by the LBT[13] and firms that are located in the six states that belonged to East Germany. While the LBT on profits was implemented in the exact same way in East Germany, the introduction of the LBT on the capital stock was delayed after reunification and then never implemented (more details in Section 2.1). Hence, for those firms nothing changed in the 1998 tax reform. Because of the design of the LBT, I can still calculate a hypothetical LBTC rate for each of those non-liable firms. The East German municipalities still set a LSF for the LBTP that can be used to calculate a counterfactual LBTC rate, if the LBTC was actually implemented in East Germany. This makes it possible to estimate β_t from Equation 8 also for East Germany and for non-liable firms in West Germany.

First, I replicate my previous analysis for establishments that belong to these two groups. Figure 6 reports these dynamic estimates. The left figure in Panel A shows the estimates for wages. The point estimates are close to zero and never statistically significant effects. Unfortunately, the estimates are relatively imprecise. The left figure in Panel B shows the corresponding point estimates for employment. Again, no point estimate is statistically significant. If anything they are slightly negative. In general, I find no significant differential developments between higher and lower tax municipalities in these non-liable firms, validating the identification approach.

Second, I focus on the firms in the non-liable sectors and contrast the point estimates with the effects found for the liable firms. The results are displayed in the right Panels of Figure 6. The blue lines show the estimates for the liable plants and the red line shows the effects on non-liable plants. While wages increase strongly in the liable sector, I find a slightly decreasing trend for wages in the non-liable sector. The point estimates are not statistically different from zero in most years. Similarly, effects on employment are small and close to zero in the whole post-period. Table C.7 shows the DiD estimates for liable and non-liable firms. The estimates for non-liable firms are always close to zero and insignificant, while the estimates for the effect on wages are always highly statistically and economically significant for liable firms. This provides additional support for a causal interpretation of the estimates.

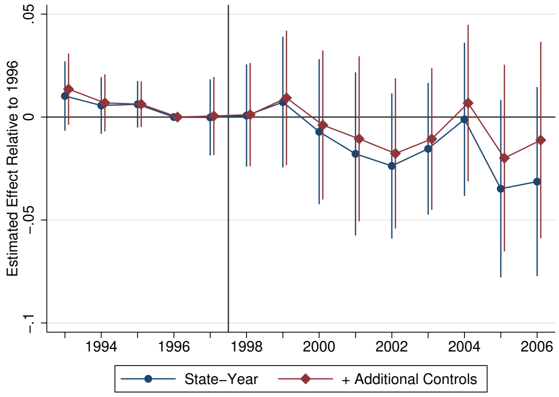
Finally, I check the investment response for building investments, which were not affected by the capital stock tax. Panel A in Appendix Table C.8 displays the estimates for this effect. They are insignificant and close to zero, supporting the identification approach. Panel B in Appendix Table C.8 shows the estimates for the investment response in East Germany. Again, the estimates are statistically insignificant and relatively small, lending more support to the identifying assumptions. The results show that it is not general investment trends (that would be visible in building investment) or general trends in Germany (that would be detectable in East Germany) that are driving the results.

[13]Certain high-skilled services such as lawyers, doctors, accountants or journalists, the public sector and agriculture.

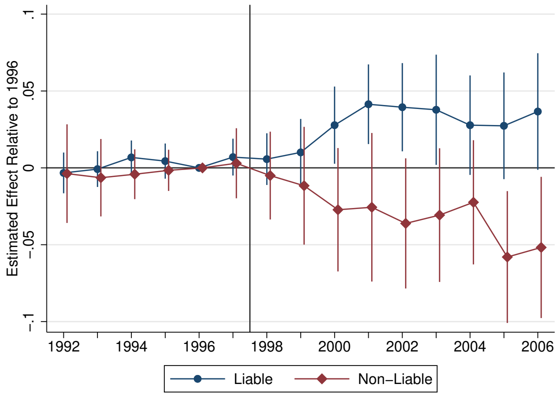
Figure 6: Placebo Tests: Non-liable and East German firms

