

## Corporate Taxes Reduce Investment: New Evidence from Germany

Sebastian Link, Manuel Menkhoff, Andreas Peichl, Paul Schüle

### Key Messages

- Firms react to increases in corporate taxes by investing less than previously planned: a one percentage point increase in corporate taxes is associated with a cut in firm investment of around three percent.
- Each additional Euro of tax revenues comes at the cost of a decrease in firm investment of more than 2 Euro.
- If taxes are increased during a recession, the magnitude of the investment response is twice as large.
- These findings have implications for the assessment of the corporate tax system and the optimal design of fiscal federalism.



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# Corporate Taxes Reduce Investment: New Evidence from Germany

*Sebastian Link, Manuel Menkhoff, Andreas Peichl, Paul Schüle \**

Due to the COVID-19 pandemic and the war in Ukraine, governments around the world are struggling with expanding debt levels. In Germany, for example, the debt to GDP ratio increased by more than 10 percentage points from 2019 to 2021<sup>1</sup>, not yet including the economic impact of the war in Ukraine. As debt rises, governments are facing increasing pressure to create further fiscal revenues. Key proposals to do so are raising taxes for individuals (e.g. Ayaz et al. 2022) or for firms.

However, raising taxes creates a trade-off: while in the short term, higher taxes may lead to additional tax revenues, it may also reduce investment and therefore inhibit economic growth, resulting in lower tax revenues in the long term. While the theoretical predictions on this effect of taxes on investment are clear (Hall and Jorgenson, 1967), empirical evidence is still scarce.

This policy brief provides novel empirical evidence on the causal effect of increasing corporate taxes on firm investment, based on our recent working paper (Link et al. 2022).<sup>2</sup> The study combines unique data on investment plans and their realizations of firms in the German industrial sector and data on more than 1,400 local tax changes in the specific system of business taxation in Germany.

We show that firms reduce their investments if corporate taxes were increased. An increase of corporate tax rates to stabilize fiscal revenues would be especially costly during recessions. We conclude that fiscal policy should therefore avoid higher corporate taxation in times of economic crisis. Moreover, our results have implications for the optimal design of fiscal federalism in Germany. Strong dependencies of municipalities on local business tax revenues should be avoided, as they can be very harmful during recessions.

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<sup>1</sup> See <https://www.bundesbank.de/en/press/press-releases/deutsche-staatsschulden-888504>

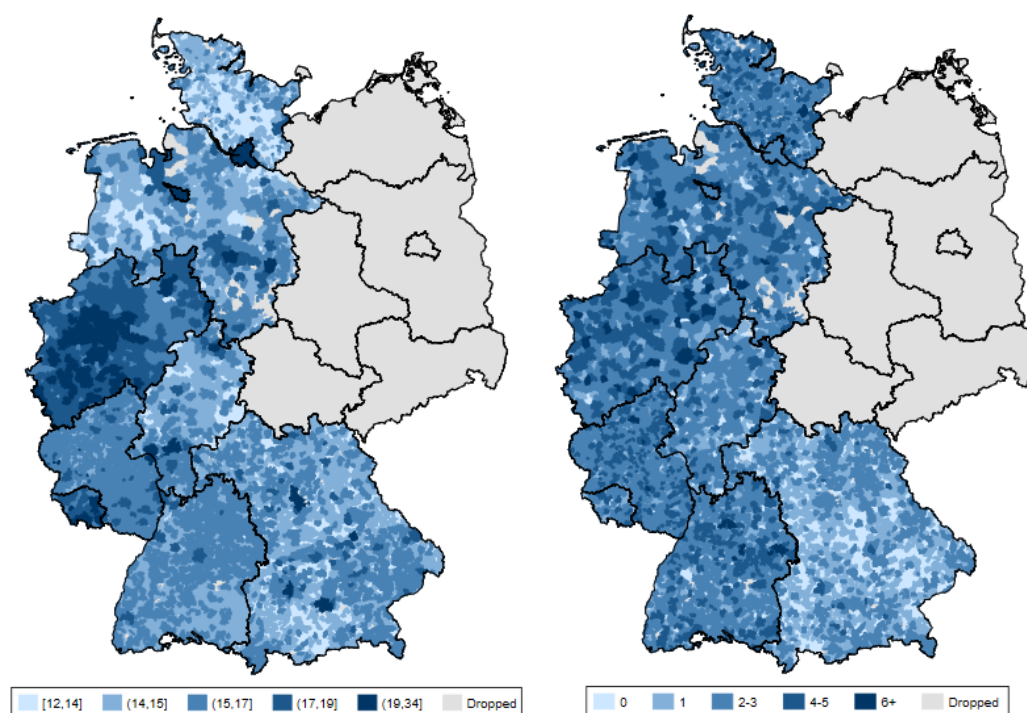
<sup>2</sup> For details regarding our methodology and data, we refer the reader to Link et al. (2022).

