Demand Shocks, Employment Effects and Local Labor Supply Elasticities*

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1 Extended Abstract (with first results)

Many economists and policymakers believe that lower business taxes encourage business activities and thereby create jobs (see Kotlikoff, 2014; Obama, 2014). The implied mechanism is simple: lower corporate taxes, reduce the cost of capital and increase investments (Chirinko, 1993; Hassett and Hubbard, 2002; Bond and Van Reenen, 2007), which in turn raises employment under the assumption that capital and labor are complements. In other words, corporate tax cuts induces positive labor demand shocks, which translate into increasing employment. Nevertheless, if and how business tax shocks affect labor markets crucially depends on labor supply behavior as well. If labor supply is inelastic, employment is hardly affected and wages will adjust. This is the mechanism one has in mind when believing that a large share of corporate taxes is borne by labor – the relatively immobile factor in firm production. In contrast, if labor supply is elastic, e.g. because workers are regionally mobile, lower corporate taxes should indeed spur employment.

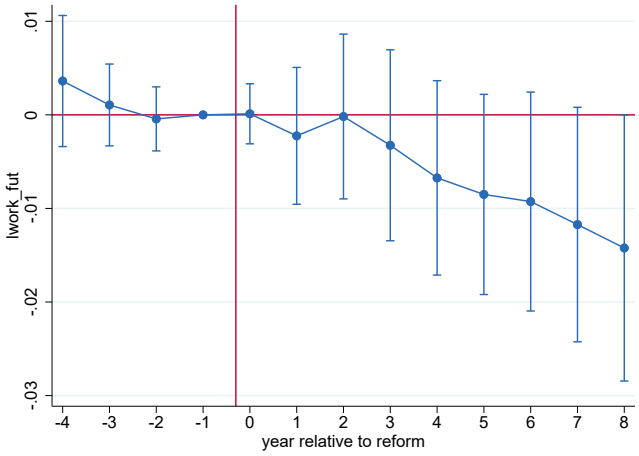
In this paper, I exploit substantial variation in *municipal* business tax rates in Germany over a long time span to investigate how employment effects reacts to corporate tax incentives. The exercise might be of particular interest since the local nature of the business tax should make workers potentially more mobile relative to settings where taxes are set at, e.g., the national level.

Based on a simple model, I show under which conditions taxes on business profits affect wages and how the tax variation can be used as a labor demand shock to back out labor supply responses. Hence, I use the reverse approach of the relatively large literature that uses labor supply shocks to trace out the labor demand curves (Card, 1990; Borjas, 2003; Acemoglu et al., 2004).

I make use of administrative data (1992-2016) on the universe of German workers subject to social security contributions and link it to a long, administrative panel of municipal tax rates. In Germany, municipalities can set local taxes on firm profits. Each year, about 10% of the roughly 11,000 municipalities change these business taxes rates, yielding a large number of local labor demand shocks to be exploited for identification. At the same time, tax base definitions remain fixed and cannot be adjusted by local policymakers.

Following the theoretical model, I first show that wage responses of business taxes can be used as a first stage regression to measure the initial demand shock. In a second step, I provide evidence on the underlying mechanisms by using the labor demand shocks induced by local business taxation to estimate labor supply elasticities for different worker types at

Figure 1: Employment effects of local business tax changes



Source: IAB data. *Notes*: This figure plots the effects of a one point increases in the local business tax rate on log number of workers using an event study design with municipal and year-by-region fixed effects. 95% confidence intervals are plotted.

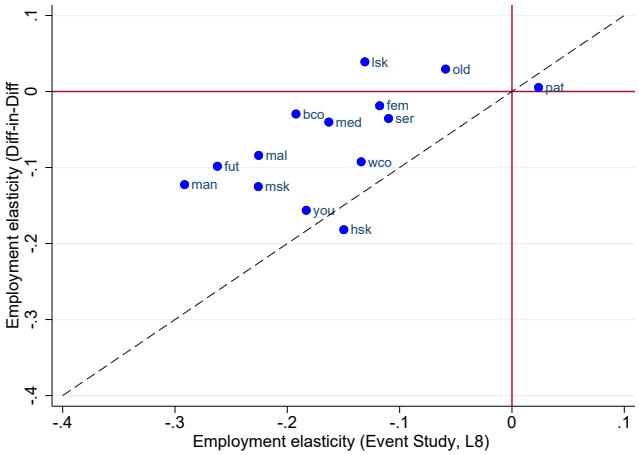
a very low level of geography.

My preliminary findings are as follows. Firm employment responds negatively to increases in local business taxes. Figure 1 shows the reduced form effect on total employment. The graph clearly shows that tax increases negatively affect the total number of municipal employees after some lag.

This effect is exclusively driven by the intensive margin. Moreover, I do not find evidence that the (few) tax decreases I observe in the data have positive employment effects. This is an important insights, also in terms of the trickle-down economics debate surrounding the recent tax reforms in the US.

While the effect on employment is significant at conventional levels, confidence intervals are somewhat large, which might hint at substantial heterogeneity in the responses. As a result, I use the rich dataset to estimate these employment effects for different worker types. Figure 2 plots employment elasticities of different worker groups, showing substantial heterogeneity in the point estimates. Employment effects for low-skilled workers, old-workers and part-timers are small, while young, high-skilled, manufacturing show employment elasticities of around 0.2 and above. These differences already hint at differences in labor supply elasticities, which are investigated in the next steps.

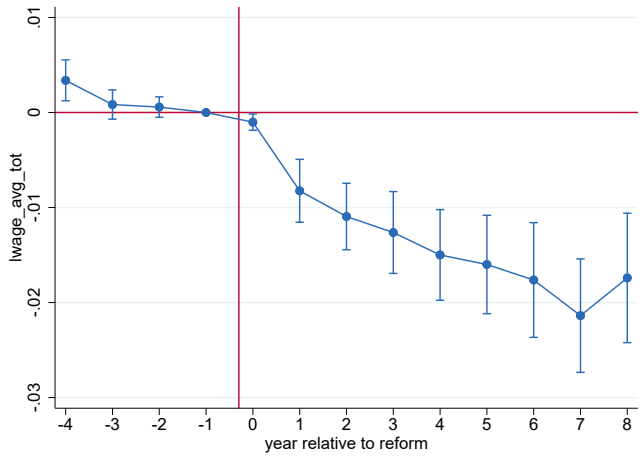
Figure 2: Employment elasticities of different worker types



Source: IAB data. *Notes*: This shows estimated employment elasticities for different worker types. These employment elasticities are estimated using two different methods: (i) a simple difference-in-difference model (vertical axis) and (ii) the long-run effect using the eight lag of the event study model. Abbreviations for worker groups are: full-time (fut), part-time (pat), high-skilled (hsk), medium-skilled (msk), low-skilled (lsk), young (you), medium-aged (med), old (old), white-collar (wco), blue-collar (bco).

After showing the reduced form effect of profit taxes on employment, I estimate the implied first stage relationship, hence the wage effects of local business taxes. I replicate the findings of earlier work by Fuest et al. (2018) on my extended panel dataset, see Figure 3.

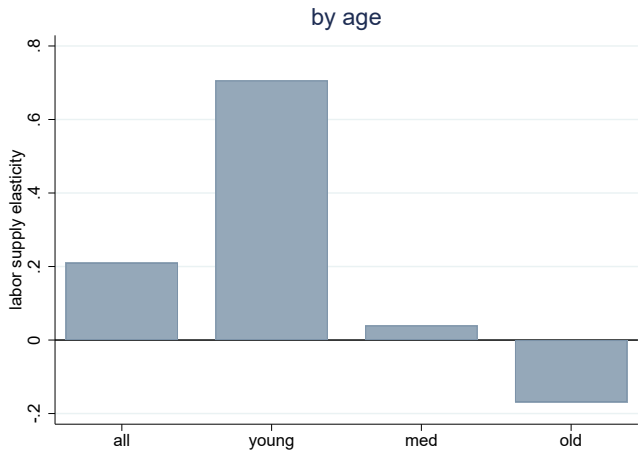
Figure 3: Wage effects of local business tax changes



Source: IAB data. *Notes*: This figure plots the effects of a one point increases in the local business tax rate on log wages of workers using an event study design with municipal and year-by-region fixed effects. 95% confidence intervals are plotted.

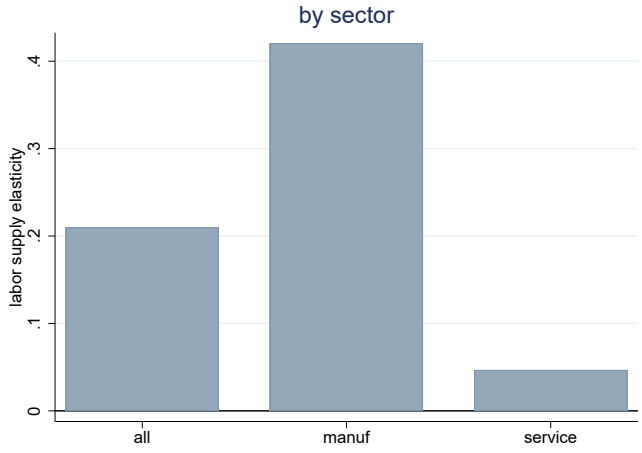
Bringing the reduced form and first stage effects together, I am able to estimate local labor supply elasticities for different heterogeneous worker groups. Figure 4 to 8 show the respective supply elasticities by age, sector, skill, working hours and gender respectively. In line with the results from Figure 1, I find substantial heterogeneity in labor supply responses to demand shock at the local level. The graphs show that young, highly-skilled, male, full-time manufacturing workers are much elastic in terms of their labor supply at the local level.

Figure 4: Local labor supply elasticities by age



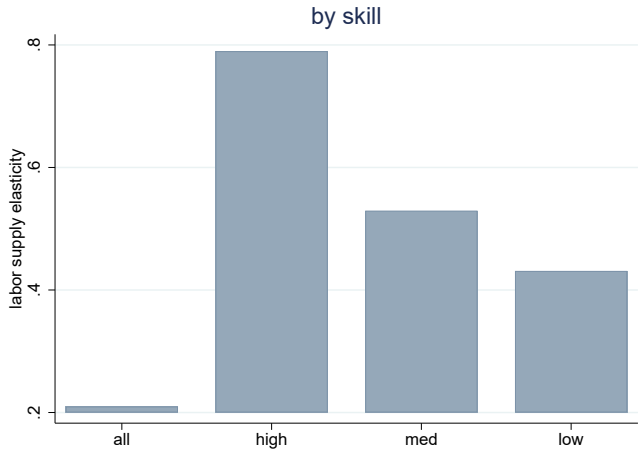
Source: IAB data. *Notes*: This figure shows local labor supply elasticities by age, differentiating between young, mid-aged and old workers.

Figure 5: Local labor supply elasticities by sector



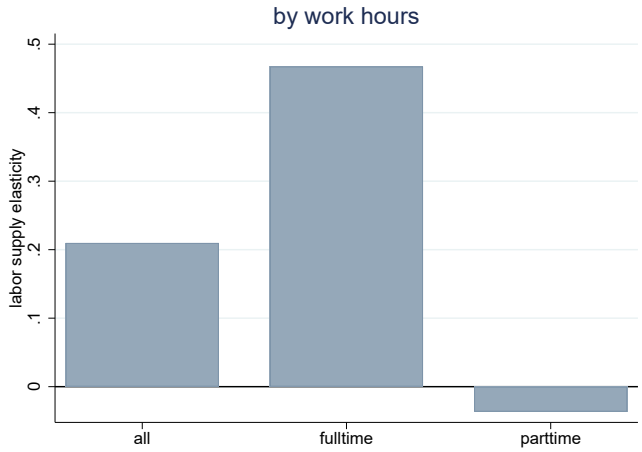
Source: IAB data. *Notes*: This figure shows local labor supply elasticities by sector, differentiating between manufacturing and services.

Figure 6: Local labor supply elasticities by skill



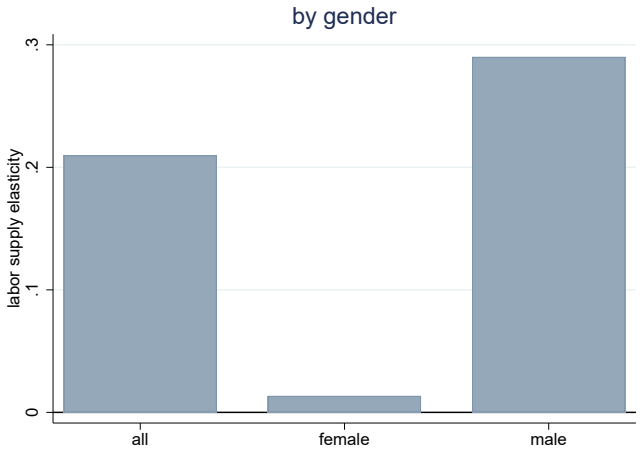
Source: IAB data. *Notes*: This figure shows local labor supply elasticities by worker skill, differentiating between high-skilled, medium-skilled and low-skilled.

Figure 7: Local labor supply elasticities by working hours



Source: IAB data. *Notes*: This figure shows local labor supply elasticities by worker hours, differentiating between full-time and part-time workers.

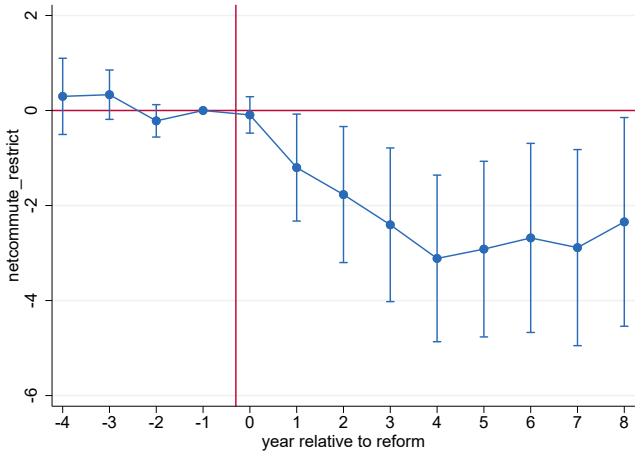
Figure 8: Local labor supply elasticities by gender



Source: IAB data. *Notes*: This figure shows local labor supply elasticities by gender.

In a last step, I intend to explore the reasons behind the observed heterogeneity in labor supply responses. The most obvious mechanisms in the context of local business taxation is labor mobility. Based on data on local commuter flows, I document that commuting behavior responds to changes in local tax rates. Figure 9 shows a strong decrease in the number of net commuters (in-commuters minus out-commuters) following an increase in the local business tax rates. Note that the effect coincides with timing of the employment effect, which is lending further relevance to the mechanism. Unfortunately, I cannot decompose the commuting response by worker type.

Figure 9: Commuting effect of local business tax changes



Source: IAB data. *Notes*: This figure plots the effects of a one point increases in the local business tax rate on municipal net commuting (=in-commuting minus out-commuting) using an event study design with municipal and year-by-region fixed effects. 95% confidence intervals are plotted.

Related Literature. This paper predominantly speaks to two strands of the literature.

The first one is research on the labor market impacts of business taxes, which has seen renewed interest in recent years. Suarez Serrato and Zidar (2016) started this new strand of papers, estimating the welfare effect of US-state corporate taxes in a spatial equilibrium framework with mobile workers and firms. Using reduced-form and structural estimates they show that firm owners bear roughly 40% of the incidence, while workers and landowners bear 30-35% and 25-30%, respectively. The related study by Fuest et al. (2018) estimates the incidence of corporate taxes on wages, exploiting the German institutional set-up described above. As discussed, they focus purely on wage effects and find negative responses of worker remuneration to higher business taxes. Their results suggest that workers bear about half of the corporate tax burden through lower wages. Giroud and Rauh (2019) estimate the effect of US-state taxes on business activity of multi-state firms. They find negative, short-run employment elasticities of -0.4 for C-corporations, which are subject to the corporate tax. Half of the effect is driven by reallocation of productive resources to other states drives within the firm. Finally, Garrett et al. (2019) study the effect of accelerated depreciation policies, which provide incentives comparable the ones induced by corporate tax cuts, on employment and earnings. Adopting a local labor markets approach, they show that larger drops in investment costs lead to an increase in employment and earnings. Moreover, they emphasize the importance of local labor markets for their effects.

I contribute to these studies by providing estimates on the employment effects of business taxes in the long-run and for various worker types. Moreover, I highlight the interplay

of labor demand shocks and local labor supply elasticities, using compelling variation in local tax rates provided by the German institutional setting. My findings have important implications, supporting existing and long-standing theoretical arguments that the mobility of production factors is crucial when analyzing the real effects of corporate taxation. In this context, the jurisdictional level at which a tax is set has been neglected in the discussion. Clearly, the regional tax setting level affects the appropriate mobility assumption. In fact, with labor mobility increasing over time – across municipalities, U.S. state borders, and within the European Union or the Americas – the channel shown in this paper might become increasingly relevant in the future, even for business taxes set on higher jurisdictional and/or geographical levels.

Secondly, the study modestly adds to the enormous literature on labor supply elasticities. The elasticity of labor supply is a key behavioral parameter in labor and public economics having important implications for welfare analysis (Eissa et al., 2008) and optimal taxation (Diamond and Saez, 2011). A long and extensive literature has estimated labor supply elasticities using different methodological approaches. Those range from structural continuous models (Hausman, 1981; MaCurdy et al., 1990) or discrete choice labor supply models (Hoynes, 1996; Bargain et al., 2011) to reduced from, quasi-experimental identification strategies (e.g. Eissa and Hoynes, 2004).

I contribute to this literature by exploiting quasi-experimental variation at a low level of geography to trace out labor supply curves for different worker groups. Hence, this is one of the first papers to estimate local labor supply elasticities for different workers types. Moreover, I contribute by exploiting labor demand shocks to trace the respective workers' labor supply curves.

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