Panel A: Effect on Wages

Panel A.1: Non-liable and East

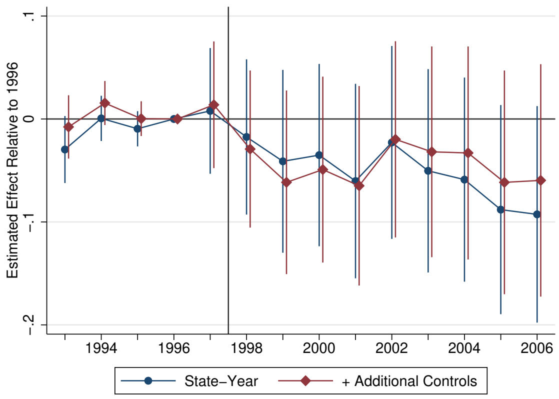


Panel A.2: Liable vs Non-liable

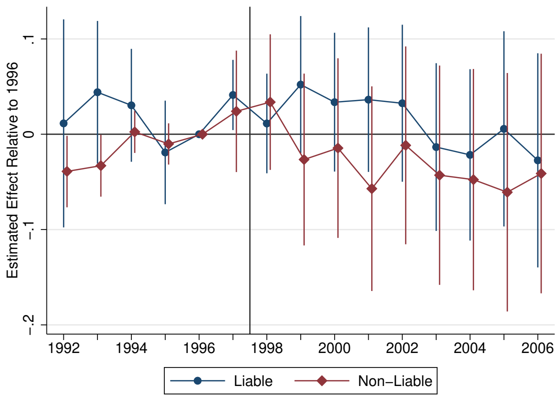


Panel B: Effect on Employment

Panel B.1: Non-liable and East



Panel B.2: Liable vs Non-liable



Data: Statistical Offices of the Federal States and Establishment History Panel. *Notes:* This graph plots the point estimates β_t and the corresponding 95% confidence intervals from the event study model described in Equation 8 for firms in East Germany. In Panel A the dependent variable is the establishment-level log average wage. In Panel B the dependent variable is the establishment-level full-time employment. All regressions include plant, district, pre-treatment controls, state × year and district type × year fixed effects. All regressions control for changes in the LBTP rate. In Panels A.1 and B.1 the estimates in red include additionally sector × year fixed effects. In Panels A.2 and B.2 the blue coefficients are for liable plants while the red coefficient are for non-liable businesses. Standard errors are clustered on the district level.

6 Effects on the Regional Level

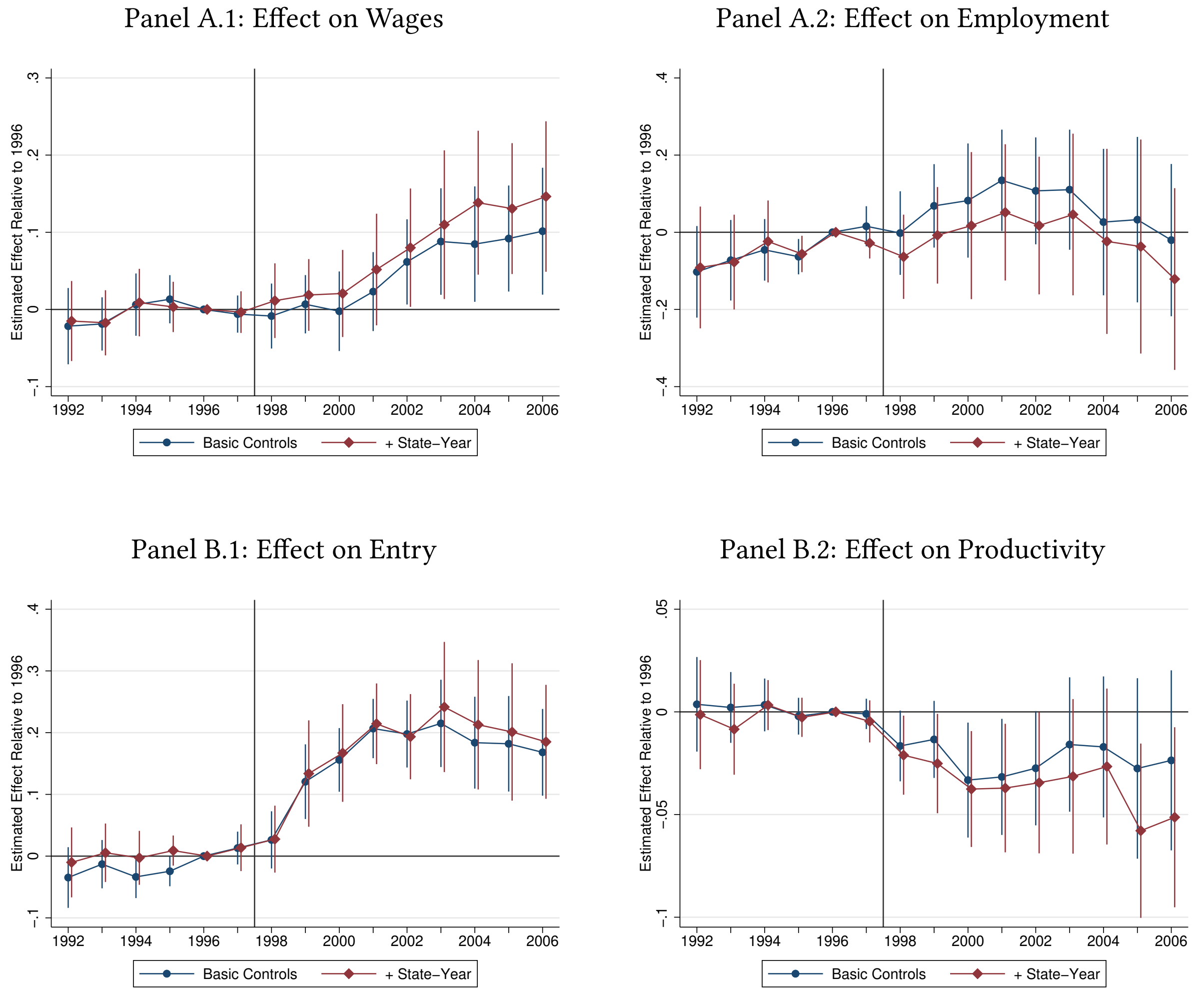
Finally, I analyze the effects of the tax cut on the regional level. To this end, I aggregate the social security data on the district level and estimate the same specifications on the aggregate level. As outlined in Section 2.3 a capital stock tax should affect the productivity distribution. Specifically, a capital tax cut should lead to the entry of more lower productivity entrepreneurs and it should also make it easier for them to accumulate capital. Higher productivity entrepreneurs should be less strongly affected.

Figure 7 displays the results of event study specification on the regional level. Panel A.1 shows a positive effect of the tax cut on wages confirming the results of the previous section. The results are very similar for the specifications with and without State-Year fixed effects. Panel A.2 reports the effects on employment. As in the previous sections, coefficients are largely close to zero and not significantly different from zero. These two panels confirm the results from the micro-level regressions. Next, we extend the results by investigating the effect on the entry of new plants and changes in productivity. Panel B.1 displays the effect of the tax cut on the amount of new plants being opened in each district. Once again, pretends are flat, suggesting that lower and higher tax regions developed similarly before the tax cut. After the tax cut the amount of new plants increases quickly and reaches a 20 percent higher level after about four years. It then remains elevated at that level. A larger capital stock tax cut leads to increases in entry.

Panel B.2 displays the effect on employment-weighted average plant productivity (measured by AKM firm fixed effects). Before the tax cut the trends of higher and lower tax regions are parallel. After the tax cut productivity decreases in the districts that experienced a larger tax cut. The average wage premium declines by about 2.5 to 5 percentage points. Table 7 displays the corresponding DiD estimates on the regional level. Panel B shows how the effect of the tax cut on entry varied across the productivity distribution. While entry increased by more than 30 percent for lower productivity plants (first and second quintile of TFP distribution), it increased much less (or even decreased) for higher productivity plants. This suggests that capital stock taxation shapes the prodcutivity composition of plants. This finding is in line with the main mechanism in Guvenen, Kambourov, Ocampo, et al. (2022) and Guvenen, Kambourov, Kuruscu, et al. (2023). Capital stock taxes reduce the return to capital more for lower productivity entrepreneurs than for higher productivity entrepreneurs. This leads to a different selection of entrepreneurs who actually start a business. In contrast, profit taxes reduce returns by the same percentage for all productivity levels. The results in this section therefore provide support for the importance of this mechanism.

Appendix Table C.10 provides some further evidence. It shows the effects of the LBTC tax cut, but also the effects of changes in the log net of tax rate of the LBTP. Interestingly the effects on productivity go into opposite directions. As mentioned before, the LBTC tax

Figure 7: Dynamic effect of the tax cut on the regional level



Data: Statistical Offices of the Federal States and Establishment History Panel. *Notes:* This graph plots the point estimates β_t and the corresponding 95% confidence intervals from the event study model described in Equation 8. All regressions include plant, district and district type $\times$ year fixed effects. All regressions control for changes in the LBTP rate. The estimates in red include additionally state $\times$ year fixed effects. Regressions are weighted by average district employment. Standard errors are clustered on the district level.

cuts led to lower average productivity. In contrast, the higher log net of tax rate for the profit component leads to increased productivity. When looking at entry by productivity group, it becomes clear that a different composition of entrants is not driving this result (as those effects are insignificant). Instead a lower profit tax makes it easier for high productivity firms to accumulate more capital and grow quickly, which increases the employment-weighted productivity. This provides further support for the mechanism outlined in the model by Guvenen, Kambourov, Kuruscu, et al. (2023). In particular, it shows that lower capital stock taxes lead to increased entry (mostly by lower productivity firms), while lower profit taxes allow more productive firms to grow more quickly. This highlights the different implication of both taxes for aggregate productivity.

Table 7: DiD on the Regional Level

Panel A:	Labor Market				
	Employment	Wage	Entry	Exit	Productivity
Post × Δ LBTC	0.0332	0.0598**	0.132***	0.0500	-0.0254**
	(0.0616)	(0.0295)	(0.0270)	(0.0478)	(0.0122)
Panel B:	Entry by Productivity				
	Low	Mid-Low	Mid	Mid-High	High
Post × Δ LBTC	0.360***	0.318***	0.0946***	-0.0507	0.121***
	(0.102)	(0.104)	(0.0306)	(0.0659)	(0.0438)
Tax Change Controls	✓	✓	✓	✓	✓
District FE	✓	✓	✓	✓	✓
District type FE × Year FE	✓	✓	✓	✓	✓
State × Year FE	✓	✓	✓	✓	✓
Observations	4845	4845	4845	4845	4845

Data: Statistical Offices of the Federal States and Establishment History Panel. *Notes:* This table displays estimates from DiD regressions as described in Equation 7. Each estimate comes from a different specification. The dependent variables in Panel A are log employment, log wages, the log number of plants entering and exiting and productivity. The dependent variables in Panel B are the log number of plants entering by productivity quintile. All regressions control for changes in the LBTP rate and the controls detailed below the coefficient estimates. LBTC refers to the Local business capital tax in 1996. Standard errors in parentheses are clustered at the district level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

7 Conclusion

This paper studies capital stock taxation, exploiting a unique German tax reform. I use this variation to estimate the effects of capital taxation on investment, wages, employment and profits. My results show that firms that experienced larger tax cuts payed had higher profits after the reform. The more exposed firms increased investment in machines and equipment. Furthermore, the firms that experienced larger tax cuts also increased wages after the reform. The effect on employment is less clear. There are no statistically significant effects on aggregate employment in the long-run. Entry of new plants increased in in more exposed districts, which is mostly driven by the entry of lower productivity plants. This resulted in a decrease in average productivity. I find the opposite effect for profit taxation: lower profit taxes are associated with higher productivity. This is likely driven by the ability of more productive firms to accumulate more capital under lower profit taxes. The findings highlight that the choice between profit and capital taxation can shape the productivity composition of active plants.

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A Additional Institutional Details

The definition of the capital stock in the LBTC: The regulation for the definition of the tax base is laid out in the following sections: §95 Bewertungsgesetz 1991 und §12 Gewerbesteuergesetz 1991. The tax base for the LBTC was defined according to the assessed value of the business wealth adjusted for some specific tax provisions. In general, the goal was to assess the value of the assets used in the business under the assumption that the business was fully financed through equity. The value of the business was not assessed according to the market value of the business. In particular, this method of business valuation does not take into account discounted future profits. Instead every asset of the business was evaluated according to the following rule: If an investor would buy the business and continue operating it, how much would they value each individual asset. In particular, how much less would the investor be willing to pay for the business if a specific asset was not included in the business. In practice, this method will generally arrive at the sum of all assets valued individually at market values. From this value debt is subtracted. The resulting value will generally correspond closely to equity as calculated in the balance sheet. Next, this value is reduced by the assessed value of real estate belonging to the business. Real estate is already subject to property taxation and therefore exempted from the LBTC. The tax base is also reduced by the share of the value that belongs to foreign subsidiaries or domestic subsidiaries that are themselves subject to the tax. Finally, half of the long-run debt that is economically linked to the founding or purchase of the business if it is larger than 50 000 DM is added to the value. As mentioned above, the representative business for the law is fully financed through equity. Adding part of the long run debt to the tax base is supposed to more closely align the treatment of debt and equity financing. Table A.1 displays the main steps to arrive at the tax base.

Table A.1: Simplified Calculation of LBTC Tax base

Starting value	Sum of all assets valued individually
-	Sum of all debt
=	approx. Equity
-	Assessed value of business real estate
-	Sum of assets that belong to foreign subsidiaries
-	Sum of assets that belong to domestic subsidiaries that are themselves subject to the LBTC
+	1/2 of long-run debt that is economically linked to the founding, purchase, or the expansion of the business
+	provisions that are economically linked to the founding, purchase, or the expansion of the business
=	LBTC Tax base

B Theoretical Motivation

The basic set-up is the same as in Section 2.3. I extend the model slightly by making interest payments and the capital stock tax non-deductible from the profit tax base. This is how mainly equity financed firms are taxed in the German LBT. The after tax profit of a firm is given by:

$$\pi = (1 - \tau_c^k) \left[F(k, n) - w_c n_i \right] - r k_i - \tau_c^a a_i \tag{10}$$

where τ_p is the profit tax rate, τ_k is the capital stock tax rate, w is the wage and r is the interest rate. Factor demand functions are given by the first order conditions:

$$\frac{\partial F(k, n)}{\partial k} = \frac{r + \tau_c^a}{(1 - \tau_c^k)} = \phi \tag{11}$$

$$\frac{\partial F(k, n)}{\partial n} = w \tag{12}$$

B.1 Cost of Capital

This section outlines the theoretical impacts of profit and capital stock taxation in a standard model of profit maximization. In particular I focus on the effect of the two types of taxation on the user cost of capital. A standard model of profit maximization with competitive input markets yields the following first order condition for capital:

$$\frac{\partial F(k, n)}{\partial k} = \frac{r + \tau_c^a}{(1 - \tau_c^p)} = \phi \tag{13}$$

F(.) is the production function using capital K and labor L. The interest rate is denoted as r. The tax rate on the capital stock is denoted as τ_a and the tax rate on profit is denoted as τ_k. The term on the right side is the Cost of Capital (ϕ). Increases in the interest rate and both types of taxes increase ϕ. The estimates in Section 5 correspond to the following reduced form effects:

$$\frac{\partial ln(I)}{\partial \tau_c^a} = \frac{\partial ln(Y)}{\partial ln(\phi)} \frac{\partial ln(\phi)}{\partial \tau_c^a} \tag{14}$$

The effect of τ_c^k on outcome Y is the product of the effect of τ_c^a on ϕ and the effect of ϕ on investment. To obtain an effect that is comparable across different taxes and policies I focus on the effect of ϕ on investment. To obtain this effect I have to divide the reduced-form estimates by the effect of the tax on ϕ. Using the definition of ϕ from Equation 13, I derive the semi-elasticities of ϕ to the taxes:

$$\sigma_a = \frac{\partial ln(\phi)}{\partial \tau_c^a} = \frac{1}{r + \tau_c^k} \tag{15}$$

$$\sigma_k = \frac{\partial ln(\phi)}{\partial \tau_c^k} = \frac{1}{(1 - \tau_c^k)} \tag{16}$$