## The Local Business Tax System in Germany

The local business tax (LBT) is a tax on business income in Germany. The tax rate consists of two components: a basic rate, which is determined by the federal government, and a local scaling factor, which is set at the municipal level. Each year, the municipal council has to vote on next year's scaling factor, even if it remains unchanged. As municipalities in our sample are much more likely to increase rather than decrease their local scaling factor, we rely on tax changes induced by municipalities increasing their local scaling factor, henceforth referred to as a tax hike.

We use information on municipal tax scaling factors from the Statistical Offices of the German Federal States for the years 1980 to 2018. To avoid capturing structural changes of the German reunification, and as data for East Germany are only available since 1990, we restrict our sample to West German municipalities.

**Figure 1: Variation in Local Business Tax Rates (1980-2018)**



Notes: This figure shows the cross-sectional and time variation in municipal scaling factors of the German local business tax (LBT). The map on the left plots the average LBT rate (in percent) induced by different scaling factors for the period 1980-2018. The map on the right indicates the number of tax hikes, defined as an increase of the scaling factor. Municipalities in light grey areas are dropped from the sample as they are either located in East Germany or underwent a change of boundaries due to a merger. Moreover, we exclude observations where a tax hike was followed or preceded by another tax hike in the next or last two years.

Figure 1 shows variation in LBT rates across municipalities and over time. As displayed in the map on the left, average tax rates vary substantially between municipalities, ranging from 12 to 34 percent. The figure on the right displays the identifying variation we rely on, i.e. the number of tax hikes between 1980 and 2018. Only few municipalities never increased the LBT in this period, while the median municipality increased the LBT rate two times.

## Measuring the Impact of Tax Changes on Firm Investment

To measure firm investment in these municipalities, using microdata from the ifo Investment Survey (IVS), a representative survey of incorporated firms in the German manufacturing sector. Since its inception in 1955, the survey is conducted by the ifo Institute biannually in spring and fall. The repeated panel structure of the IVS allows us to follow approximately 1,500 firms over time. Importantly, the IVS not only elicits ex-post realizations of investment, but also the planned volume of investment for the subsequent year. By comparing planned to realized investments, we observe whether firms in each year invested more, less, or the same amount as previously planned. As municipalities announce LBT changes at the end of each year, i.e. after the fall survey, firms' investment plans do not include information about changes in the LBT.

Our analysis relies on 1,436 tax hikes in 797 municipalities that are distributed rather uniformly across four decades (1980-2018). The hypothesis guiding our analysis is that firms surprised by the announcement of a tax hike in December will on average invest less in the subsequent year than previously planned. We therefore expect downward revisions of planned investments to be more frequent in municipalities that increased their local scaling factors. At the same time, firms' investment plans elicited in the fall should incorporate all other, potentially unobserved, information influencing investment in the subsequent year. We are therefore confident that omitted variables do not threaten identification in our setting.

We use the natural logarithm of the ratio between realized and planned investment volumes to measure investment revisions (log revision ratio), enabling us to take the magnitude of each revision into account. The resulting estimates from the log revision ratio directly translate into the semi-elasticity of investment with respect to the tax rate, as on average firms invest approximately as much as previously planned. For details on the identification strategy, estimation of the impact and several robustness checks, please see Link et al. (2022).

