Which Workers Bear the Burden of Corporate Taxation and Which Firms Can Pass It On? Micro Evidence from Germany

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Abstract

In this paper we provide empirical evidence on the wage incidence of the German business tax, which is set at the municipal level. For our analysis, we use a very rich administrative linked employer-employee panel, covering 11 years, and link it to data on the business tax rates of about 11,500 German municipalities. On average 8% of the municipalities adjust their business tax rate per year. We are able to exploit multiple quasi-natural experiments to identify the tax incidence on wages. The detailed administrative data allow us to estimate heterogenous incidence effects and to explore different channels of how the business tax burden is passed on. We find a wage elasticity with respect to the effective marginal tax rate of -0.18. Low-skilled labor shares a relatively higher burden as well as workers in firms with non-binding sectoral collective agreements or firm level bargaining contracts.

JEL Classification: H22, H25, J30, J38
Keywords: business taxation, wage incidence, microdata, Germany

1   Introduction

The debate about who bears the burden of corporate taxation has recently shifted from the theoretical to the empirical arena. Theoretically, the debate was initiated by Harberger (1962)'s seminal work. Numerous studies have followed, converging to the view that labor bears a substantial share of the corporate tax burden through lower wages in open economies. Compared to the multitude of theoretical contributions, there are few empirical studies that are able to cleanly identify the incidence of corporate taxation on wages.[1] In addition, there is no empirical evidence on the channels that firms might use to shift the burden of corporate taxation to their workers. If the corporate tax rate rises, are incumbent workers denied the next pay rise? Do potential new hires receive a lower wage offer? Moreover, to the best of our knowledge, no empirical study has analyzed whether there is worker and firm heterogeneity in the incidence of the corporate tax on wages. Do low-skilled workers with a lower bargaining power share a relatively larger burden? Are firms under a sectoral collective bargaining agreement less flexible in passing on the burden?

This paper is the first to provide micro worker and micro firm evidence on the channels of the corporate tax incidence on wages.[2] Our identifying variation comes from the roughly 11,441 German municipalities which can annually adjust the rate of the local business tax (LBT) (*Gewerbesteuer*).[3] In the cross-section, the business tax rate for corporate firms usually varies between 10% and 20% due to different collection rates. In addition, there is substantial variation in the collection rates within municipalities, due to variation over time: every year about 8% of the municipalities (roughly 1,000 in total) adjust the collection rates, changing the local business tax rate on average by 0.5 percentage points. This variation enables us to exploit multiple local quasi-natural experiments to identify the effect.

In order to be able to explore different incidence channels and to look at heterogenous firm and worker effects, we make use of a rich administrative linked employer-employee dataset (LEED). We construct a panel of 11 years (from 1998 to 2008) and link it to administrative data on the universe of all German municipalities during that period. The richness of the administrative LEED linked to community

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[1] A seminal study has been published recently as Arulampalam et al. (2012), others will be discussed below.

[2] The related literature will be discussed in the next section.

[3] More precisely, municipalities can set a municipality specific collection rate, which works as a multiplier of the federal business tax rate. The LBT revenue mostly accrues to the municipality and is its most important source of revenue. In the remainder of the paper we use the terms "corporate tax(ation)" and "business tax(ation)" as synonyms unless this may give rise to confusion.

level data allows us to address potential caveats which are especially important in the German context. First, non-corporate and corporate firms are taxed differently in Germany. Thus information on the legal form of the firm is crucial to identify an effect. Second, labor unions still play a major role in the German wage formation process. The employer part of the LEED allows us to control for union status. Last, we need detailed worker level data to address questions of heterogenous worker effects. In fact, the relative burden of high and low-skilled labor is most likely to be different as the complementarity/substitutability between these labor inputs with regard to capital is different (Griliches, 1969).

Our central estimate of the long-run wage elasticity with respect to the effective corporate tax rate is −0.18. We find that it takes up to two years until the corporate tax burden is (partly) shifted to labor. Our results further suggest that the burden is largely borne by incumbent workers. Worker groups that are more vulnerable, such as low-skilled workers, women, part-timers and individuals with low firm specific tenure share a relatively higher burden of the corporate tax. As far as firm heterogeneity is concerned, we find significant industry difference in the business tax incidence on wages. Following economic intuition, we find that firms shift a larger share of tax burden to their workers if the wage bargaining takes place at the firm level rather than at the sectoral level and if the collective agreement is not binding, i.e. wages exceed the minimum wage stipulated in the agreement. Moreover, more profitable firms seem to shift less of the burden.

The remainder of the paper is structured as follows. Section 2 gives a short overview of the related literature. In Section 3 we sketch the tax treatment of German firms in general and describe the German business tax in detail. The data sources used for the empirical analysis are described in Section 4. Results are shown in Section 5. Section 6 concludes.

2   Related literature

The theoretical literature on the incidence of corporate taxation started from a general equilibrium perspective. The seminal paper by Harberger (1962) showed that capital bears the whole burden of corporate taxation in a closed economy. Subsequently, the literature quickly evolved either extending the model to the open economy case (Diamond and Mirrlees, 1971; Bradford, 1978; Kotlikoff and Summers, 1987; Harberger, 1995), incorporating more sectors (Shoven, 1976) or introducing

uncertainty (Ratti and Shome, 1977).[4] Existing computational general equilibrium (CGE) models find that labor bears roughly 40 percent of the corporate tax burden when assuming a large open economy with reasonable portfolio, product and factor substitution elasticities (see Mutti and Grubert (1985); Gravelle and Smetters (2006); Randolph (2006); Harberger (2008) and Gravelle (2010) for surveys).

As far as empirical evidence is concerned, there are only a few, rather recent studies that try to identify the incidence of corporate taxation on wages. While Hassett and Mahur (2006) find extremely high estimates of the wage incidence, most other studies find a wage incidence of between 40 and 80 percent (Desai et al., 2007; Felix, 2007; Felix and Hines Jr., 2009; Dwenger et al., 2011; Liu and Altshuler, 2011; Arulampalam et al., 2012).

The existing studies can be grouped into two clusters, based on the identifying variation exploited to establish a causal link between changes in the burden of corporate taxation and changes in wage. In the first set of studies, tax burdens vary by countries (or US States) and the wage incidence is identified in macro regressions by exploiting the variation in tax rates across countries (or US States) over time (Hassett and Mahur, 2006; Felix, 2007; Desai et al., 2007; Felix and Hines Jr., 2009). The second set of studies exploits cross- and within-firm (industry) variation in tax liabilities (rates) to identify the effect (Dwenger et al., 2011; Liu and Altshuler, 2011; Arulampalam et al., 2012). In addition, studies using panel data implicitly exploit reforms of firm taxation rules – in fact (Dwenger et al., 2011) do so explicitly. With regard to the level of analysis, the study by Felix and Hines Jr. (2009) uses individual worker data. Yet, they only have one cross-section at their disposal and thus cannot control for individual specific fixed effects, which play a big role in wage regressions.

The study most closely related to this paper is Bauer et al. (2012).[5] The authors use similar individual data and also exploit the variation in the local business tax rate to identify the effect on wages. However, there are two important differences. Firstly, Bauer et al. (2012) do not have worker information on the municipality but only on the district level. They therefore aggregate the business tax data to the county (*Kreis)* level – there are 11,441 municipalities but only 343 counties. This aggregation might be problematic for two reasons. First, it makes the variation imprecise. Assume that only one municipality changes the tax rate in a

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[4] Recent surveys on the theoretical literature of the general equilibrium are provided by Auerbach (2005) or Harberger (2006).

[5] This recently published paper was conducted independently of our study.

certain county. On the hand, the variation of this municipality is understated when averaging the tax rates at the county level. On the other, using the county's average tax rates creates a spurious variation for all other municipalities, in which the tax rate has not changed. This spurious variation hampers identification as some workers and firms are treated as if they were affected by changes in the tax rate, although they were not. In fact, every year 8% of the municipalities change the collection rate, inducing changes of the average collection rate at the county level in between 65% to 75% of the counties (Bauer et al., 2012).[6] Second, due to the aggregation to the county level potential tax competition channels between municipalities in one county cannot be accounted for. Another difference of our paper to Bauer et al. (2012) is that we also make use of firm level micro data. This is crucial because corporate taxation differs greatly for different firm types, depending on their legal form (corporate vs unincorporated).[7] Moreover, some firm types are not liable to the business tax at all. Finally, the detailed firm data enables us to test for firm heterogeneity in the incidence on wages.
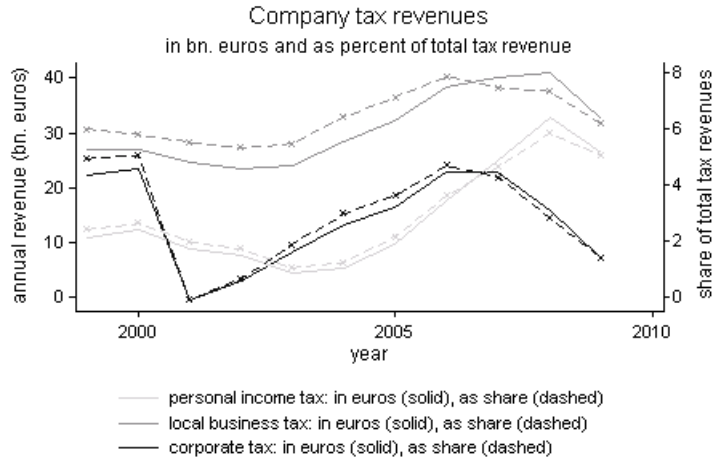
Our study adds to the existing literature in three important ways. First, in terms of identifying variation, we exploit numerous quasi-natural experiments of the locally determined business tax. Additional identification comes from the conventional variation in the cross-section, that is across roughly 11,500 municipalities and across firm-types, and due to changes in the corporate tax laws set at the federal level over time. Second, we are the first study to explicitly analyze the adjustment channel through which firms shift parts of the corporate tax burden to wages. We differentiate between a wage incidence effect for incumbent workers, which materializes through wage moderation, and the effect for potential new hires, which in the case of a rise in the corporate tax rate, receive a lower wage offer than they would have in the absence of a shock. Finally, we make use of administrative panel data on individual wages, which are linked to a large firm sample. The linked employer-employee data allow us to control for both observed and unobserved individual and firm heterogeneity in the wage incidence. We are thus able to assess whether the wages of different groups are affected differently by increases in the companies' business tax liabilities.

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[6] Note that early conference versions of this paper used the variation across counties and found very different estimates than the ones presented below (Fuest et al., 2011, 2012).

[7] In fact, we show very different results for corporate and non-corporate firms below.

Figure 1: Revenues of company taxes

Company tax revenues
in bn. euros and as percent of total tax revenue

personal income tax: in euros (solid), as share (dashed)
local business tax: in euros (solid), as share (dashed)
corporate tax: in euros (solid), as share (dashed)

3 Institutional Background

Taxation of firms in Germany consists of three pillars: the personal income tax (PIT), the corporate tax (CT) and the local business tax (LBT). Figure 1 shows the total revenues of the three different taxes on firms for Germany. The local business tax is the most important tax with a revenue of about €40 billion, which corresponds to approximately 6 percent of Germany's total tax revenue. There have been several changes of the German corporate tax legislation affecting all three forms of firm taxation in the recent years (see Table 1 in the Appendix for a synapsis).

The local business tax applies to both non-corporate (*Personengesellschaften*) and corporate firms (*Kapitalgesellschaften)* – certain free professions such as journalists, physicians, lawyers or farmers are exempt. Since 1998, the LBT base, Y_{LBT}, essentially consists of operating profits.[8] Until 2008 the business tax liabilities could be deducted from their own tax base. Moreover, there is an allowance of €24,500 for non-corporate firms.

The tax rate of the local business tax, τ_{LBT}, consists of two components, the basic federal rate (*Steuermesszahl*), τ_{fed}, and the collection rate (*Hebesatz*), cr: $\tau_{LBT} = \tau_{fed} \cdot cr$. The basic federal rate was set at 5.0% from 1998 to 2007 and decreased to 3.5% in 2008.[9] The collection rate is set by the municipalities and

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[8] From 1998 to 2007 half of the long-term debt service was added to the Y_{LBT}. This changed with the the tax reform of 2008. Instead of long-term debt services 25% of all interest payments exceeding €100,000 are included in Y_{LBT}. The interest payments comprise a lump sum interest portion of rents, leasing rates and royalties.

[9] Note that prior to 2008 there was a reduced τ_{fed} for non-corporate firms. For every €12,000 exceeding the allowance of €24,500, τ_{fed} was raised by one percentage point, so that the full basic

usually varies between 250% and 450% in the period from 1998 to 2008. It is the most important instrument of the German municipalities, which can be influenced by the municipalities themselves, to raise tax revenues.

In addition to the LBT, non-corporate firms (*Personengesellschaften*) are subject to the personal income tax. The tax base is the share of the operating profits assigned to the proprietor. Importantly, until 2008, a share of the business tax liabilities could be deducted from the personal income tax base.[10] The taxable income from running a business is added to taxable income from other sources and the PIT schedule is applied. In most cases, profits of the firms are so high that companies are in the highest PIT bracket and face the top marginal tax rate, τ_{PIT}^{top}, which changed several times during the period under consideration. In addition a solidary surcharge, *soli*, for the German unification of 5.5% of the tax rate is added (*Solidaritätszuschlag*).

Corporate firms (*Kapitalgesellschaften*) are subject to the corporate tax in addition to the LBT. The tax base for the corporate tax is defined similarly to the tax base of the personal income tax. The corporate tax rate has undergone several changes in recent years. Until 2000 a corporate tax imputation system existed in Germany, where retained profits where subject to a corporate tax rate, τ_{CT}, of 45% in 1998 and 40% in 1999 and 2000.[11] As of 2001 retained and distributed profits were equally taxed at 25%.[12] In 2008 τ_{CT} was lowered to 15%. As for the PIT, a solidary surcharge, *soli*, of 5.5% of the tax rate is added.

In order to calculate the effective corporate tax burden for corporate (non-corporate) firms, first, the local business tax burden as well as the corporate tax (personal income tax) burden have to be determined. Second, the deductions of the LBT liabilities from the PIT base and in some years from its own base have to be taken into account. The effective marginal tax rate[13] for corporate firms, τ_{EMTR}^{corp}, from 1998 to 2007 is thus[14]:

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federal rate of 5.0% had to be paid with a taxable income starting from €72,500.

[10] From 2001 to 2007, $1.8 \cdot \tau_{fed} \cdot Y_{LBT}$ could be deducted. From 2008 onwards, $3.8 \cdot \tau_{fed} \cdot Y_{LBT}$ could be credited.

[11] Dividends were taxed at a rate of 30% from 1998 to 2000.

[12] In 2003 this rate was raised by 1.5 percentage points to finance the costs of a major flood in Germany.

[13] Note that this is an effective statutory marginal tax rate, as opposed to measures of the effective marginal tax burden on investment which include tax base parameters.

[14] Since 2008 the denominator of the fraction is set to 1, since the local business tax cannot be deducted from its own tax base anymore.

$$\tau_{EMTR}^{corp} = \frac{\tau_{CT} \cdot (1 + soli) + \tau_{fed} \cdot cr}{1 + \tau_{fed} \cdot cr} \tag{1}$$

The effective marginal tax rate for a non-corporate firm, where the owners are in the top income tax bracket, $\tau_{EMTR}^{non-corp}$, is[15]:

$$\tau_{EMTR}^{non-corp} = \frac{\tau_{PIT}^{top} \cdot (1 + soli) + \tau_{fed} \cdot cr}{1 + \tau_{fed} \cdot 1.8} \tag{2}$$

4 Data

For our analysis we combine two distinct data sources. First, administrative data on the universe of German municipalities containing information on their fiscal and budgetary situation and, second, detailed administrative linked employer-employee data.

4.1 Municipality data

As far as the municipality data is concerned, we make use of statistics provided by the official statistical authorities of the 16 German federal states (*Statistische Landesämter*). The states collect information on all municipalities' fiscal and budgetary situation. We combine and harmonize the annual state specific datasets and construct a panel on the universe of municipalities from 1998 to 2008 covering roughly 125,000 data points – i.e., municipality-years. Most importantly, the dataset contains information on the local collection rate, but also information on the population size and fiscal information on the municipalities' expenses and revenues. Moreover, we added regional unemployment rates on a more aggregated level to control for local labor market conditions.[16]

Table 1 shows some descriptive statistics of the municipality data. Our main variable of interest is the municipalities' collection rate, τ_{LBT}, which is expressed in

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[15] Since 2008 the denominator of the fraction is set to $1 + \tau_{fed} \cdot 3.8$, since the local business tax cannot be deducted from its own tax base anymore, but parts of the LBT liabilities can still be deducted from the PIT, where the multiplier of the basic federal rate changed from 1.8 to 3.8.

[16] The few studies on the German business tax find that population size and the share of old people affect the local business tax rates positively, while the neighboring tax rates only have an effect on the home tax base if the neighboring municipalities are large (Büttner, 1999, 2001, 2003). In addition, there are a couple of microsimulation studies, assessing the potentials of various reform proposal of the German business tax (Maiterth and Zwick, 2006; Fossen and Bach, 2008).

percent. The mean (unweighted) collection rate in Germany from 1998 to 2008 is roughly 330% with a standard deviation of about 40 percentage points.

Table 1: Descriptive statistics - community data

	mean	sd	min	max
collection rate (in %)	328.80	36.60	0	900
local unemployment rate (in %)	10.23	5.41	2	31.5
population (in 1000)	7.19	45.38	0	3425.759

There is substantial cross-sectional and time variation in the collection rates. Figure 2 shows the variation across states and municipality sizes. States such as North Rhine-Westphalia or Saxony have on average a higher rate, whereas in Hesse or Brandenburg the rates are lower. To show the within-state variation more directly Figure 1 in the Appendix depicts Germany's 11,441 municipalities and the cross-sectional variation in the collection rates as of the year 2008. The darker colors indicate municipalities with higher collection rates.[17] Figure 2 further shows that, the bigger the municipality, the higher the collection rate on average. The largest variation is in the medium-sized municipalities (small cities with a population of 20,000 to 50,000).

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[17] Note that the black areas in some States (mostly in Rhineland-Palatinate and Schleswig-Holstein) are due to small municipality sizes and the black border lines.

Figure 2: Cross-Sectional variation in collection rates
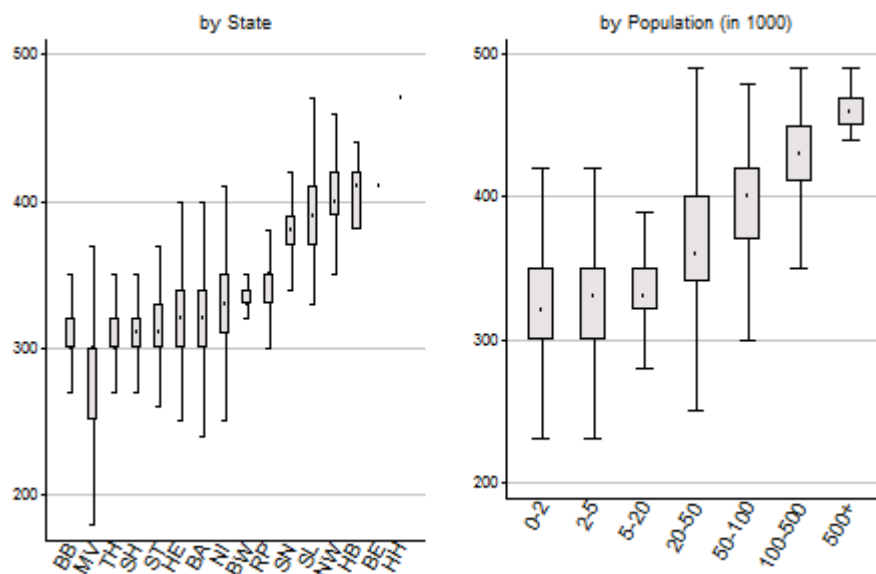
Finally, Table 2 shows how many municipalities have changed their collection rate during the observation period. As mentioned above, municipalities can adjust their collection rate at the beginning of each year. Every year, on average 8% of the municipalities change their collection rate – that is about 1,000 municipalities per year. As suggested above, most municipalities increase the collection rate over time and most of the increases in collection rate occurred between 2000 and 2006. Figure 2 in Appendix A additionally shows the variation of the collection rate over time separately for each state, demonstrating an upward trend of the collection rate and increasing variation over time in almost every state.

Table 2: Share of communities with changing collection rates (in %)

	$\Delta\tau \neq 0$	$\Delta\tau > 0$	$\Delta\tau < 0$	N
Total	8.1	7.2	.9	114410
by Year				
1999	5.4	4.3	1.1	11441
2000	8.4	7.4	1	11441
2001	12.7	11.5	1.3	11441
2002	8.6	7.9	.7	11441
2003	9.8	9.1	.8	11441
2004	8.8	8.2	.6	11441
2005	11	10.4	.7	11441
2006	7.8	7	.8	11441
2007	4.4	3.7	.8	11441
2008	4	3.2	.8	11441
by State				
SH	11.1	10.7	.5	11160
HH	0	0	0	10
NI	11.9	11.6	.3	10240
HB	10	10	0	20
NW	13.3	12.6	.6	3960
HE	6.5	5.5	1	4260
RP	8.7	8.4	.3	23060
BW	7.5	7	.5	11010
BA	4.4	3.5	.9	20560
SL	21	10	11	520
BE	10	10	0	10
BB	10.2	7.3	2.9	4190
MV	6	4.2	1.8	8140
SN	11.4	10.1	1.3	4850
ST	12.4	9.9	2.5	3000
TH	3.3	2.8	.6	9420

4.2 Worker and firm data

For workers and firm information we use the linked employer-employee dataset (LIAB) provided by the Institute of Employment Research (IAB) in Nuremberg, Germany (Alda et al., 2005). The employee data are a 2% sample of the administrative employment statistics of the German Federal Employment Agency (*Bundesagentur für Arbeit*), called the German employment register, which covers all employees paying social security contributions or receiving unemployment benefits (Bender et al., 2000). The employee information are recorded annually on June 30th of each year and include wages, age, tenure, qualification, occupation and employment type (full-time, part-time or irregular employment). Civil servants are excluded as they are rarely observed in the social security data. Our worker panel consists of between 1.6 and 2.0 million workers annually observed from 1998 to 2008.

Importantly, the wages are right censored at the ceiling for the social security contributions. Although, the ceiling is quite high with €63,400 in 2008 for Western Germany, more than 10% of the observations are censored. In principle, there are two ways to tackle this problem: impute the censored wages or exclude the observations. In contrast to Bauer et al. (2012) we opt for the latter alternative, mainly for two reasons. First, simply imputing the wages does not suffice since the standard errors of all regression estimates would have to be adjusted as well. Secondly, given that the imputation method cannot replicate the true data generating process, imputing parts of the wages creates an artificial variation in the left-hand side variable, which might lead to biased conclusions. In fact, if business taxes do affect wages, one must control for them in the imputation stage and would create endogeneity per definition. We check the sensitivity of our results with respect to the inclusion of the censored and imputed wages and find that including the imputed strongly biases the estimates upward.

Employee information recorded in the data include wages, age, firm specific tenure, qualification, occupation, employment type (full-time, part-time or marginal employment), industry and municipality. We use the same skill definition as in the supply part of the model, differentiating between high, medium and low-skilled workers. Since we are interested in labor demand dependent on the skill level, individuals with missing information on qualification are excluded.

The firm component of the LIAB is the IAB Establishment Panel (Kölling, 2000), which is a stratified random sample of the universe of all German estab-

lishments. The term "establishment" refers to the fact that the observation unit is the individual plant, not the firm; there can be several plants per firm.[18] The employer data covers establishments with at least one worker for whom social contributions were paid, in 16 industries and establishments from both the former West and East Germany. The panel dataset contains information on the establishment structure and personnel decisions from 1993 onwards. We extract the following variables: value added, investment, number of employees, export share, industry, total wage bill, legal form, union wage status (industry, firm or no collective agreement in place), wage payments above the union wage, profitability (measured on a five-point scale). Per year we observe roughly 12,000 establishments.

Table 3 shows some descriptive statistics of the linked employer-employee data.[19] The average monthly wage in our sample is €2,460 (all money variables are in 2008€). As far as worker characteristics are concerned, men are clearly over-represented. Moreover, the share of full-time workers is large compared to part-timers and marginally employed. We, therefore, exclude the marginally employed from the sample. Moreover, 94% of the individuals work in corporate firms. As non-corporate firms are much smaller on average in our sample (the median number of workers is 384 as opposed to 1,138 for corporate firms) and as the effective tax burden for non-corporate and corporate firms differs substantially as shown in Section 3, we exclude non-corporate firms from our baseline sample and test for difference in the incidence between corporate and non-corporate firms later in the analysis.

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[18] In the context of the German business tax, the tax base of firms with multiple establishments is divided between municipalities according to formula apportionment based on the wage bill of the individual establishments.

[19] Note that at this stage the imputed wages are still included. They are, however, dropped for the econometric analyses presented below.

Table 3: Descriptive statistics, LIAB 1998-2008

	mean	sd	min	max
monthly wage (in 2008€)	2,466.64	984.31	43.86	26,748.76
age	41.35	9.87	16	64
tenure	10.73	8.10	0	34
share: male	0.77	0.42	0	1
share: migrants	0.09	0.28	0	1
share: high-skilled	0.11	0.32	0	1
share: medium-skilled	0.72	0.45	0	1
share: low-skilled	0.16	0.37	0	1
share: full-timer	0.94	0.23	0	1
share: part-timer	0.06	0.23	0	1
share: marginally emp.	0.00	0.05	0	1
share: blue collar	0.67	0.47	0	1
share: white collar	0.33	0.47	0	1
number of employees	5,697.89	11,665.77	1	50,524
monthly wage bill (in 1,000 2008€)	17,403.52	38,831.98	0	224,777
value added (in 1,000 2008€)	109.30	193.18	0	26,493
investments (in 1,000 2008€)	13.64	35.53	0	8,529
share: non-corporate	0.06	0.25	0	1
share: corporate	0.94	0.25	0	1
share: sector union contract	0.72	0.45	0	1
share: firm union contract	0.15	0.36	0	1
share: no union contract	0.13	0.33	0	1
collection rate (in %)	392.70	55.35	50	520
population (in 1,000)	341.06	654.35	0	3,426

Note: Number of observations: 7,982,240.

5 Results

In the following section, we estimate the incidence of corporate taxation on wages. After estimating the baseline model (Section 5.1), we pay special attention to heterogeneous worker and firm effects. As far as the workers (Section 5.2) are concerned there are two channels through which firms can pass the burden of corporate taxation on to their employees. First, they can pay the incumbent workers a lower wage. Secondly, they can offer new hires a lower pay. For incumbent workers the incidence most likely materializes through wage moderation since existing work contracts make wage cuts legally impossible for the contract duration unless renegotiation takes place, which is likely to happen only in exceptional cases. In principle, it would be possible to reduce the wage when (fixed-term) contracts are renewed, but in nominal terms this is rarely seen in practice. The easiest way to pass the burden of corporate taxation on to the existing workforce is through wage moderation. Despite nominal downward wage rigidity, real wages decline if nominal wages increases are smaller than increases in the price level. Thus, incumbent workers might just see fewer pay rises compared to a hypothetical situation without an increase in the business tax rate. For new hires firms might use a second channel to pass on the burden. They might pay new hires lower wages than in a situation without an increase of the corporate tax rate. We will explore the two channels in turn and additionally pay attention to worker and firm heterogeneity in the incidence responses on wages.

5.1 Baseline model

In order to assess the effects of the business tax rates on wages, we estimate a Mincerian type of wage equation. As dependent variable, we use the log monthly wage of individual i in firm f, municipality m and year t, $\ln w_{ifm,t}$. The independent variable of interest is municipality m's collection rate, $\tau_{m,t}$. We include up to L lags of the collection rate to capture the long-term incidence for incumbents (in our preferred specification $L = 2$, see below). We further include three sets of control variables on the worker, firm and municipality level. Controls on the individual worker level are captured by the vector $\mathbf{X}_{i,t}$ and include age, firm-specific tenure and skill. On the firm level, we control for the number of employees, output, investment (all in logs), the export share and we also add industry dummies ($\mathbf{Y}_{f,t}$). Municipality controls are denoted by $\mathbf{Z}_{m,t}$ and comprise the population size, the property tax rate, local unemployment rates and state dummies. The baseline model thus reads:

$$\ln w_{ifm,t} = \sum_{l=0}^{L} \alpha_{t-l} \tau_{m,t-l} + \boldsymbol{\beta}\mathbf{X}'_{i,t} + \boldsymbol{\gamma}\mathbf{Y}'_{f,t} + \boldsymbol{\lambda}\mathbf{Z}'_{m,t} + \mu_i + \mu_f + \mu_m + \mu_t + \varepsilon_{ifm,t} \quad (3)$$

In order to rule out that unobserved time-invariant personal characteristics such as ability bias our coefficients, we estimate equation (3) using the fixed effects estimator. To rule out possible selection issues into firms, we first focus on the sub-sample of firm-stayers, i.e. those workers who do not change jobs under the period of consideration. We relax this assumption below and look at all workers, paying special attention to firm switchers below (see Section 5.2). As it turns out the focus on firm stayers does not affect our results.

Since we look at employees who stay in the firm, the fixed effects estimator automatically controls for unobserved firm and municipality fixed effect, μ_f, μ_m in this specification. In addition, we add year fixed effects μ_t.[20]

As mentioned in Section 4.2 our baseline sample only contains workers in corporate firms and excludes all workers with imputed wages due to the right-censoring of the administrative data. Moreover, we exclude marginally employed workers and drop workers in agricultural industry and the public sector (because most of the firms are not liable to the business tax).

Since wage adjustment for incumbent workers might take some time due to legal restrictions, it is important to pay special attention to the timing of the effect of changes in the business tax rate on wage. To start, we therefore include several lags of the local collection rate. Table 4 shows the baseline results with varying lag lengths, $L = 0, 1, 2$.

In order to calculate the long-term incidence of the business tax on wages we proceed in two steps. First, we calculate the long-term marginal effect of changes in the collection rate on wages by adding up the coefficients and providing a t-statistic for the cumulative effect. Secondly, we transform the long term effect into a wage elasticity of the marginal effective corporate tax rate, using equation (1). This wage elasticity measures the wage response (in %) to a 1% increase in the effective statutory marginal tax rate of the firm.

Table 4 clearly shows that corporate taxation does have a negative effect on

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[20] Note that the combination of the fixed effects estimator and year fixed effects make the inclusion of the personal characteristics $\mathbf{X}_{i,t}$ obsolete as they are either time invariant or increasing annually by one unit.

wages as implied by the negative cumulative effect of the collection rate in all three specifications. Secondly, we find that it does matter to take into account at least one lag of the collection rate. In fact, only controlling for the collection rate in period t leads to an upward bias (in absolute terms) of the implied elasticity of one third. One interpretation of this finding is that there might be wage shocks in period t, which are unrelated to the changes in the corporate tax burden and reversed in period $t+1$. Including a second lag of the collection rate does not change coefficients and elasticities.

Table 4: Effects on individual wages: lag structure

Model	(1)	(2)	(3)
coll. rate$_t$	-0.015***	-0.020***	-0.020***
	(0.001)	(0.001)	(0.001)
coll. rate$_{t-1}$		0.009***	0.009***
		(0.001)	(0.001)
coll. rate$_{t-2}$			-0.001
			(0.001)
value added p.c.	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
investment p.c.	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)
export share	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
employees	0.048***	0.048***	0.048***
	(0.001)	(0.001)	(0.001)
local UR	-0.199***	-0.197***	-0.197***
	(0.009)	(0.009)	(0.009)
property tax rate	-0.019***	-0.019***	-0.019***
	(0.001)	(0.001)	(0.001)
community population	0.014***	0.014***	0.014***
	(0.001)	(0.001)	(0.001)
constant	7.604***	7.578***	7.580***
	(0.013)	(0.014)	(0.014)
Adjusted R^2	0.054	0.055	0.055
Observations	2217452	2217452	2217452
Cumulative effect	-0.01544	-0.01138	-0.01171
t-statistic	-13.2	-8.1	-7.5
Implied wage elasticity	-0.24	-0.18	-0.18

Notes: Fixed effects estimation. Dependent variable: log monthly wage. All specifications include year fixed effects. Clustered standard errors in parentheses. Significance levels are 0.1 (*), 0.05 (**), and 0.01 (***).

Yet, we include two lags of the collection rate in all subsequent models because the lag structure might be different for the different worker and firm types analyzed below. This might especially be true for differences in the collective agreement status of firms. As collective agreements have been renewed every one to two years during our sample period, we regard the inclusion of two lags of the collection rate as the most appropriate specification.

In Table 2 of the Appendix we show how sensitive our estimates are with respect to the sample selection. We find that the exclusion of firm switchers does not affect the results. Neither does restricting the sample to workers who do not change from full-time to part-time. Yet, an important finding is that including workers with imputed wages due to censoring at the social insurance contribution ceiling significantly biases the estimates upward. The implied wage elasticity almost doubles.

5.2   Worker heterogeneity

Next, we turn to heterogenous worker effects. We split the sample into several worker groups and estimate the incidence on wages for each sub-sample separately. We find substantial variation in the implied wage elasticity with respect to the effective marginal corporate tax rate. With respect to qualification, low-skilled labor shares a much higher burden than medium-skilled labor (implied wage elasticities of -0.57 vs. -0.16).[21] Interestingly, high-skilled labor responds equally strongly to changes in the business tax rate as low-skilled labor. In fact, this u-shaped pattern in the skill distribution is also found when estimating own-wage labor demand elasticities on the same data (see Peichl and Siegloch (2012)). The finding might be driven by the fact that the high-skilled in our sample are a negative selection within the group of high-skilled, as we excluded the high wage earnings, i.e. those with censored wage above the social insurance contribution ceiling.

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[21] High-skilled individuals hold a university, polytechnical or college degree. Medium-skilled workers have either completed vocational training or obtained the highest German high school diploma, called the *Abitur*. Low-skilled workers have neither finished vocational training nor obtained the *Abitur*.

Table 5: Heterogenous workers effect on individual wages: incumbent results, separate regressions

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Group	Baseline	skill level			contract		firm tenure			gender		collar	
		high	medium	low	full-time	part-time	low	medium	high	female	male	blue	white
coll. rate$_t$	-0.020***	-0.024***	-0.018***	-0.039***	-0.018***	-0.080***	-0.019***	-0.019***	-0.016***	-0.040***	-0.014***	-0.018***	-0.023***
	(0.001)	(0.006)	(0.001)	(0.004)	(0.001)	(0.009)	(0.003)	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)	(0.003)
coll. rate$_{t-1}$	0.009***	0.004	0.008***	0.014***	0.010***	-0.004	-0.004	0.014***	0.013***	0.006**	0.011***	0.010***	0.004
	(0.001)	(0.004)	(0.001)	(0.003)	(0.001)	(0.008)	(0.003)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.003)
coll. rate$_{t-2}$	-0.001	-0.015***	0.000	-0.012***	0.000	-0.020***	-0.016***	-0.005***	0.015***	-0.008***	0.001	-0.001	-0.004
	(0.001)	(0.005)	(0.001)	(0.003)	(0.001)	(0.008)	(0.003)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.003)
value added p.c.	0.001***	0.005***	0.001***	0.002***	0.001***	0.001	-0.001	0.003***	-0.004***	0.004***	0.000**	0.001***	0.003***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
investment p.c.	0.002***	0.003***	0.002***	0.003***	0.002***	0.002***	0.001***	0.001***	0.003***	0.002***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
export share	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
employees	0.048***	0.039***	0.050***	0.045***	0.048***	0.054***	0.039***	0.040***	0.032***	0.048***	0.047***	0.050***	0.041***
	(0.001)	(0.004)	(0.001)	(0.002)	(0.001)	(0.007)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
local UR	-0.197***	0.034	-0.178***	0.096***	-0.219***	0.388***	-0.031	-0.118***	-0.363***	-0.043*	-0.245***	-0.224***	-0.034
	(0.009)	(0.047)	(0.010)	(0.027)	(0.009)	(0.083)	(0.027)	(0.014)	(0.016)	(0.024)	(0.010)	(0.010)	(0.024)
property tax rate	-0.019***	-0.016***	-0.020***	-0.013***	-0.019***	-0.026***	-0.013***	-0.010***	-0.013***	-0.021***	-0.018***	-0.020***	-0.021***
	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.004)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
community population	0.014***	0.015***	0.017***	0.005	0.014***	0.024***	0.007***	0.012***	0.010***	0.016***	0.015***	0.014***	0.015***
	(0.001)	(0.002)	(0.001)	(0.003)	(0.001)	(0.004)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
constant	7.580***	7.969***	7.551***	7.663***	7.595***	7.200***	7.845***	7.674***	7.711***	7.548***	7.600***	7.569***	7.632***
	(0.014)	(0.053)	(0.016)	(0.042)	(0.015)	(0.076)	(0.033)	(0.021)	(0.027)	(0.032)	(0.015)	(0.016)	(0.031)
Adjusted R^2	0.055	0.110	0.060	0.030	0.056	0.037	0.051	0.050	0.041	0.040	0.061	0.052	0.068
Observations	2217452	78761	1723172	415519	2124165	93287	391971	919215	906266	474669	1742783	1755454	461998
Cumulative effect	-0.01171	-0.03432	-0.01036	-0.03586	-0.00761	-0.10510	-0.03860	-0.00966	0.01190	-0.04282	-0.00281	-0.00962	-0.02305
t-statistic	-7.5	-4.3	-6.1	-7.7	-5.0	-7.8	-8.6	-4.2	4.4	-10.2	-1.7	-5.8	-5.6
Implied wage elasticity	-0.18	-0.54	-0.16	-0.57	-0.12	-1.66	-0.61	-0.15	0.19	-0.67	-0.04	-0.15	-0.37

Notes: Fixed effects estimation. Dependent variable: log monthly wage. All specifications include year fixed effects. Clustered standard errors in parentheses. Significance levels are 0.1 (*), 0.05 (**), and 0.01 (***).

When looking at different contract types, we find that the elasticity for part-timers is much higher in absolute terms than for full-timers. Note, however, that the variation in working hours is likely to be much higher among the part-time workers so that the estimated elasticity could well be a combined wage and hours effect. Unfortunately, we do not have hour information in the LIAB data except for the broad full-time vs. part-time classification.

Intuitively, we find that especially the workers with low firm-specific tenure bear a relatively larger share of the burden, while merited workers with a long firm-specific tenure do not suffer from wage decreases following rises in the corporate tax burden. As far as gender is concerned, we find that women bear a much higher burden of the corporate tax then men. Moreover, the implied wage elasticity for white collar workers is much higher in absolute terms than for blue collar workers.

Overall, our results suggest that more vulnerable (low-skilled, women, part-timers, low-firm tenure) share a relatively higher burden of the corporate tax. These findings could be driven by the lower bargaining power of these specific groups and a higher (absolute) own wage labor demand elasticity.

So far we have analyzed the incidence on incumbent workers. As argued above this incidence materializes through wage moderation as firms face legal restrictions and can hardly change existing work contracts. An additional channel for firms to pass on the burden of higher corporate taxation is to pay new hires lower wages than in a hypothetical situation without an increase of the corporate tax rate. To test this channel, we slightly modify model (3) and regress the log monthly wage $\ln w_{ifc,t}$ on a dummy, $REF_{c,t}$, that equals one if municipality m has increased its collection rate from year $t-1$ to t. In addition, we include a dummy, $NH_{i,t}$, that indicates that individual i is a new hire, i.e. that she changed jobs from $t-1$ to t. This dummy captures the fact that firm switchers are clearly a selected group and different from firm stayers. To capture the wage incidence of the business tax for new hires we interact the "reform" and "new hire" dummy: $IA_{im,t} = REF_{m,t} \cdot NH_{i,t}$. The interaction term, $IA_{ic,t}$, measures the wage premium or penalty of workers that start the job in a firm that has recently faced an increase in the corporate tax burden compared to new hires of a firm whose business tax rate has remained constant. As done in model 3, we additionally control for personal, firm and municipality characteristics ($\mathbf{X}_{i,t}$, $\mathbf{Y}_{f,t}$, $\mathbf{Z}_{m,t}$). Our empirical specification is thus:

$$
\begin{aligned}
\ln w_{ifm,t} \;=\; & \alpha_0 + \alpha_1 NH_{i,t} + \alpha_2 REF_{m,t} + \alpha_3 IA_{im,t} \\
& + \boldsymbol{\beta}\mathbf{X}'_{i,t} + \boldsymbol{\gamma}\mathbf{Y}'_{f,t} + \boldsymbol{\lambda}\mathbf{Z}'_{m,t} + \mu_i + \mu_f + \mu_m + \mu_t + \varepsilon_{ifm,t}. \quad (4)
\end{aligned}
$$

Again, we apply the fixed effects estimator to wipe out individual fixed effects μ_i. To control for unobserved personal characteristics is especially important in the context of this specification since the identifying assumption of our model is that firm switchers do not select into firms based on whether there has been a change in the local business tax rate. In this model demeaning the data does not automatically wipe out firm and community fixed effects (μ_f, μ_m) as we do not restrict our analysis to firm stayers. Thus, we include firm and community dummies in different specifications below. Again, we add year fixed effects (μ_t) in all models.

Table 6 shows the results. When controlling for worker fixed effects, we find a very similar overall elasticity to the one shown in specification of (1) of Table 4. Yet, the interaction is not significantly different from zero once we control for worker fixed and firm or community fixed. This implies that there does not seem to be an additional penalty for new hires in the form of a lower wage.

Table 6: Firm switchers: person, firm, community FE

Model	(1)	(2)	(3)	(4)
new hire	-0.085***	-0.029***	-0.030***	-0.038***
	(0.005)	(0.004)	(0.003)	(0.003)
reform	0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)
new hire * reform	0.010	0.010**	-0.000	0.005
	(0.006)	(0.005)	(0.004)	(0.004)
age	0.023***	0.034***	0.030***	0.030***
	(0.000)	(0.000)	(0.000)	(0.000)
age squared	-0.024***	-0.030***	-0.030***	-0.030***
	(0.000)	(0.000)	(0.000)	(0.000)
foreigner	-0.014***	-0.004***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
male	0.170***			
	(0.001)			
medium-skilled	-0.185***	-0.046***	-0.043***	-0.043***
	(0.001)	(0.005)	(0.004)	(0.004)
low-skilled	-0.294***	-0.057***	-0.054***	-0.053***
	(0.001)	(0.005)	(0.004)	(0.004)
blue collar	-0.118***	-0.021***	-0.021***	-0.021***
	(0.001)	(0.001)	(0.001)	(0.001)
value added p.c.	0.034***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
investment p.c.	0.014***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)
export share	0.002***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
local UR	-0.527***	-0.249***	-0.256***	-0.257***
	(0.010)	(0.008)	(0.008)	(0.008)
property tax rate	0.029***	-0.017***	-0.016***	-0.017***
	(0.001)	(0.000)	(0.000)	(0.000)
community population	0.032***	0.012***´	0.002	0.009***
	(0.000)	(0.001)	(0.004)	(0.001)
worker fixed effects	No	Yes	Yes	Yes
firm fixed effects	No	No	No	Yes
community fixed effects	No	No	Yes	No
Adjusted R^2	0.474	0.080	0.089	0.094
Observations	3311484	3311484	3311484	3311484
Implied wage elasticity	0.38	-0.26	-0.25	-0.27

Notes: Dependent variable: log monthly wage. All specifications include year, state and industry fixed effects. Clustered standard errors in parentheses. Significance levels are 0.1 (*), 0.05 (**), and 0.01 (***).

5.3 Firm heterogeneity

It is very important to test for firm heterogeneity in the corporate tax incidence on wages. First of all, we check whether wage elasticities differ by legal form. As stressed in Section 3 both corporate and non-corporate firms are liable to the local business tax, but the overall tax burden on firms differs considerably because profits of non-corporate firms are subject to the personal income tax while corporations pay corporate tax. So far we have focused on corporate firms, which are over-represented in our sample and are, in addition, much larger than non-corporate firms (see Section 4.2). Another reason is that many non-corporate firms (especially the small ones) do not pay business taxes due to an allowance and other exemptions in the tax code.

Indeed, Table 7 shows that the wage effect of the local business tax is completely different for non-corporate firms. In fact, we find a positive effect on wages.[22] We therefore decided to exclude non-corporate firms from all preceding and subsequent analyses. One potential interpretation of the positive coefficient is that owners of non-corporate firms might decide to pay themselves a higher wage as a response to an increase in the local business tax. Unfortunately, we are not able to test this hypothesis directly with our data.

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[22] Note that it is not as straightforward to calculate the effective marginal tax rate for non-corporate firms due to certain size-related allowances in the business tax code and due to the progressive personal income tax schedule.

Table 7: Effects on individual wages: Results by legal form

Model	(1)	(2)
Company type	Corporate	Non-corporate
coll. rate$_t$	-0.020***	0.032***
	(0.001)	(0.005)
coll. rate$_{t-1}$	0.009***	0.020***
	(0.001)	(0.004)
coll. rate$_{t-2}$	-0.001	0.030***
	(0.001)	(0.004)
value added p.c.	0.001***	0.006***
	(0.000)	(0.001)
investment p.c.	0.002***	-0.004***
	(0.000)	(0.000)
export share	0.000***	0.000***
	(0.000)	(0.000)
employees	0.048***	0.040***
	(0.001)	(0.005)
local UR	-0.197***	0.106**
	(0.009)	(0.053)
property tax rate	-0.019***	-0.018***
	(0.001)	(0.004)
community population	0.014***	0.009**
	(0.001)	(0.004)
constant	7.580***	7.301***
	(0.014)	(0.058)
year fixed effects	Yes	Yes
Adjusted R^2	0.055	0.041
Observations	2217452	124872
Cumulative effect	-0.01171	0.08207
t-statistic	-7.5	10.4

Notes: Fixed effects estimation. Dependent variable: log monthly wage. All specifications include year fixed effects. Clustered standard errors in parentheses. Significance levels are 0.1 (*), 0.05 (**), and 0.01 (***).

Similar to Section 5.2, we test for heterogenous firm effects by splitting the sample into subgroups and re-estimating the model. As Table 8 reveals, we find remarkable differences when splitting by industry affiliation. We do not find a negative effect of the business tax rate on wages for the construction industry and even a positive effect in the mining and energy sector. In contrast, firms in the service sector seem to pass the burden of corporate taxation to workers much more strongly, with an absolute wage elasticity exceeding one.

As mentioned above firms might face restrictions when trying to shift the tax burden to their workers. One of these restrictions are collective bargaining agreements regarding the wages. In Germany, there are two types of collective agreements: one is at the industry level, the other at the firm level.[23] We find that firms under sector level union contracts do have a relatively smaller wage elasticity compared to companies under a firm level contract. An interpretation of this result is that if only firm f in municipality m faces an increased collection rate, but the tax burdens for all other firms in industry s remain unchanged, it is less likely that this single change will affect the wage bargaining result when the collective agreement is renegotiated. In contrast, when a company under a firm level collective agreement faces a higher tax burden, it can react directly when the agreement is renewed. Surprisingly, we find that firms that are not covered by a collective agreement at all do not seem to shift the burden to labor. Following the our argument, we would have expected an even higher effect for this group as there are no binding restrictions. In fact, we find a significant and positive effect of the collection rate on wages. One possible explanation is that some firms covered by sector level collective bargaining agreements pay wages in excess of the minimum stipulated by the sectoral agreement while others do not.

We therefore split the firms that have a collective agreement into a group that pays wages above the wage level stipulated in the respective agreement and into another group that where the union wage is binding. In line with economic intuition, we find that firms that pay wages above the wage fixed in collective bargaining shift the burden much more strongly with a wage elasticity of -0.37. Those firms actually are able to react to changes in the corporate tax burden, by reducing the wages, via wage moderation, until they hit the wage rate set up in the collective agreement. Firms where the union wage is already binding do not have this possibility. We indeed find that the wage elasticity is much smaller (-0.06) and not significantly different from zero.

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[23] In general, it is mostly larger firms that have firm level collective agreements.

Last we use a measure of the self-assessed profitability of the firm in the preceding year. We find that firms that face no problems at all and assess their profitability as "very good" do not shift the burden of corporate taxation to their employees. In contrast, firms that assess their profit situation as "sufficient" show a much higher wage elasticity of -1.12. Interestingly, the effect of the collection rate on wage for firms that have a poor profitability is positive and significant.

Table 8: Heterogenous firm effect on individual wages: incumbent results, separate regressions

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Group	baseline	industry					collective agreement			wages and union contract		profitability				
		manufacturing	construction	traffic/trade	services	mining/energy	sector level	firm level	no	wages according	wages above	very good	good	satisfactory	sufficient	poor
coll. rate$_t$	-0.020***	-0.028***	-0.023***	0.039***	-0.053***	0.004	-0.033***	0.011**	0.011***	0.002	-0.038***	-0.032***	-0.028***	0.021***	-0.058***	0.111***
	(0.001)	(0.001)	(0.005)	(0.003)	(0.005)	(0.006)	(0.001)	(0.005)	(0.003)	(0.002)	(0.002)	(0.008)	(0.002)	(0.002)	(0.004)	(0.004)
coll. rate$_{t-1}$	0.009***	0.010***	0.005	-0.030***	0.022***	0.069***	0.020***	-0.028***	0.018***	0.019***	0.012***	0.028***	0.004*	-0.024***	0.016***	-0.036***
	(0.001)	(0.001)	(0.003)	(0.002)	(0.004)	(0.005)	(0.001)	(0.004)	(0.002)	(0.002)	(0.002)	(0.005)	(0.002)	(0.003)	(0.004)	(0.004)
coll. rate$_{t-2}$	-0.001	0.008***	0.022***	-0.030***	-0.038***	-0.006*	0.004***	-0.037***	0.003	-0.024***	0.004**	-0.001	0.006***	-0.013***	-0.029***	0.008**
	(0.001)	(0.001)	(0.004)	(0.003)	(0.004)	(0.004)	(0.001)	(0.004)	(0.002)	(0.002)	(0.002)	(0.005)	(0.002)	(0.003)	(0.004)	(0.004)
value added p.c.	0.001***	-0.002***	0.008***	0.009***	0.003***	-0.002*	0.005***	-0.008***	0.004***	0.014***	-0.000	0.018***	0.009***	0.005***	0.002***	-0.031***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
investment p.c.	0.002***	0.002***	0.005***	0.004***	0.001***	-0.004***	0.001***	0.003***	0.005***	-0.006***	0.003***	0.002***	-0.001***	0.002***	0.001***	-0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
export share	0.000***	0.000***	0.001***	0.000	0.001***	0.002***	-0.000***	0.001***	-0.000***	-0.001***	0.000***	-0.000	-0.000***	0.000***	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
employees	0.048***	0.046***	0.038***	0.022***	0.054***	0.050***	0.055***	0.032***	0.080***	0.087***	0.048***	0.029***	0.027***	0.031***	0.032***	-0.009***
	(0.001)	(0.001)	(0.004)	(0.004)	(0.002)	(0.004)	(0.001)	(0.003)	(0.002)	(0.002)	(0.002)	(0.005)	(0.002)	(0.002)	(0.003)	(0.004)
local UR	-0.197***	-0.142***	0.561***	-0.508***	0.202***	-0.966***	-0.043***	-0.872***	-0.157***	-0.837***	0.408***	-0.171***	-0.076***	-0.032	0.664***	-1.436***
	(0.009)	(0.011)	(0.051)	(0.034)	(0.034)	(0.043)	(0.011)	(0.026)	(0.024)	(0.020)	(0.016)	(0.051)	(0.016)	(0.020)	(0.036)	(0.053)
property tax rate	-0.019***	-0.012***	-0.008***	-0.016***	-0.025***	0.033***	-0.017***	-0.024***	0.003*	-0.003*	-0.023***	-0.024***	-0.027***	-0.012***	-0.008***	-0.132***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)
community population	0.014***	0.017***	0.023***	-0.107***	0.020***	0.287***	0.009***	0.006***	-0.009***	-0.026***	0.013***	0.037	0.003	0.007***	0.023***	0.318***
	(0.001)	(0.001)	(0.002)	(0.024)	(0.003)	(0.017)	(0.002)	(0.001)	(0.002)	(0.004)	(0.002)	(0.032)	(0.002)	(0.002)	(0.003)	(0.037)
constant	7.580***	7.585***	7.275***	9.129***	7.534***	4.092***	7.628***	8.148***	7.222***	7.776***	7.682***	7.528***	7.846***	7.707***	7.710***	5.063***
	(0.014)	(0.016)	(0.039)	(0.294)	(0.038)	(0.215)	(0.024)	(0.033)	(0.031)	(0.052)	(0.025)	(0.370)	(0.033)	(0.029)	(0.040)	(0.440)
Adjusted R^2	0.055	0.079	0.041	0.036	0.033	0.203	0.071	0.110	0.040	0.096	0.080	0.151	0.097	0.026	0.047	0.198
Observations	2217452	1643894	74009	172402	228446	98701	1581739	361905	273808	450683	1125704	166468	779248	654685	299816	296311
Cumulative effect	-0.01171	-0.00958	0.00354	-0.02146	-0.06857	0.06649	-0.00971	-0.05473	0.03243	-0.00366	-0.02213	-0.00474	-0.01772	-0.01606	-0.07141	0.08257
t-statistic	-7.5	-5.3	0.4	-5.3	-11.4	11.0	-5.5	-9.5	6.9	-1.2	-9.3	-0.6	-5.6	-5.4	-13.6	13.4
Implied wage elasticity	-0.18	-0.15	0.05	-0.37	-1.11	1.09	-0.16	-0.85	0.47	-0.06	-0.35	-0.07	-0.28	-0.25	-1.12	1.39

Notes: Fixed effects estimation. Dependent variable: log monthly wage. All specifications include year fixed effects. Clustered standard errors in parentheses. Significance levels are 0.1 (*), 0.05 (**), and 0.01 (***).

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6   Conclusions

In this paper, we use administrative linked employer-employee data and multiple local business tax reforms to demonstrate how firms pass on the burden of corporate taxation to the workers. We find that wage moderation plays an important role. A 1% increase in the effective marginal corporate tax rate leads to a 0.18% decrease in the wages of incumbent workers. A second channel through which firms can shift the burden is to offer new hires a relatively lower wage. Our results suggest that this channel is less important.

In addition, the high-quality data allow us to identify worker *and* firm heterogeneity regarding the business tax incidence on wages. While the wages of workers with medium skills are hardly affected by changes in the local business tax, the high and low-skilled bear a larger share of the burden. Moreover, we find that women, part-timers and individuals with low firm specific tenure bear a relatively higher share of the business tax burden.

As far as firm heterogeneity is concerned we find very different incidence results for corporate firms compared to non-corporate firms. This finding might be driven by the fact that non-corporate firms are much smaller and often do not pay local business taxes. Moreover, business owners might be able to shift income from profits to their own (executive) wages more easily in smaller, non-corporate firms to avoid (parts of the) corporate tax burden. In addition, we find that firms shift a larger share of tax burden to their workers if the wage bargaining takes place at the firm level rather than at the sectoral level and if the collective agreement is not binding, i.e. wages exceed the minimum wage stipulated in the agreement. Moreover, more profitable firms seem to shift less of the burden.

Our finding has important policy implications. If proposals of higher taxes on firms are brought forward as a means of redistribution (following the old-fashioned antagonism between labor and capital), one should keep in mind that labor does suffer when corporate taxes are increased. In particular, it is low skilled labor that bears a high share of the labor burden, which is important to take into account when trying to achieve redistributive objectives.

References

Alda, H., S. Bender, and H. Gartner (2005). European Data Watch: The Linked Employer-Employee Dataset Created from the IAB Establishment Panel and the Process-Produced data of the IAB (LIAB). *Schmollers Jahrbuch: Journal of Applied Social Science Studies 125*(2), 327–336.

Arulampalam, W., M. P. Devereux, and G. Maffini (2012). The Direct Incidence of Corporate Income Tax on Wages. *European Economc Review 56*(6), 1038–1054.

Auerbach, A. J. (2005). Who Bears the Corporate Tax? A Review of What We Know. NBER Working Paper No. 11686.

Bauer, T. K., T. Kasten, and L. Siemers (2012). Business taxation and wages: Evidence from individual panel data. IZA Discussion Paper No. 6717.

Bender, S., A. Haas, and C. Klose (2000). The IAB Employment Subsample 1975-1995. *Schmollers Jahrbuch: Journal of Applied Social Science Studies 120*(4), 649–662.

Bradford, D. F. (1978). Factor prices may be constant but factor returns are not. *Economics Letters 1*(3), 199–203.

Büttner, T. (1999). Determinants of Tax Rates in Local Capital Income Taxation: A Theoretical Model and Evidence from Germany. CESifo Working Paper No. 194.

Büttner, T. (2001). Local Business Taxation and Competition for Capital: The Choice of the Tax Rate. CESifo Working Paper No. 440.

Büttner, T. (2003). Tax Base Effects and Fiscal Externalities of Local Capital Taxation: Evidence from a Panel of German Jurisdictions. *Journal of Urban Economics 54*(1), 110–128.

Desai, M. A., C. F. Foley, and J. R. Hines (2007). Labor and Capital Shares of the Corporate Tax Burden: International Evidence. mimeo, presented at the International Tax Policy Forum and Urban-Brookings Tax Policy Center conference on Who Pays the Corporate Tax in an Open Economy?, 18 December, 2007.

Diamond, P. A. and J. Mirrlees (1971). Optimal Taxation and Public Production. *American Economic Review 61*, 8–27 and 261–278.

Dwenger, N., P. Rattenhuber, and V. Steiner (2011). Sharing the burden: Empirical evidence of corporate tax incidence. Working Paper of the Max Planck Institute for Tax Law and Public Finance No. 2011-14.

Felix, R. A. (2007). Passing the Burden: Corporate Tax Incidence in Open Economies. Federal Reserve Bank of Kansas City Regional Research Working Paper 07-01.

Felix, R. A. and J. R. Hines Jr. (2009). Corporate Taxes and Union Wages in the United States. NBER Working Paper No. 15263.

Fossen, F. M. and S. Bach (2008). Reforming the German Local Business Tax - Lessons from an International Comparison and a Microsimulation Analysis. *FinanzArchiv 64*(2), 245–272.

Fuest, C., A. Peichl, and S. Siegloch (2011). Do Employees Bear the Burden of Corporate Taxation? A Micro Level Approach Using Linked Employer-Employee Data. Presented at the 67th Annual Congress of the International Institute of Public Finance in Ann Arbor.

Fuest, C., A. Peichl, and S. Siegloch (2012). Wage Incidence of Corporate Taxation: A Micro Level Approach Using Linked Employer-Employee Data. Presented at the 17th Annual Meeting of the Society of Labor Economists in Chicago.

Gravelle, J. C. (2010). Corporate Tax Incidence: Review of General Equilibrium Estimates and Analysis. Congressional Budget Office Working Paper No. 2010-03.

Gravelle, J. G. and K. A. Smetters (2006). Does the Open Economy Assumption Really Mean that Labor Bears the Burden of a Capital Income Tax. *Advances in Economic Analysis & Policy 6*(1), Article 3.

Griliches, Z. (1969). Capital-skill complementarity. *Review of Economics and Statistics 51*(4), 465–468.

Harberger, A. C. (1962). The incidence of the corporation income tax. *Journal of Political Economy 70*, 215–240.

Harberger, A. C. (1995). The ABCs of Corporate Tax Incidence: Insights into the Open-Economy Case. In *Tax Policy and Economic Growth: Proceedings of a Symposium sponsored by the American Council for Capital Formation*, pp. 51–73. Washington: ACCF Center for Policy Research.

Harberger, A. C. (2006). Corporate Tax Incidence: Reflections on What Is Known, Unknonw and Unknowable. In J. W. Diamond and G. R. Zodrow (Eds.), *Fundamental Tax Reforms: Issues, Choices, and Implications*, pp. 283–308. Cambridge, MA: MIT Press.

Harberger, A. C. (2008). Corporation Tax Incidence: Reflections on What Is Known, Unknown and Unknowable. In G. R. Diamond, John W. & Zodrow (Ed.), *Fundamental Tax Reform: Issues, Choices and Implications*, pp. 283–308. Cambridge, MA: MIT Press.

Hassett, K. A. and A. Mahur (2006). Taxes and Wages. AEI Working Paper No. 128.

Kölling, A. (2000). The IAB-Establishment Panel. *Schmollers Jahrbuch: Journal of Applied Social Science Studies 120*(2), 291–300.

Kotlikoff, L. J. and L. H. Summers (1987). Tax Incidence. In A. J. Auerbach and M. Feldstein (Eds.), *Handbook of Public Economics*, Volume 2, pp. 1043–1092. Amsterdam: Elsevier.

Liu, L. and R. Altshuler (2011). Measuring the burden of the corporate income tax under imperfect competition. Oxford University Centre for Business Taxation Working Paper No. 1105.

Maiterth, R. and M. Zwick (2006). A Local Income and Corporation Tax as an Alternative to the German Local Business Tax: An Empirical Analysis for Selected Municipalities. *Journal of Economics and Statistics 226*(3), 285–307.

Mutti, J. and H. Grubert (1985). The Taxation of Capital Income in an Open Economy: The Importance of Resident-Nonresident Tax Treatment. *Journal of Public Economics 27*(3), 291–309.

Peichl, A. and S. Siegloch (2012). Accounting for Labor Demand Effects in Structural Labor Supply Models. *Labour Economics 19*(1), 129–138.

Randolph, W. C. (2006). International Burdens of the Corporate Income Tax. CBO Working Paper 2006-09.

Ratti, R. A. and P. Shome (1977). On a General Equilibrium Model of the Incidence of the Corporation Tax under Uncertainty. *Journal of Public Economics 8*(2), 233–238.

Shoven, J. B. (1976). The Incidence and Efficiency Effects of Taxes on Income from Capital. *Journal of Political Economy 84*(6), 1261–1283.

A Appendix
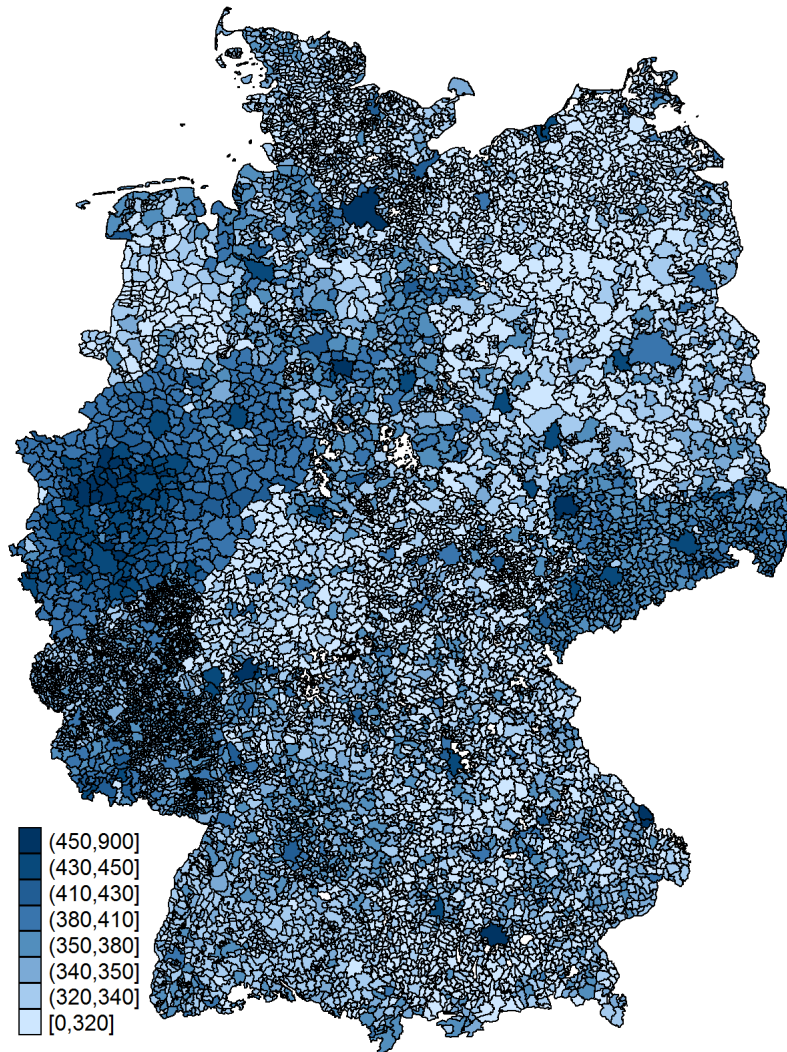
Figure 1: Municipalities and collection rates in 2008

(450,900]
(430,450]
(410,430]
(380,410]
(350,380]
(340,350]
(320,340]
[0,320]

Figure 2: Time variation in collection rates
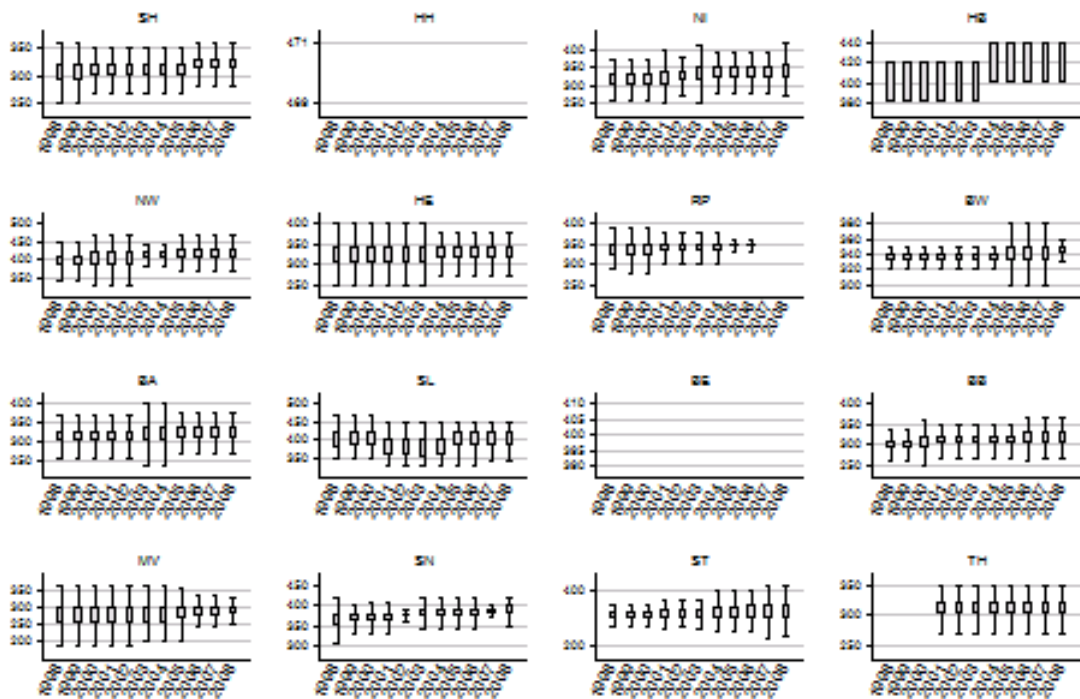
Table 1: Changes in corporate tax legislation

Tax	Year	Tax Base	Tax Rate
Personal Income Tax (PIT)	1998	Operating Profits of non-corporate firm plus additions and deductions minus allowance	25.9-53.0%; allowance=€6,322
	1999		23.9-53.0%; allowance=€6,681
for non-corporate firms, incl.	2000		22.9-51.0%; allowance=€6,902
free professions such as	2001		19.9-48.5%; allowance=€7,206
journalists, physisicans,	2002		19.9-48.5%; allowance=€7,235
lawyers or farmers	2003		19.9-48.5%; allowance=€7,235
	2004		16.0-45.0%; allowance=€7,664
	2005		15.0-42.0%; allowance=€7,664
	2006		15.0-42.0%; allowance=€7,664
	2007		15.0-45.0%; allowance=€7,664
	2008		15.0-45.0%; allowance=€7,664
Corporate Tax (CT)	1998	Operating profits	45.0% on retained profits; 30% on dividends
	1999		40.0% on retained profits; 30% on dividends
for corporate firms	2000	Operating profits	40.0% on retained profits; 30% on dividends
	2001		25.0%
	2002		25.0%
	2003		26.5%
	2004		25.0%
	2005		25.0%
	2006		25.0%
	2007		25.0%
	2008		15.0%
Local Business Tax (LBT)	1998-2007	Operating profits from PIT or CT plus long-term debt minus loss from preceding years and minus an allowance of €24,500 for non-corporate firms	5% on tax base in case firm is corporate; In case firm is non-coporate: 1% if tax base+allowance €< 36,500; 2% if tax base+allowance €< 48,500; 3% if tax base+allowance €< 60,500; 4% if tax base+allowance €< 72,500; 5% if tax base+allowance €< 72,500
for corporate and and non-corporate firms; free professions are exempt	2008	Operating profits from PIT or CT plus 25% of all interest payments in case those exceed €100,000 minus loss from preceding years and minus an allowance of €24,500 for non-corporate firms	3.5% on tax base for non-corporate & corporate
Solidarity Surcharge	1998-2008		5.5% of CT or LBT

Table 2: Effects on individual wages: Robustness w.r.t sample

Model	(1)	(2)	(3)	(4)	(5)	(6)
Firm stayers	Yes	Yes	Yes	No	Yes	Yes
Contract stayers	Yes	No	Yes	Yes	Yes	Yes
Exclude censored wages	Yes	Yes	No	Yes	Yes	Yes
Exclude East	No	No	No	No	Yes	No
Exclude wage outliers	No	No	No	No	No	Yes
coll. rate$_t$	-0.020***	-0.019***	-0.022***	-0.019***	-0.024***	-0.018***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
coll. rate$_{t-1}$	0.009***	0.009***	0.007***	0.007***	0.025***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
coll. rate$_{t-2}$	-0.001	-0.003***	-0.006***	-0.001	-0.012***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
value added p.c.	0.001***	0.002***	0.000	0.001***	-0.003***	0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
investment p.c.	0.002***	0.002***	0.002***	0.002***	0.004***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
export share	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
employees	0.048***	0.049***	0.042***	0.041***	0.045***	0.049***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
local UR	-0.197***	-0.183***	-0.122***	-0.204***	0.013	-0.084***
	(0.009)	(0.010)	(0.011)	(0.010)	(0.014)	(0.009)
property tax rate	-0.019***	-0.018***	-0.018***	-0.019***	-0.015***	-0.021***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
community population	0.014***	0.013***	0.015***	0.013***	0.007***	0.015***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
constant	7.580***	7.573***	7.766***	7.636***	7.674***	7.521***
	(0.014)	(0.015)	(0.016)	(0.019)	(0.024)	(0.013)
Adjusted R^2	0.055	0.045	0.037	0.055	0.057	0.101
Observations	2217452	2293468	2751020	2256576	1549023	1996050
Cumulative effect	-0.01171	-0.01297	-0.01994	-0.01227	-0.01181	-0.00948
t-statistic	-7.5	-7.9	-11.6	-7.8	-5.3	-6.6
Implied wage elasticity	-0.18	-0.20	-0.32	-0.19	-0.19	-0.15

Notes: Fixed effects estimation. Dependent variable: log monthly wage. All specifications include year fixed effects. Clustered standard errors in parentheses. Significance levels are 0.1 (*), 0.05 (**), and 0.01 (***).

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