The semi-elasticity for τ_c^a depends both on the interest rate r and the current rate of τ_a. I use an interest rate of 6.5%, which was the average interest rate for business loans in 1997 and 1998 (Bundesbank (2023)). The average LBTC rate was 0.74%. This yields a semi-elasticity σ_k of 13.8. The semi-elasticity for τ_c^k does not depend on the interest rate but only on τ_k. The LBTP rate was 18.5%. This yields a semi-elasticity σ_k of 1.23. Hence, a one percentage point cut of τ_c^a reduces ϕ approximately 13.8 / 1.23 = 11.2 times more than a 1 percentage point cut of τ_c^k. This insight is important to interpret the semi-elasticities estimated in the empirical section of the paper and to compare the semi-elasticities of the LBTC to the LBTP. Concretely, I can divide the semi-elasticities for the LBTC by 11.2 to make them comparable to semi-elasticities estimated on corporate income tax variation. Using my estimated semi-elasticity of 50 and dividing it by 11.2, I obtain an adjusted semi-elasticity of 4.5.

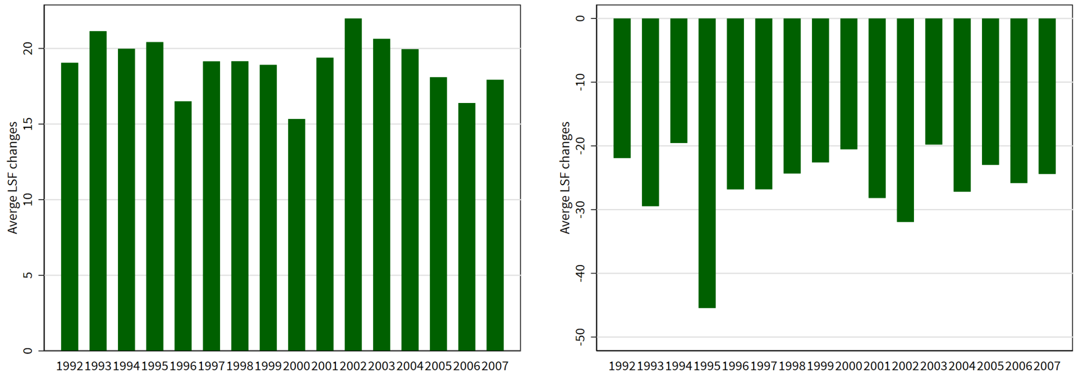
Other studies (most importantly Fuest, Peichl, and Siegloch (2018)) use an elasticity with respect to the net-of-tax rate. To also make results more comparable with these studies I calculate elasticities of ϕ to τ_c^k and 1-τ_c^p:

$$\epsilon_{\tau_c^a} = \frac{\partial ln(\phi)}{\partial ln(\tau_c^a)} = \frac{\tau_c^a}{r + \tau_c^a} \tag{17}$$

$$\epsilon_{1-\tau_c^k} = \frac{\partial ln(\phi)}{\partial ln(1-\tau_c^k)} = -1 \tag{18}$$

Using the same values as above I obtain an elasticity of ϕ to τ_c^a of about 0.1 and to (1-τ_c^k) of -1. To obtain comparable estimates I divide LBTC elasticity estimates by 0.1.

Figure C.1: Local Business Tax changes around the reform



Data: Statistical Offices of the Federal States. *Notes:* The figures display the average size of positive and negative LSF changes around the reform in 1998.

C Additional Results

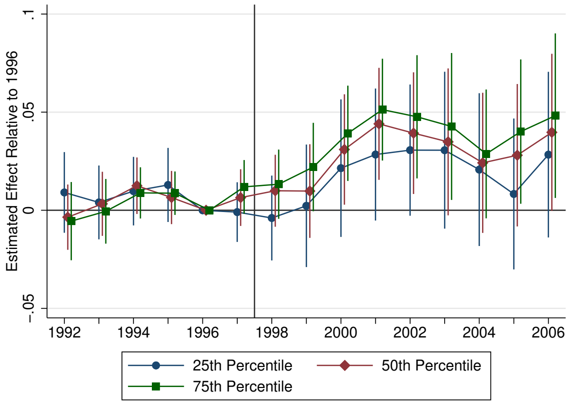
Table C.2: Effect of the tax cut on employment by education level

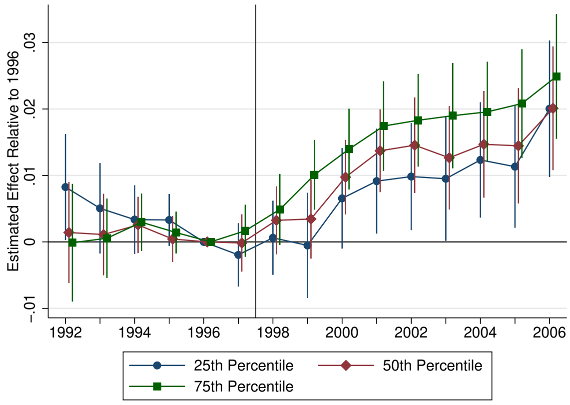
	Share of Employment by Qualification			
	Low	Medium	High	Other
Post $\times$ Δ LBTC	0.00477	-0.00493	-0.0000721	0.000230
	(0.00933)	(0.00751)	(0.00522)	(0.00293)
Tax Change Controls	✓	✓	✓	✓
District FE	✓	✓	✓	✓
Establishment FE	✓	✓	✓	✓
District type FE $\times$ Year FE	✓	✓	✓	✓
Pre-Treatment Controls	✓	✓	✓	✓
State $\times$ Year FE	✓	✓	✓	✓
Observations	2,486,416	2,486,416	2,486,416	2,486,416

Data: Statistical Offices of the Federal States and Establishment History Panel. *Notes:* This table displays estimates from DiD regression of education-type employment on the size of the tax cut as described in Equation 7. All regressions control for changes in the LBTP rate. LBTC refers to the Local business capital tax in 1996. Standard errors in parentheses are clustered at the district level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure C.2: Dynamic effect of the tax cut on 25th, 50th and 75th percentile wages

Effect on Wages





Data: Statistical Offices of the Federal States and Establishment History Panel. *Notes:* This graph plots the point estimates β_t and the corresponding 90% confidence intervals from the event study model described in Equation 8. The dependent variable is the establishment-level 25th, 50th and 75th percentile wage. All regressions include plant, district and district type × year fixed effects. All regressions control for changes in the LBTP rate. Standard errors are clustered on the district level.

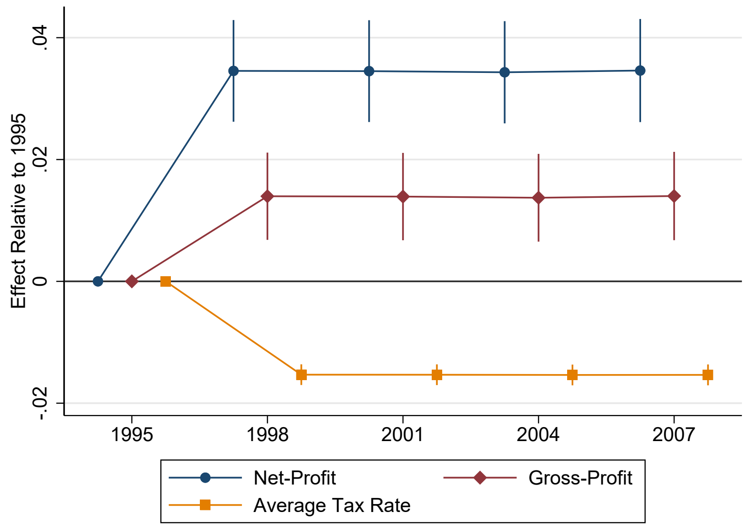
Table C.3: Effect of the tax cut on Wages throughout the Distribution

	Log Wage FT		
	P25	P50	P75
Post × Δ LBTC	0.00956	0.0230**	0.0322**
	(0.0116)	(0.0117)	(0.0128)
Tax Change Controls	✓	✓	✓
District FE	✓	✓	✓
Establishment FE	✓	✓	✓
District type FE × Year FE	✓	✓	✓
Pre-Treatment Controls	✓	✓	✓
State × Year FE	✓	✓	✓
Observations	2,462,460	2,462,460	2,462,460

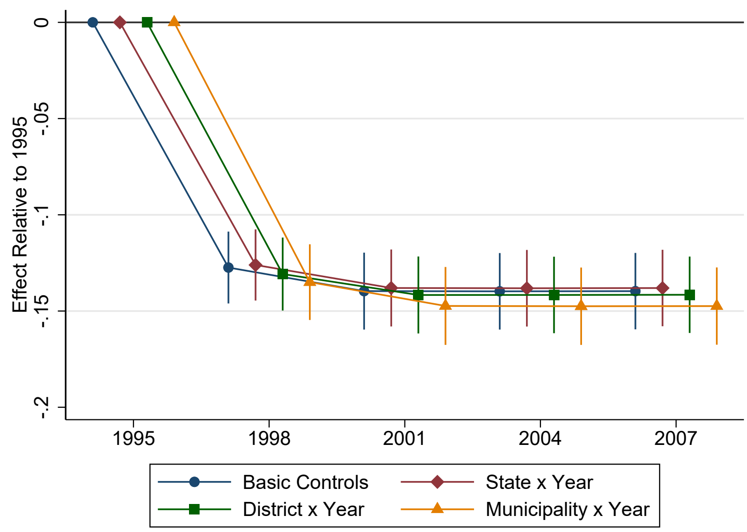
Data: Statistical Offices of the Federal States and Establishment History Panel. *Notes:* This table displays estimates from DiD regression of full-time wages on the size of the tax cut as described in Equation 7. P25 refers to wages at the 25th percentile in each establishment, P50 to the 50th percentile (median) and P75 to the 75th percentile. LBTC refers to the Local business capital tax in 1996. All regressions control for changes in the LBTP rate. Standard errors in parentheses are clustered at the district level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure C.3: Dynamic effect of the tax cut on profits and taxes

Panel A: Effect on Profits and AETRs



Panel B: Effect on Taxes Paid



Data: Statistical Offices of the Federal States and Local Business Tax Statistics. *Notes:* This graph plots the point estimates β_t and the corresponding 90% confidence intervals from the event study model described in Equation 8. The dependent variables in Panel A are gross profits, net profits and the average effective tax rate (AETR). The dependent variable in Panel B is sum of LBT payments. Regressions in Panel A include municipality $\times$ industry, industry $\times$ year, state $\times$ year and district type $\times$ year fixed effects. Regressions in Panel B include municipality $\times$ industry, industry $\times$ year, district type $\times$ year fixed effects and the fixed effects described in the figure. All regressions control for changes in the LBTP rate. Standard errors are clustered on the municipality level.

Figure C.4: Dynamic effect of the tax cut on profits and taxes

Effect on Profits and AETRs - Municipality × Year FE

Data: Statistical Offices of the Federal States and Local Business Tax Statistics. *Notes:* This graph plots the point estimates β_t and the corresponding 90% confidence intervals from the event study model described in Equation 8. The dependent variables in Panel A are gross profits, net profits and the average effective tax rate (AETR). The dependent variable in Panel B is sum of LBT payments. Regressions in Panel A include municipality × industry, industry × year, municipality × year and district type × year fixed effects. All regressions control for changes in the LBTP rate. Standard errors are clustered on the municipality level.

Table C.4: Effect of the tax cut on Wages: Controlling for Composition

	Mean Log Wage FT		
Post × Δ LBTC	0.0247**	0.0274**	0.0330***
	(0.0110)	(0.0110)	(0.0110)
Tax Change Controls	✓	✓	✓
District FE	✓	✓	✓
Establishment FE	✓	✓	✓
District type FE × Year FE	✓	✓	✓
Pre-Treatment Controls	✓	✓	✓
State × Year FE	✓	✓	✓
Education Controls		✓	✓
Age Controls			✓
Observations	2,462,460	2,462,460	2,462,460

Data: Statistical Offices of the Federal States and Establishment History Panel. *Notes:* This table displays estimates from DiD regression of full-time wages on the size of the tax cut as described in Equation 7. Education controls refer to the number of employees with low, medium and high education. Age controls refer to the number of employees between 15 and 29, 30 and 54, and 55 and older. LBTC refers to the Local business capital tax in 1996. All regressions control for changes in the LBTP rate. Standard errors in parentheses are clustered at the district level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C.5: Elasticity Estimates

Panel A.	Mean Log Wage FT			
Post × Log Δ LBTC	0.0514***	0.0448***	0.0247**	0.0446***
	(0.00988)	(0.00816)	(0.0110)	(0.00766)
Panel B.	Log Regular Employment			
Post × Log Δ LBTC	0.138***	0.0325	0.00158	0.0290
	(0.0259)	(0.0451)	(0.0499)	(0.0441)
Tax Change Controls	✓	✓	✓	✓
District FE	✓	✓	✓	✓
Establishment FE	✓	✓	✓	✓
District type FE × Year FE	✓	✓	✓	✓
Pre-Treatment Controls		✓	✓	✓
State × Year FE		✓	✓	✓
Industry × Year FE	✓	✓	✓	✓
Industry × State × Year FE				✓
Observations	2,486,448	2,486,416	2,486,416	2,486,416

Data: Statistical Offices of the Federal States and Establishment History Panel. *Notes:* This table displays estimates from DiD regression of the average full time wage (Panel A) or regular employment (Panel B) on the logarithm of the size of the tax cut as described in Equation 7. All regressions control for changes in the LBTP rate. LBTC refers to the Local business capital tax in 1996. Standard errors in parentheses are clustered at the district level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C.6: DiD mean full-time wages and full-time employment - Using Industry Variation

Panel A:	Labor Market Log Mean Wage FT				
Post × Δ LBTC Industry	0.0180***	0.0100***	0.0115***	0.00755**	0.0129**
	(0.00286)	(0.00334)	(0.00275)	(0.00328)	(0.00555)
	Log FT Employment				
Post × Δ LBTC Industry	0.0342***	0.00620	0.0187	-0.00411	-0.0196
	(0.00865)	(0.0162)	(0.0148)	(0.0143)	(0.0160)
Tax Change Controls	✓	✓	✓	✓	
District FE	✓	✓	✓	✓	✓
Establishment FE	✓	✓	✓	✓	✓
District type FE × Year FE	✓	✓	✓	✓	✓
Pre-Treatment Controls		✓	✓	✓	✓
State × Year FE		✓	✓	✓	✓
Industry × Year FE	✓	✓	✓	✓	✓
Industry × State × Year FE				✓	
District × Year FE					✓
Observations	2,462,460	2,462,460	2,462,460	2,462,460	2,462,460

Data: Statistical Offices of the Federal States and Establishment History Panel. *Notes:* This table displays estimates from DiD regressions log full-time wages and log full-time employment on the size of the tax cut as described in Equation 7. All regressions control for changes in the LBTP rate. LBTC refers to the Local business capital tax in 1996. Standard errors in parentheses are clustered at the district level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C.7: Liable and Non-Liable Firms

	Log Regular Employment			Mean Log Wage FT		
Post × Δ LBTC	0.0829*	-0.00141	-0.00813	-0.02237*	-0.0215	-0.000486
	(0.0423)	(0.0392)	(0.0356)	(0.0124)	(0.0139)	(0.0135)
Post × Liable × Δ LBTC	-0.00808	0.00529	-0.0143	0.0783***	0.0860***	0.0452***
	(0.0292)	(0.0245)	(0.0239)	(0.0085)	(0.0100)	(0.00996)
Tax Change Controls	✓	✓	✓	✓	✓	✓
District FE	✓	✓	✓	✓	✓	✓
Establishment FE	✓	✓	✓	✓	✓	✓
District type FE × Year FE	✓	✓	✓	✓	✓	✓
Pre-Treatment Controls		✓	✓		✓	✓
State × Year FE		✓	✓		✓	✓
Industry × Year FE			✓			✓
Observations	3,358,290	3,358,290	3,358,290	3,358,290	3,358,290	3,358,290

Data: Statistical Offices of the Federal States and Establishment History Panel. *Notes:* his table displays estimates from DiD regressions as described in Equation 7. LBTC refers to the Local business capital tax in 1996. Post × LBCT 1996 shows estimates for non-liable firms. The sum of the coefficients Post × LBCT 1996 and Post × Liable × LBCT 1996 is the effect on liable firms. All regressions control for changes in the LBTP rate. Standard errors in parentheses are clustered at the district level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.8: Placebo: Investment

Panel A	Effect on Building Investment			
	Log Investment BL			
Post × Δ LBTC	-0.0754	0.0710		
	(0.653)	(0.783)		
Observations	9399	9395		
Panel A	Effect on Investment: East German States			
	Log Total Investment		Log Investment E+M	
Post × Δ LBTC	-0.0971	0.127	-0.198	0.0186
	(1.125)	(1.083)	(1.128)	(1.081)
Observations	1614	1614	1753	1753
Municipality FE	✓	✓	✓	✓
Establishment FE	✓	✓	✓	✓
Industry × Year FE	✓	✓	✓	✓
State × Year FE		✓		✓

Data: Statistical Offices of the Federal States and IVS. *Notes:* his table displays estimates from DiD regressions as described in Equation 7. LBTC refers to the Local business capital tax in 1996. Panel A displays estimates for investments in buildings and land. Panel A shows estimates for total investment and investment in machines and equipment (E+M) in the East German states. All regressions control for changes in the LBTP rate. Standard errors in parentheses are clustered at the municipality level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.9: Effect on Profits and Tax rates

	EATR		Log Net Profit		Log Gross Profit	
Post × Δ LBTC	-0.0151***	-0.0153***	0.0345***	0.0311***	0.0139***	0.0103**
	(0.00103)	(0.00103)	(0.00510)	(0.00477)	(0.00437)	(0.00407)
Observations	399615	399615	399615	399615	399615	399615
Tax Change Controls	✓	✓	✓	✓	✓	✓
Municipality × Industry FE	✓	✓	✓	✓	✓	✓
Industry × Year FE	✓	✓	✓	✓	✓	✓
State × Year FE	✓		✓		✓	
District × Year FE		✓		✓		✓

Data: Statistical Offices of the Federal States and Local Business Tax Statistics. *Notes:* Standard errors in parentheses are clustered at the municipality level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.10: DiD on the Regional Level

		Entry by Productivity				
	Productivity	Low	Mid-Low	Mid	Mid-High	High
Post × Δ LBTC	-0.0254**	0.360***	0.318***	0.0946***	-0.0507	0.121***
	(0.0122)	(0.102)	(0.104)	(0.0306)	(0.0659)	(0.0438)
Net-of-tax-rate LBT	0.408***	0.0172	-0.471	0.0553	-1.163*	-0.212
	(0.141)	(0.665)	(0.599)	(0.349)	(0.668)	(0.482)
Tax Change Controls	✓	✓	✓	✓	✓	✓
District FE	✓	✓	✓	✓	✓	✓
District type FE × Year FE	✓	✓	✓	✓	✓	✓
State × Year FE	✓	✓	✓	✓	✓	✓
Observations	4845	4845	4845	4845	4845	4845

Data: Statistical Offices of the Federal States and Establishment History Panel. *Notes:* This table displays estimates from DiD regressions as described in Equation 7. Each estimate comes from a different specification. The dependent variables are productivity and the log number of plants entering by productivity quintile. All regressions control for changes in the LBTP rate and the controls detailed below the coefficient estimates. LBTC refers to the Local business capital tax in 1996. Standard errors in parentheses are clustered at the district level. Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.