## Results: Cuts in Firm Investment after Tax Hikes

Overall, we find a clear and statistically significant negative effect of increases in corporate tax rates on investment responses by the firms. That is, firms affected by a tax hike strongly revise their investment decisions within the same year. Our results suggest that a one percentage point increase in the LBT rate is associated with a decrease in the ratio of realized over planned investment by around three percent.<sup>1</sup>

### Effects Larger in Recessions

In contrast to most other quasi-experimental evaluations of the effect of corporate taxes on investment behavior, the long panel dimension of our data in combination with the occurrence of multiple local tax changes in each year allows us to analyse potential heterogeneity in effect sizes over the business cycle.<sup>2</sup> That is, we analyse the heterogeneity of the effect of a tax change on corporate investment in periods of recession and normal times. We classify a recession year if at least on quarter of the year is defined as a recession by the German Council of Economic Experts. Municipalities are as likely to raise taxes in recessions as in normal times. However, while in normal times the share of firms that invest less than previously planned increases by 2 percentage points in years of a tax hike, this figure almost triples to between 5 and 7 percentage points during recessions. This finding also holds in several robustness tests.

### Economically Sizable Response of Investment

The effect of tax increases on corporate investment is economically sizable. To illustrate the economic significance of the estimated effects, we conduct a back-of-the-envelope calculation. According to our estimates, 2.12 Euro of firm investment are lost already in the first year after a tax hike for each additional Euro of tax revenues raised. In recession years, the investment even decreases by 4.24 Euro for each additional Euro of tax revenue. Although these projections rely on several simplifying assumptions and are thus subject to a high degree of uncertainty, they illustrate that the foregone volume of investment is non-negligible.

<sup>1</sup> See Table 1 in the Appendix for details of the regression results. The largest value of 3.5 refers to the most restrictive set of fixed effects in the OLS regression model as shown in column (5) of Table 1. Since in the absence of a tax hike firms invest approximately as much as they have planned, the ratio of realized over planned investment is close to one. The log of the ratio is close to zero. Hence, our estimates directly map into a semi-elasticity of investment with respect to the LBT of more than three percent.

<sup>2</sup> Therefore, we can evaluate whether the treatment effect is state dependent. Potential channels for this state dependence of tax shocks are discussed in Link et al. (2022). These include uncertainty about expected returns to investments, cashflow sensitivity, and the role of tax incidence.

## Policy Conclusions

Our findings have direct policy implications as they support the countercyclical Keynesian notion of “do not increase taxes during recession”. This has further implications for the optimal design of fiscal federalism: The current German system of local business taxation is inefficient, as the strong reliance on LBT revenues can force municipalities to increase taxes even in recessions, when this is especially harmful. Moreover, the cyclicity of municipal revenues does not make sense given the tasks allocated to municipalities that do not change over the business cycle (or might even need higher spending during recessions because of responsibilities at the municipal level like social assistance).

In terms of forgone investments, it would hence be especially costly if corporate tax rates were increased to stabilize fiscal revenues in turbulent economic times like the current crisis. The results do not directly speak in favour of corporate tax decreases to stimulate investment as our estimates are based on increases in the statutory corporate tax rate. Rather than changing corporate tax rates, prior studies have shown that targeted tax policies, such as accelerated depreciation rules that are revenue neutral, are more promising when it comes to stimulating investment and find strong responses of firms (e.g. Zwick and Mahon, 2017; Curtis et al., 2021). Consequently, we recommend a combination of stable corporate tax rates with such targeted tax policies to balance the trade-off between fiscal revenues and economic growth in the medium term.

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## Appendix

**Table 1: Difference-in-Differences: Investment Revisions after a Tax Hike.**

	(1)	(2)	(3)	(4)	(5)
Tax Hike	-0.026*	-0.029**	-0.028*	-0.029**	-0.035**
	(0.015)	(0.014)	(0.015)	(0.014)	(0.017)
Constant	-0.035***	-0.035***	-0.035***	-0.035***	-0.034***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
N	34552	34552	34552	34552	34552
Year FE	-	Yes	-	Yes	-
Firm FE	-	-	Yes	Yes	Yes
Year x State FE	-	-	-	-	Yes
Year x Industry FE	-	-	-	-	Yes

Notes: This table reports estimates from linear OLS regressions. Standard errors in parentheses are clustered at the municipality level. Levels of significance: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .