Small Firms and Corporate Taxes: Effects on (Real) Economic Outcomes*

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Abstract

What is the impact of corporate taxes on investments, production and input use among small firms? We study these questions by exploiting a sizable 4.5 percentage-point corporate tax rate cut in Finland in 2014. We use detailed administrative data and a differences-in-differences method utilizing small privately held corporations as our treatment group (tax rate cut) and similar partnerships as a control group (no changes in taxes). We find no response in new investments after the corporate tax rate cut. However, we observe a significant increase in annual sales (3.7%) and variable costs (6.7%). These results suggest that corporate tax rates have a direct effect on the extent of business activity among small firms but they have little or no effect on their overall stock of productive capital.

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1 Introduction

During the last decade, many developed countries have reduced their corporate tax rates in order to prompt economic activity and growth. Just recently, the US reduced drastically its corporate tax rate from 35% to 21% in 2017. In addition, various other investment stimuli have been introduced in many countries, such as more favorable deduction and depreciation rules. These reforms have reduced the cost of capital and relaxed the financial constraints of firms, creating incentives for new investments and increased business activity. This development has also activated researchers to study the effects of these reforms using quasi-experimental methods and administrative data, focusing mostly on investment responses and the incidence of corporate taxes (see Yagan 2015; Suarez Serrato and Zidar 2016; Zwick and Mahon 2017; Ohrn 2018; Fuest et al. 2018; Maffini et al. 2019; Liu and Mao 2019).

Despite this recent surge in empirical evidence, many key questions are still unanswered. There is only a scarce quasi-experimental evidence on the impacts of corporate taxes, a central parameter in policy debate considered to be a key factor in affecting investments and firm growth. Also, many of the earlier papers focus on analyzing incentives that are targeted at specific types of firms or industries, such as bonus depreciations and special tax deductions. Consequently, there is a lack of knowledge on how changes in firm-level incentives that affect the firm population on a larger scale, such as a corporate tax cut, affect investments and economic activity of firms. Furthermore, evidence on the impact of financial incentives among smaller firms is very limited, even though these firms are argued to play a key role in spurring economic growth and employment (see, e.g. Decker et al. 2014).

We contribute to the literature by providing novel evidence of the effects of a corporate tax cut on small firms. We study a large 4.5 percentage-point reduction in the corporate tax rate in 2014 in Finland. This tax cut is considerable, and approximately five times larger than the average corporate tax rate variation used in Fuest et al. (2018) who study the corporate tax incidence in Germany. This exogenous variation together with high-quality administrative data covering all Finnish businesses enable us to analyze the effect of the tax cut on a range of key firm-level response margins. Moreover, the corporate tax cut in Finland was combined with a dividend tax increase that left the shareholder-level effective dividend tax rate mostly unchanged, allowing us to focus solely on the effects of firm-level taxes. In general, firm-level taxes are argued to be more relevant for new investment and growth. According to the new view of dividend taxation, the dividend tax rate does not affect the marginal cost of

capital that determines the level of new investment but the corporate tax rate does (Auerbach, 1979).

Our analysis focuses on small firms with annual sales below 2.5 million euros. We use a differences-in-differences method utilizing similar-sized and otherwise very comparable partnership firms with no changes in taxes as a control group for small corporations, allowing for credible and transparent identification. We follow the weighting estimation procedure used by Yagan (2015) and Zwick and Mahon (2017) to ensure the comparability of the outcomes between the organizational forms.

First, we show that the development of our several outcome variables follow parallel trends for the treatment (corporations) and control (partnerships) groups prior to the corporate tax cut, ensuring the validity of our empirical approach. Then, we study the effect of the reform on new investment, a main outcome of interest explored in both theoretical and empirical corporate tax literature. Importantly, we also examine the impact of the tax cut on other outcomes reflecting the business activity of firms, including sales, labor costs, input use, value added and firm entry. These outcomes are particularly relevant for small and growing firms, but are rarely studied in the previous literature.

We find no significant investment responses to the large corporate tax rate cut, neither for young nor older firms. Instead, we find a clear increase in sales and inputs for the treated corporations, implying a higher growth rate after the corporate tax rate cut. These results suggest that the overall business activity of small firms increased after the reform while investments into the stock of productive capital did not. Our results highlight that physical investments is not the only relevant firm-level behavioral margin when studying the impact of corporate tax rates among small and growing firms, as also the overall business activity can be affected.

We find that the responses are driven by entrepreneurs who actively work and manage their own firms. This indicates that the reform increased entrepreneurial effort among those firms where the main owner is in close connection to business operations and decisions. We believe that this is the main mechanism driving the observed responses, a channel that has not been studied before in the corporate tax literature. Moreover, we find no differences in responses for more or less cash constraint firms and no effects on firm entry, implying that these potential channels do not explain our results.

Our results contribute to the existing literature in many ways. First, we contribute to the large literature studying the effects of financial incentives on investments. Most

of the previous quasi-experimental empirical literature exploits targeted variation in investments incentives, such as bonus depreciations and special tax deductions, aimed at boosting investments in particular industries or groups of firms. This branch of literature commonly estimates very large investment responses. Ohrn (2018) uses changes in deduction regulation in the US and finds a large investment response and an implied elasticity of investments of 6.5. House and Shapiro (2008) and Zwick and Mahon (2017) use changes in depreciation rules in the US and find significant investment responses and very large investment elasticities, 7.7 and 7.2, respectively. Maffini et al. (2019) find similar results from the UK. In this paper, we use variation that is not targeted at specific types of firms or investment categories and find an insignificant investment response and elasticity estimate. Hence, our results show that the investment response to the corporate tax rate can be very different compared to targeted incentive effects.

Moreover, only few previous papers study investment responses of universal business tax reforms using firm-level data. Yagan (2015) studies the massive 2003 dividend tax cut in the US and finds a large response in dividend payments but no effect on new investments, indicating a very small elasticity of investments with respect to dividend tax rates. However, according to our knowledge, our paper is the first that uses firm-level data and quasi-experimental variation to study the investment effects of a universal cut in the corporate tax rate.

In addition, we study relatively small firms that have argued to hold a key role in economic development and employment growth (Decker et al., 2014). Therefore, learning about the responsiveness of these firms is highly relevant but still relatively understudied, although some exceptions exist (see e.g. Benzarti et al. 2019). Our results suggest that firm-level incentives are indeed important for the growth of small firms. Furthermore, we study the responses separately for firms with active and passive main owners. According to our results, the role of the owner-manager is crucial for businesses activity and growth. This shows that the evidence presented in a recent paper by Smith et al. (2019), highlighting the importance of active owners on firm performance in the US, is particularly relevant for smaller firms.

This paper proceeds as follows. In Section 2, we describe the corporate tax system in Finland. In Section 3, we provide the details of the data and discuss our methods. Section 4 presents the results and Section 5 concludes.

2 Institutions

In this paper, we study the effects of a large corporate tax rate cut in Finland. The tax rate for corporate profits was reduced by 4.5 percentage points from 24.5 to 20% from January 2014. This reform is a continuation of a decreasing trend in corporate tax rates in Finland and in many other developed countries. For example, corporate taxes were cut in Germany in 2008, the UK in 2008, 2011, 2012 and 2013, Sweden in 2009, Canada in 2008-2012, and the US in 2017.

In Finland, the cut in the corporate tax was implemented together with a dividend tax increase, thus reducing only firm-level taxes on profits while leaving the owner-level effective tax rates largely unaffected. Therefore, the reform mainly affected incentives for investments funded with retained earnings or debt, while the cost of capital for new equity (share issues) remained mostly unchanged or faced only a modest increase.

The corporate tax rate cut affected all public and privately held corporations, but other organizational forms were unaffected by the reform. The 2014 tax rate cut was preceded by a smaller 1.5 percentage-point tax cut in 2012. We examine both of these reforms, but focus mainly on the latter and larger reform. These recent changes in the corporate tax rate are illustrated in Table 1.

A privately held corporation is the most common organizational form for businesses in Finland, covering nearly half of all Finnish firms. Privately held corporations are separately tax-liable, meaning that their profits are taxed at the firm level according to the corporate tax rate. Owners of privately held corporations pay an additional tax on the income withdrawn from the firm.

We use partnership firms as a control group for small corporations in our empirical analysis. Next, we briefly describe the main differences in the taxation of these two organizational forms in Finland. Partnership is a pass-through entity, meaning that their profits are taxed only at the owner level. Therefore, the corporate tax rate does not affect them. However, for both privately held corporations and partnership firms, the income withdrawn from the firm is taxed at the owner-level by similar principles. Both tax schedules are progressive in nature, and a certain share of income is taxed at a capital income tax rate for both firm types, based on the predetermined imputed return on the net assets (assets minus debt) of the firm.

Next, we briefly describe the main details of the taxation of income withdrawn from the firm for both organizational forms. For a privately held corporation, income withdrawn from the firm can be paid to the owner either as wages or dividends. In

Finland, wage and capital income are taxed according to different tax rate schedules. The wage tax schedule is progressive, top marginal tax rates being approximately 55%. Dividends below a predetermined firm net asset threshold are taxed with a capital income tax rate. In 2014, the net asset threshold was decreased from 9% to 8% of firm net assets, and the effective tax rate (corporate tax + dividend tax) for dividends below this threshold was increased from 24.5% to 26% (or 26.4% if capital income exceeded 30,000 euros). The progressive wage tax schedule is applied to any dividends exceeding this computational imputed return on net assets, and there were no notable changes in the wage tax schedule at the time of the reform. Altogether, these changes increased the owner-level effective marginal dividend tax rate by approximately 1.5 percentage points for a typical owner of a small privately held corporation. Therefore, the impact of the reduction in the corporate tax rate was for a large part offset at the owner-level by this increase in the effective dividend tax. As an additional detail, the flat tax rate on dividends below the net assets threshold increases to 40.4% (41.8%) above a monetary threshold of 150,000 euros. This threshold was increased from 60,000 to 150,000 euros in 2014, thus reducing the effective tax rate on dividends for the owners of firms with large net assets. However, due to the sample limitations described in more detail below, privately held corporations with large net assets are not included in our baseline analysis.

Owners of partnership firms also have a net asset threshold in their income tax schedule. Profits that fall under the 20% firm net assets threshold are taxed according to the capital income tax schedule, and any income above the threshold is taxed as wage income of the owner.[1] In 2012, the effective marginal tax rate for profits below the net assets threshold was slightly increased from 26.6% to 28.5% (30,4% if capital income exceeds 30,000 euros). Importantly, there were no changes in the taxation of partnership firms at the time of the 2014 corporate tax rate cut. Therefore, partnership firms constitute a suitable comparison group for privately held corporations that faced the corporate tax rate cut in 2014. The tax rates for the owners of partnership firms are described in Table 2.

Finally, there were no other changes in business taxation at the time of the corporate tax cut. For example, depreciation rules and the corporate tax base remained unchanged. Furthermore, the depreciation rules are similar for both of the organizational forms, and the investment costs are depreciated over their lifetime following

[1]Net assets of partnership firms are defined as assets - debt + 30% of labor costs, while corporations follow a simpler assets - debt definition.

the investment category specific regulations of the Finnish Tax Administration.

3 Data, Methods and Identification

We use data from the Finnish Tax Administration including all Finnish privately held corporations and partnerships in 2008–2016. These data enable us to access a wide range of firm-level outcomes such as investments, sales, labor costs and other input categories. In addition, we link firm owners to their firms using unique identifiers. The owner-level data include information on, for example, income withdrawn from the firm and the ownership share of the firm. We restrict our sample to firms that are owned by individuals, and thus exclude firms that are owned by institutional investors or hedge funds etc. We use these data in an unbalanced panel form.

We use a differences-in-differences method to study the effects of the corporate tax cut. The main outcomes we study are investment per lagged capital, sales, variable costs, labor costs and value added of the firm. Our baseline estimable equation is of the following form:

$$Y_{it} = \alpha_1 + \alpha_2(Treat_i \times Post_t) + \beta_i + \lambda_t + \varepsilon_i \tag{1}$$

where Y is the outcome variable of interest, i refers to a firm and t is time. The treatment group ($Treat$) is privately held corporations and the control group is partnership firms. $Post$ refers to the period after the reform (from 2014 onward). We include firm and year-fixed effects (β_i, λ_t) in the baseline estimation, and ε is the error term. Standard errors are clustered at the firm level.

The main identifying assumption in our differences-in-differences approach is the parallel trends assumption. This means that in the absence of the corporate tax cut, the development of firm outcomes would have been similar among corporations and partnerships. To ensure that the firms are comparable between the organizational forms, we apply two modifications: we restrict our sample to small firms and use a re-weighting strategy to better match small corporations to similar-sized partnerships.

Our baseline sample includes firms with previous year's annual sales between 100,000–2,500,000 euros and net assets below 750,000 euros. We restrict the sample due to the much longer tail of the size distribution among corporations compared to partnerships, stemming from the fact that a majority of large firms in Finland are corporations. Therefore, partnership firms offer a suitable comparison group only

for relatively small corporations. Furthermore, we drop the smallest firms from the sample in order to focus on full-time businesses and more established firms.[2]

Table 4 describes the summary statistics for the restricted sample. The sales variable contains net-of-tax annual sales of the firm. Investments refer to the purchase price of all newly installed capital assets. These include, for example, machinery and buildings. Labor costs include gross wages and other related costs such as mandatory pension contributions (excluding individual-level income taxes). Variable costs refer to all other costs than fixed costs and labor costs, including intermediate goods, materials and services used in production. Finally, the number of employees denotes the headcount of employees working in the firm within a year. Table 5 presents the detailed definition of each variable we use in our empirical analysis.

Overall, Table 4 shows that while the organizational forms are relatively similar to each other on average, the partnership firms in the restricted sample are still slightly smaller. Furthermore, both corporations and partnerships operate in similar industries, as shown in Figure 1, but there are some differences in the shares of firms in each industry category between the organizational forms. Therefore, in our baseline regression specification, we follow Yagan (2015) and Zwick and Mahon (2017) and use a re-weighting strategy based on DiNardo et al. (1996) to better match small privately held corporations to partnership firms.

First, we assign each observation to one of the ten industry categories presented in Figure 1. Then, we divide each industry category into three size groups based on annual sales. This creates 30 different industry-size bins for both organizational forms for each year. Finally, each bin is weighted to match the base-year sample of privately held corporations in 2011. Thus, following DiNardo et al. (1996), the final weight w_{bg} of observation i in a group $b \cap g$ is

$$w_{bg} = \frac{\Pr\left(i \in b \cap \bar{g} \mid i \in \bar{g}\right)}{\Pr\left(i \in b \cap g \mid i \in g\right)} \tag{2}$$

where the industry-size bins are denoted by b and the corporate-form-year groups are denoted by g. $\bar{g}$ denotes the base firm group (privately held corporations in 2011). The term in the numerator denotes the industry-size-bin weight in the base-group

[2]The sales limit is based on the 99th percentile of the sales of partnerships. The net asset limit is chosen to ensure that firms are affected by the owner-level taxes in a similar way, i.e. we do not include the owners of corporations with large net assets whose dividend tax rate was reduced in 2014, as discussed before in Section 2. Table 3 presents the number of observations dropped when implementing these restrictions. The exact sales and net assets limits do not affect our results in a meaningful manner, as discussed in more detail in Section 4.

of corporations in 2011. The term in the denominator is the the observed weight. By dividing the base weight with the observed weight we obtain the weight factors. Intuitively, the weight factor is higher than one if the share of the firms in this group is lower than in the base group, and vice versa.

After restricting the sample and applying the re-weighting strategy, we can test the parallel trends assumption by comparing the evolution of our main outcome variables prior to the corporate tax cut for both organizational forms. As shown below in Section 4, this assumption holds for all the main outcomes we consider. The fact that the variables follow parallel trends reasonably well prior to the reform validates our empirical approach and mitigates the potential concern that small firms between the organizational forms would not be comparable.

To further test and improve the comparability of the organizational forms over time, we add a linear trend for the treatment group prior to the reform ($Treat_i \times Year$) in some specifications. In addition, we control for the potential impact of the small corporate tax cut in 2012 by adding a separate control for this for the treated corporations ($Treat_i \times Year_{2012,2013}$), where we interact the treatment status with the years right after this reform.

Finally, the corporate tax rate cut increased incentives for existing partnership firms to change their organizational form to corporations. This would be a concern for our empirical setting if such responses would be prevalent. However, Figure 2 shows that this is not the case. We observe only 0.2–0.3% of partnership firms changing their organizational form from partnership to privately held corporation each year, and more importantly, there is no change in this share at the time of the reform. Therefore, we believe that this is not an issue for our empirical analysis.

4 Results

4.1 Investments

We begin by studying the effects of the corporate tax rate cut on investments. A corporate tax cut affects investment decisions by decreasing the cost of capital. In addition, a reduction in the corporate tax rate increases the amount of retained earnings available for new investment. The corporate tax cut was executed together with an adjustment to dividend tax rates such that the owner-level taxation was largely unaffected. According to the new view of dividend taxation, dividend tax rate

does not affect the marginal cost of capital that determines the level of investment, whereas the corporate tax does (Auerbach, 1979). The reason for this is that, at the margin, new investment is financed by retained earnings.[3]

Figure 3 shows the differences-in-differences estimates for the ratio of new investments divided by lagged capital assets in 2008–2016 relative to year 2011. The re-weighting strategy described in Section 3 is used in the estimation.[4] First, the figure illustrates that there is no significant difference in investments between corporations and partnerships before the reform, demonstrating that pre-reform trends are parallel between the groups. After the reform, the difference in investments is close to zero and very stable, indicating no significant investment response to the large corporate tax cut in 2014. In addition, the figure shows no response to the smaller corporate tax rate cut implemented in 2012, two years prior to the larger reform. Finally, Figure 12 in the Appendix shows the unweighted estimates, confirming the conclusion of no significant investment effects after the 2014 tax rate cut even when not using the re-weighting strategy as in Figure 3.

Table 6 quantifies the size of the estimates for investments per lagged capital using different regression specifications. Column (1) shows the estimates with firm and year-fixed effects and controlling for the 2012 reform. Column (2) adds a separate linear pre-reform trend for the treatment group. Column (3) shows the estimates when using the re-weighting approach described above without including pre-reform trends. Finally, Column (4) contains all controls included in columns (1)–(3). The differences-in-differences estimates in all of these specifications show only small effects, approximately 1.5% relative to mean investments per lagged capital, and none of the estimates are statistically significant. Therefore, the regression results confirm the graphical evidence presented above.

Moreover, Figure 4 shows the share of firms with positive new investments in both firm groups in 2008–2016, illustrating the extensive margin of investment decisions. The figure shows no change in the share of corporations investing after 2014, thereby suggesting no extensive margin responses to the reform. Overall, these results indicate

[3]The net cost of investment funded with retained earnings is reduced by dividend taxes with the exactly same dividend tax rate at which the return is eventually taxed. Therefore, these two effects cancel out and leave the rate of return unaffected by dividend taxes. However, this does not necessarily hold for newly entered or young firms since dividend taxes increase the required return for new equity (Auerbach, 1979). To further study the role of this margin for our results, we also show the results separately for newly established and older firms below.

[4]Figure 13 in the Appendix shows the development of weighted investments per lagged capital in levels separately for both corporations and partnerships.

that the corporate tax cut did not cause an increase in investments among small firms, at least in the short run.

In order to compare our investment responses to the previous literature, one feasible approach is to use the implied estimates to calculate the elasticity of investments with respect to the net-of-tax rate. In Figure 5, we include an investment elasticity estimate with respect to the net-of-corporate tax rate calculated from our analysis and then collect some of the most recent quasi-experimental estimates on investment elasticities in the literature. The estimated elasticities from our analysis are presented in Table 6. Depending on the specification, the point estimates vary between 0.23–0.58 but are clearly statistically insignificant in all specifications. The comparison in Figure 5 indicates that the investment elasticities derived in the earlier literature mostly relying on variation in targeted investment incentives are quite large, as shown in the first four estimates from the left in the figure. However, the elasticity is much smaller in our study where the variation stems from a more universal tax rate reform, implying an elasticity of investment closer to zero.

A potential caveat concerning our negligible investment effects is that young and newly established firms might be more prone to raise new equity instead of using debt or own equity to finance their investments. In this case, the corporate tax rate cut would not necessarily improve investment incentives. Since we are studying relatively small firms, it could be that young firms are driving the obtained zero result. However, when we split our sample by the age of the firm in Table 7, we find no evidence that the investment response would be larger for older firms. If anything, younger firms seem to be more responsive in terms of new investments after the tax rate cut, but the estimates are still small and statistically significant only at the 10% level.

4.2 Economic Activity

Next, we focus on outcomes that reflect the overall business activity of firms. In addition to investment responses, the corporate tax rate cut could induce other types of responses. Given the key role of small and growing firms in spurring economic development and employment (Decker et al. 2014), understanding the responsiveness of these firms by studying other margins than investments is highly relevant. Although the dividend tax increase mostly offsets the corporate tax cut at the owner-level, the corporate tax cut still creates a mechanical cash injection to the firm that could positively impact the overall business activity. Relatedly, entrepreneurial effort could play an important role in the economic activity of small firms, as the role of the owner

can be particularly relevant in firms with a smaller number of employees. A corporate tax cut can directly impact the incentives of the owner even when the owner-level tax burden remains unchanged. First, owners of small firms are likely able to utilize the firm as a source for private spending, meaning that they can, at least to some extent, translate retained earnings of their firm into personal consumption (see e.g. La Porta et al. 2000 and Bennedsen and Wolfenzon 2000). Moreover, previous literature shows that firm owners are active in using various means to avoid taxes. In particular, owners can dynamically plan the timing of dividend payments to reduce the overall tax burden (see e.g. le Maire and Schjerning 2013). Therefore, by improving the financial incentives of the owner, the corporate tax rate cut could impact the growth of these firms through a larger effort of the owner.

Figure 6 presents the differences-in-differences estimates to illustrate how firm-level sales, variable costs, labor costs and value added (sales minus variable costs and labor costs) responded to the corporate tax cut. As before, the estimates in the figure include firm fixed effects and utilize the re-weighting strategy.[5] First, the figure confirms that the comparison between partnerships and corporations is feasible, as the trends in the outcomes follow each other closely before the reform. The only small deviation from this pattern is in year 2009, when the evolution of the outcomes for corporations were slightly behind those of partnership firms.

After 2014, firm-level sales for corporations increase significantly relative to partnerships. Also, we find a similar increase in variable costs, and a small increase in labor costs. The observed increase in sales, therefore, suggests that the tax cut boosted overall firm production. Moreover, the increased variable costs confirm that the activity increase represents a real response instead of a reporting response related to tax evasion.[6] However, as we find no change in value added, our results indicate no increase in productivity (or profitability) of the firms. Furthermore, we observe no responses in sales or other variables to the smaller corporate tax rate cut implemented in 2012, as the effects are visible only after the larger tax cut in 2014. Finally, Figure 14 in the Appendix shows the unweighted estimates. The figure underlines

[5]Figure 15 in the Appendix shows the development of the weighted outcomes in levels separately for both firm groups.

[6]In general, the corporate tax rate cut reduces the benefits from tax evasion and sales underreporting. Therefore, an increase in reported sales could also reflect this type of a response. Also, an increase in sales could reflect income shifting behavior where increased reported profits of the firm would replace some of the wages paid to the owner. However, an associated increase in reported variable costs implies that firms respond by increasing their true output instead of these pure evasion or avoidance responses.

that without the re-weighting strategy, the parallel pre-trend assumption does not appear to hold in years prior to 2011. Therefore, the weighting procedure (or controlling for the pre-trend) is essential for guaranteeing the causal interpretation of the differences-in-differences estimates.

Table 8 shows the differences-in-differences estimates for all four outcomes presented in Figure 6. The table presents the results for our preferred specification that uses the re-weighting strategy and controls for the pre-trend for the treatment group. These results confirm the visual observations from Figure 6: there is a statistically significant increase in sales and variable costs after the reform. In terms of magnitudes, the sales response represents a 3.7% increase relative to the mean sales of corporations, and a 6.7% increase in variable costs. Furthermore, the point estimates for both labor costs and value added are positive but not statistically significant.[7] Moreover, the clear responses in other economic activity measures than capital investments illustrate that the corporate tax cut was relevant for small corporations, meaning that the negligible investment effect cannot be explained by, for example, unawareness or inattention to taxes.

Finally, all of the above specifications included firm fixed effects, concealing a potential entry effect of new firms. Therefore, to ensure that we are not disregarding any potential effects on new business creation, we also examine the entry decisions of firms. Figure 7 plots the share of new corporations and partnership relative to existing firms in 2008–2016 and Table 9 tabulates the number of all firms and the share of new firms. Overall, during the last decade, a privately held corporation has been a more popular organizational form for new firms, but the share of new firms has been decreasing in both groups over time. There appears to be no significant change in this longer-run trend that could be clearly associated with the 2014 corporate tax cut. Therefore, we conclude that the corporate tax cut did not accelerate new business creation, although this evidence is mostly descriptive.[8]

[7] Our measure for labor costs includes wages paid to the main owner. The point estimate for labor costs excluding the owner's wage is positive and remains insignificant but is approximately half the size compared to the estimate including all wages paid by the firm.

[8] In addition, the corporate tax rate cut could affect the exit of firms if, for example, larger firms would buy out smaller firms in a larger extent after the tax cut than before it. However, Table 9 shows that there is no clear reduction in the number of existing firms after 2014, suggesting that this type of an effect does not appear be significant.

4.3 Mechanisms

The results above show that small corporations responded to the tax cut by increasing their overall production, but not by increasing their investments in physical capital. An increase in output without an increase in investment may seem unintuitive given that there was no significant reduction in the owner-level tax burden. However, as discussed above, there are at least two potential underlying mechanisms that could explain these results.

First, as we focus on small firms, a significant share of the firms in our sample may be facing cash constraints. After the tax cut, the net-of-tax retained earnings of firms increased mechanically even absent any behavioral responses. Therefore, as a result of such a cash injection, the liquidity constraints may be loosened and the firms could now have more liquid funds to boost their business activity. This would show as an increased output of the firm.

Next, we study whether more cash constraint firms drive the observed responses. We define a cash constraint based on the share of liquid financial assets (cash, stock holdings) relative to the total assets of the firm in 2010–2011[9], and divide our sample into firms below and above the median (0.26) of this variable. Figures 8 and 9 present the results for more and less cash constraint firms. The figure shows that there are no significant differences in responses between more or less cash constraint firms. Therefore, this channel appears not explain our findings on increased business activity after the tax cut. Tables 10 and 11 present the associated differences-differences estimates for more and less cash constraint firms using the full set of controls, which confirm the visual observations.

The second potential channel arises from the effort of the main owner. In a recent paper, Smith et al. (2019) find that entrepreneurial effort and human capital of the owner can largely explain the success of firms in the US. As we are studying relatively small firms with, on average, only few employees and relatively small capital assets (see Table 4), entrepreneurial effort is likely to have a particularly significant impact on the firms in our sample. Relatedly, owners of small firms who are more closely connected to firm operations are presumably more be able to utilize the firm as a source for private spending (see e.g. La Porta et al. 2000 and Bennedsen and Wolfenzon 2000) and engage in dynamic tax planning procedures (see e.g. le Maire and Schjerning 2013), as discussed above. This suggests that owner-level incentives

[9]The group is defined base on the firm's average cash-to-assets ratio in 2010 and 2011. For firms with a single observation from those years it is set based on that.

are more likely to be stronger for owners who hold a more active role in the firm.

In our data, we observe if the owner of the firm is an active manager-worker, such as CEO or chairman of the board, or a more passive investor.[10] Our hypothesis is that if the effort of the owner is an important factor explaining our results, we should observe a larger increase in business activity among firms with active manager-workers compared to those with more passive owners.

Figure 10 plots the estimates for investments, sales, variable costs and labor costs for corporations with active owner-managers in comparison to partnerships. Figure 11 shows the same outcomes comparing corporations with other types of owners to partnerships. The figures show that corporations with active owner-managers are indeed the group that increased business activity after the reform, as we find a significant increase in sales and variable costs for this group. In contrast, there is no response for corporations with more passive owners. As before, we find no impact on investments for either of the groups. These results offer evidence that the entrepreneurial effort is likely to be a key driver behind the observed increase in economic activity. Tables 12 and 13 present the associated regression estimates using the full set of controls for all of the outcomes, which confirm the visual observations from Figure 10.

Moreover, Figures 16 and 17 in the Appendix present the results for firms with active owners separately for more or less cash constrained firms using similar sample divisions rule as above. The figure shows that the responses are similar regardless of cash constraints also for active owner-managers, suggesting that the role of the owner in the firm is the key driver of our results. Finally, Tables 10 and 15 in the Appendix presents the associated differences-differences estimates for more and less cash constraint firms using the full set of controls, which confirm the visual observations.

4.4 Robustness checks

TO BE ADDED HERE

[10] Active owner-managers include those who, by themselves or together with family members, own at least 30% of the firm and hold an active leading position in their firm. This classification is based on the Finnish pension insurance regulations, as these active owner-managers are insured with different regulations compared to other corporate owners. Therefore, we have a reliable register-based indicator in our data for classifying entrepreneurs into more active and passive corporate owners. See Benzarti et al. (2019) for more details on the pension insurance regulations and evidence of how entrepreneurs in Finland respond to changes in insurance contribution rules.

5 Discussion

In this paper, we document how small privately held corporations respond to a sizable 4.5 percentage-point corporate tax rate cut. We find no significant impact of the tax cut on investments when comparing small corporations to otherwise similar partnership firms that were unaffected by the tax cut. This implies that reducing the corporate tax rate is not an effective measure to spur capital investments among small firms, at least in the short or medium run. However, we find a clear and significant increase in sales (3.7%) and input usage (6.7%). We find that these effects are driven by firms that are owned by active owner-managers. This result suggests that the entrepreneurial effort is an important factor for the business activity of small firms and that seems to explain our results more than e.g. firm-level liquidity constraints. Overall, our results illustrate that the owners of small firms are responsive to corporate taxes and that small firms may respond to tax cuts also on other relevant margins than investments.

References

Alan J. Auerbach. Wealth maximization and the cost of capital. *Quarterly Journal of Economics*, pages 433–46, 1979.

Morten Bennedsen and Daniel Wolfenzon. The balance of power in closely held corporations. *Journal of Financial Economics*, 58(1):113 – 139, 2000. ISSN 0304-405X. doi: https://doi.org/10.1016/S0304-405X(00)00068-4. URL http://www.sciencedirect.com/science/article/pii/S0304405X00000684. Special Issue on International Corporate Governance.

Youssef Benzarti, Jarkko Harju, and Tuomas Matikka. Does mandating social insurance affect entrepreurial activity? *American Economic Review: Insights*, Forthcoming, 2019.

Ryan Decker, John Haltiwanger, Ron Jarmin, and Javier Miranda. The role of entrepreneurship in us job creation and economic dynamism. *Journal of Economic Perspectives*, 28(3):3–24, September 2014. doi: 10.1257/jep.28.3.3. URL http://www.aeaweb.org/articles?id=10.1257/jep.28.3.3.

John DiNardo, Nicole M. Fortin, and Thomas Lemieux. Labor market institutions and the distribution of wages, 1973-1992: A semiparametric approach. *Econometrica*, 64(5):1001–1044, 1996. URL http://www.jstor.org/stable/2171954.

Clemens Fuest, Andreas Peichl, and Sebastian Siegloch. Do higher corporate taxes reduce wages? micro evidence from germany. *American Economic Review*, 108(2):393–418, February 2018. doi: 10.1257/aer.20130570. URL http://www.aeaweb.org/articles?id=10.1257/aer.20130570.

Christopher L. House and Matthew D. Shapiro. Temporary investment tax incentives: Theory with evidence from bonus depreciation. *American Economic Review*, 98(3):737–68, June 2008. doi: 10.1257/aer.98.3.737. URL http://www.aeaweb.org/articles?id=10.1257/aer.98.3.737.

Rafael La Porta, Florencio Lopez-de Silanes, Andrei Shleifer, and Robert W. Vishny. Agency problems and dividend policies around the world. *The Journal of Finance*, 55(1):1–33, June 2000.

Daniel le Maire and Bertel Schjerning. Tax bunching, income shifting and self-employment. *Journal of Public Economics*, 107(1):1–18, 2013. URL https://EconPapers.repec.org/RePEc:eee:pubeco:v:107:y:2013:i:c:p:1-18.

Yongzheng Liu and Jie Mao. How do tax incentives affect investment and productivity? firm-level evidence from china. *American Economic Journal: Economic Policy*, 11(3):261–91, August 2019. doi: 10.1257/pol.20170478. URL http://www.aeaweb.org/articles?id=10.1257/pol.20170478.

Giorgia Maffini, Jing Xing, and Michael P. Devereux. The impact of investment incentives: Evidence from uk corporation tax returns. *American Economic Journal: Economic Policy*, 11(3):361–89, August 2019. doi: 10.1257/pol.20170254. URL http://www.aeaweb.org/articles?id=10.1257/pol.20170254.

Eric Ohrn. The effect of corporate taxation on investment and financial policy: Evidence from the dpad. *American Economic Journal: Economic Policy*, 10(2):272–301, May 2018. doi: 10.1257/pol.20150378. URL http://www.aeaweb.org/articles?id=10.1257/pol.20150378.

Matthew Smith, Danny Yagan, Owen Zidar, and Eric Zwick. Capitalists in the twenty-first century. *Quarterly Journal of Economics*, Forthcoming, 2019.

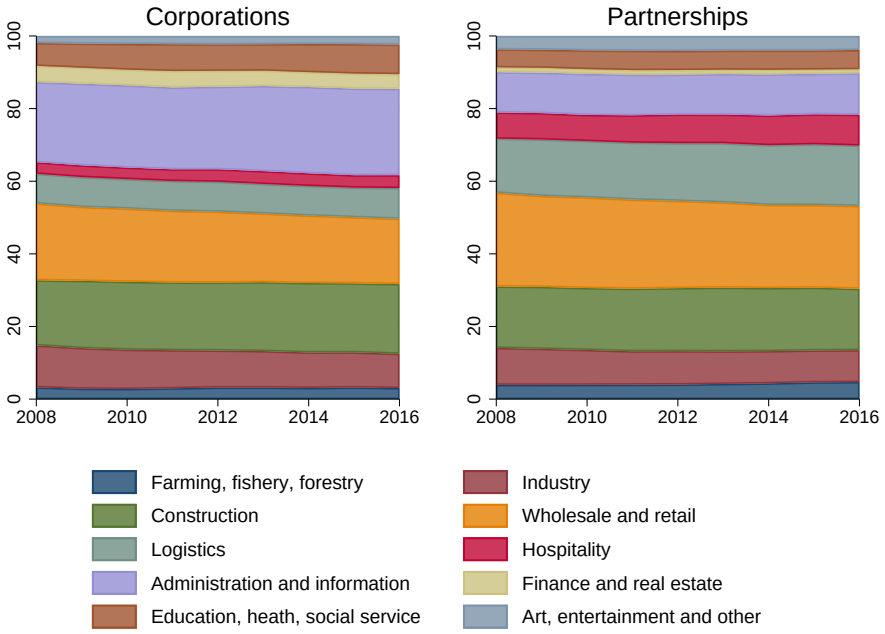
Juan Carlos Suarez Serrato and Owen Zidar. Who benefits from state corporate tax cuts? a local labor markets approach with heterogeneous firms. *American Economic Review*, 106(9):2582–2624, September 2016. doi: 10.1257/aer.20141702. URL http://www.aeaweb.org/articles?id=10.1257/aer.20141702.

Danny Yagan. Capital tax reform and the real economy: The effects of the 2003 dividend tax cut. *American Economic Review*, 105(12):3531–63, December 2015. doi: 10.1257/aer.20130098. URL http://www.aeaweb.org/articles?id=10.1257/aer.20130098.

Eric Zwick and James Mahon. Tax policy and heterogeneous investment behavior. *American Economic Review*, 107 (1):217–48, January 2017. doi: 10.1257/aer.20140855. URL http://www.aeaweb.org/articles?id=10.1257/aer.20140855.

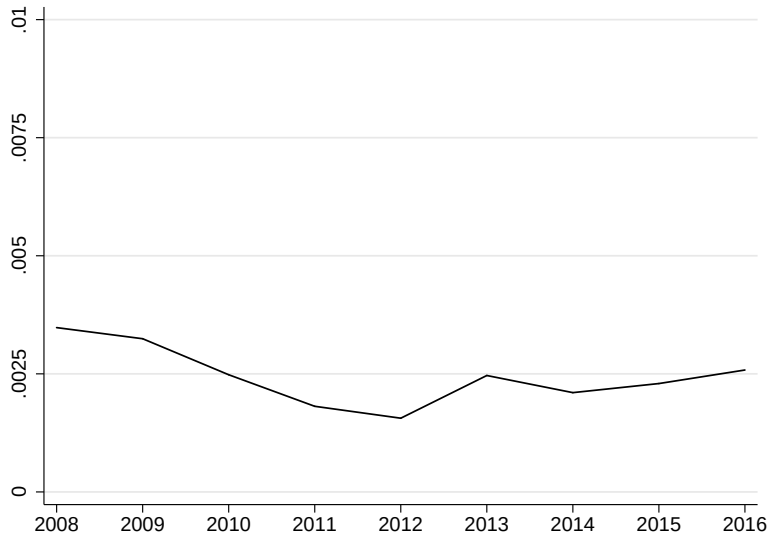
Figures

Figure 1: Shares of firms in different industries, corporations and partnerships



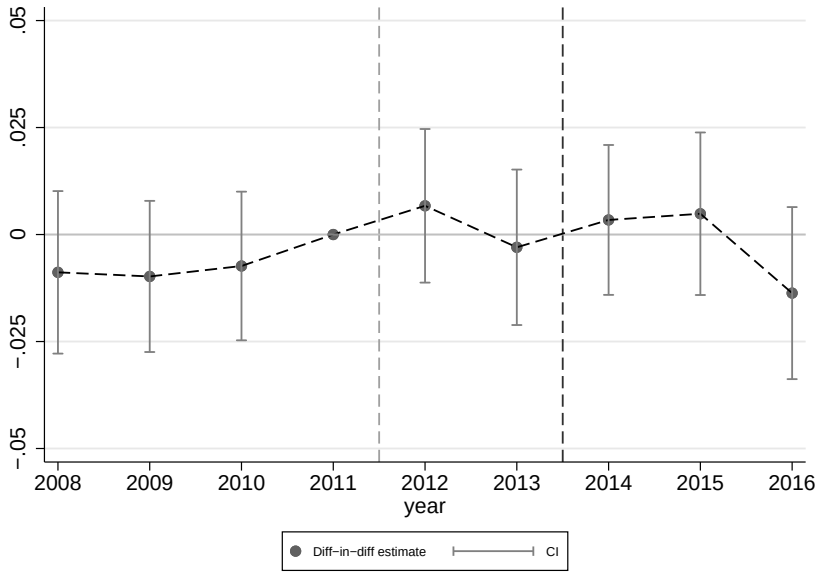
Note: Figure presents the shares of firms in different industry categories for both corporations and partnerships in the restricted sample in 2008–2016.

Figure 2: The annual share of partnership firms that change their organizational form to corporation, 2008–2016



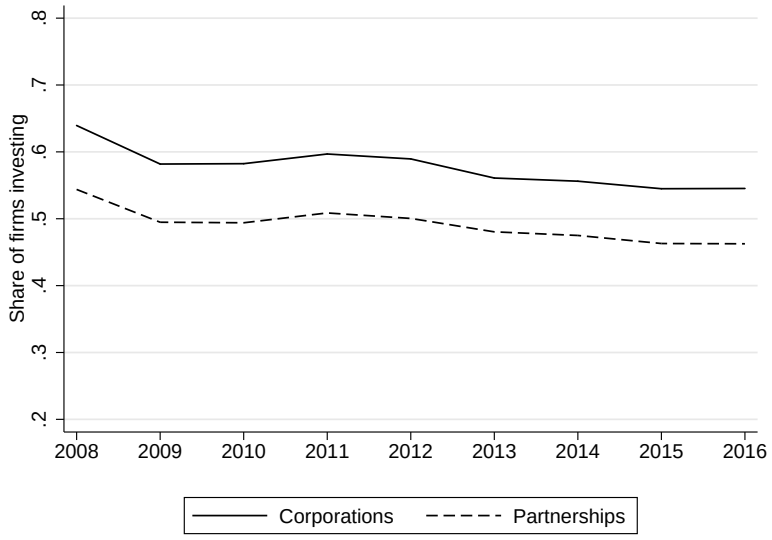
Note: Figure shows the share of partnership firms that change their organizational form to corporation in 2008–2016. The figure illustrates that this share is very small, around 0.25% each year, and that there is no significant change in the share at the time of the 2014 corporate tax cut.

Figure 3: Estimates for investment per lagged capital, 2008–2016



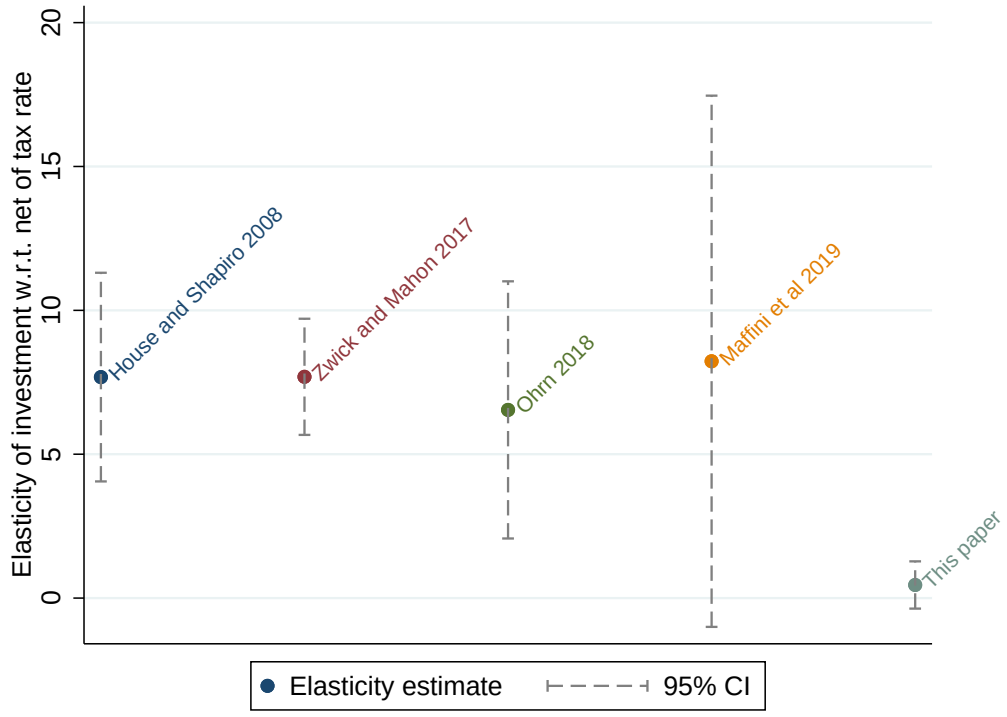
Note: Figure shows the differences-in-differences estimates and 95% confidence intervals for investments per lagged capital relative to year 2011 using the baseline restricted sample in 2008–2016. The regression includes firm-fixed effects and uses the re-weighting strategy presented in Section 3. The first vertical line denotes the small tax cut in 2012, and the second line the larger tax rate cut from 24.5 to 20% in 2014.

Figure 4: Firms with positive investments (extensive margin), 2008–2016



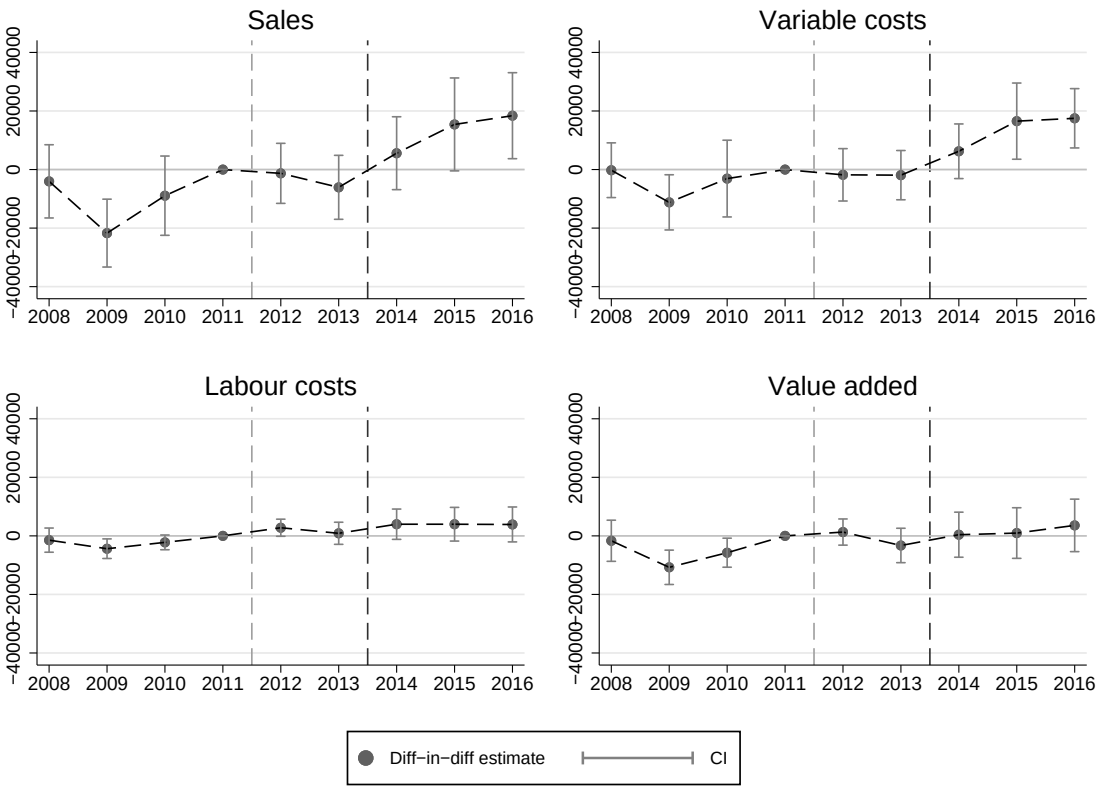
Note: Figure shows the shares of firms with positive annual investments for both corporations and partnerships in 2008–2016. Overall, the share of firms investing is relatively stable throughout the period, and there is no significant change in the share of corporations with positive investments after the 2014 tax reform.

Figure 5: Elasticity of investment with respect to the net-of-tax rate



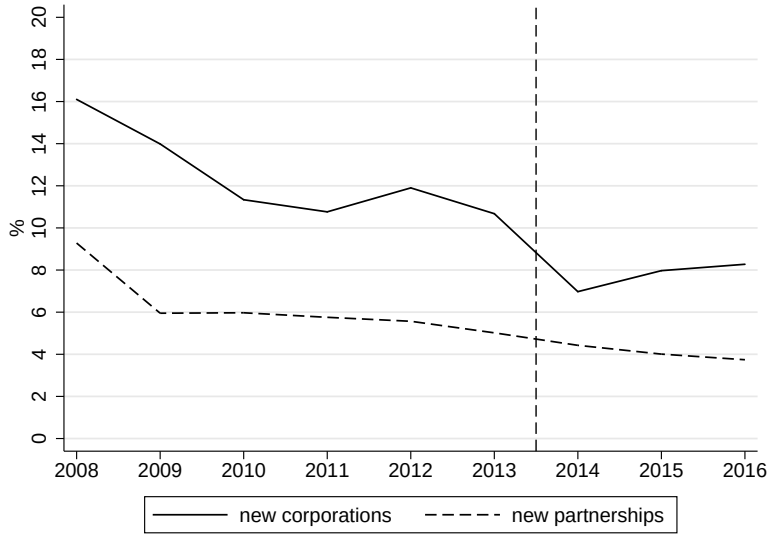
Note: Figure presents the investment elasticity estimates with respect to the net-of-tax rate and the associated 95% confidence intervals presented in the earlier literature and in this study. House and Shapiro (2008) and Zwick and Mahon (2017) study the effects of a temporary accelerated depreciation policy in the US and Maffini et al. (2019) a similar policy in the UK. Ohrn (2018) studies a corporate tax provision (DPAD) in US, which allows firms to deduct a share of domestic manufacturing income from taxable corporate income. The confidence intervals for Zwick and Mahon (2017), Ohrn (2018) and Maffini et al. (2019) are calculated by the authors of this paper using the standard errors for investment effects presented in the original papers. The elasticity estimate for this study included in the figure is presented in column (4) of Table 6.

Figure 6: Estimates for sales, variable costs, labor costs and value added, 2008–2016



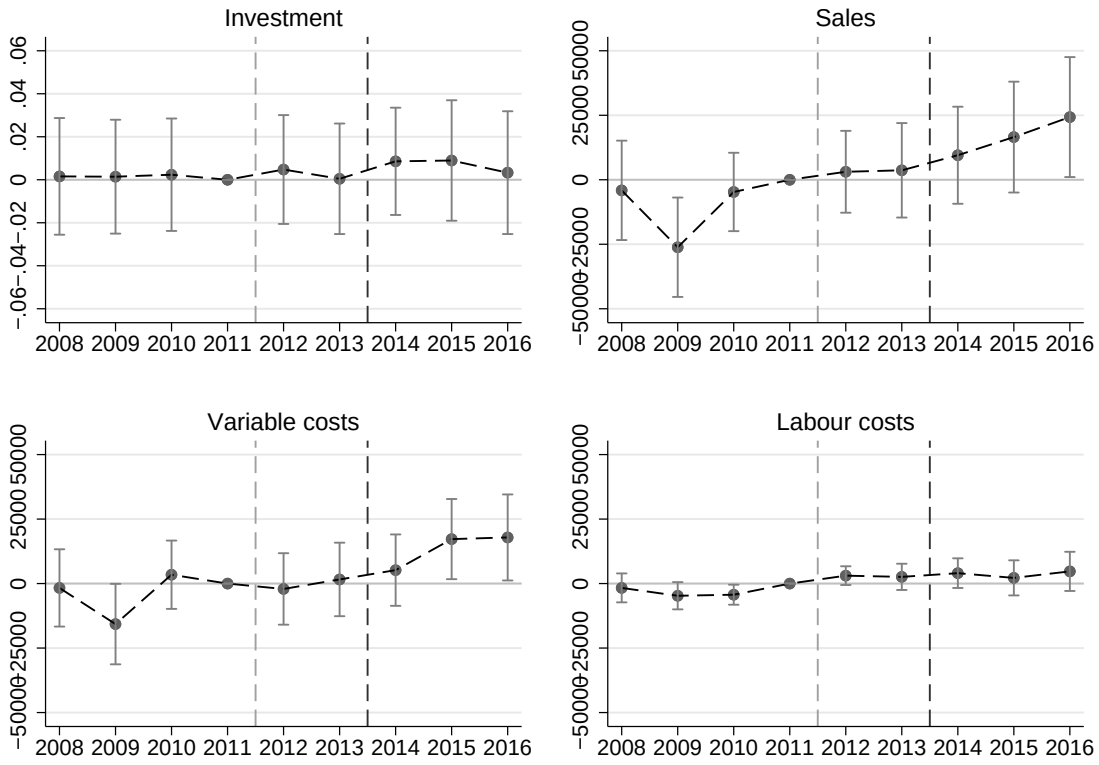
Note: Figure shows the differences-in-differences estimates for firm-level sales, variable costs, labor costs and value added relative to year 2011 using the baseline restricted sample in 2008–2016. The regressions include firm fixed effects and uses the re-weighting strategy presented in Section 3. The first vertical line denotes the small tax cut in 2012, and the second line the larger tax rate cut from 24.5 to 20% in 2014.

Figure 7: Share of new firms, 2008–2016



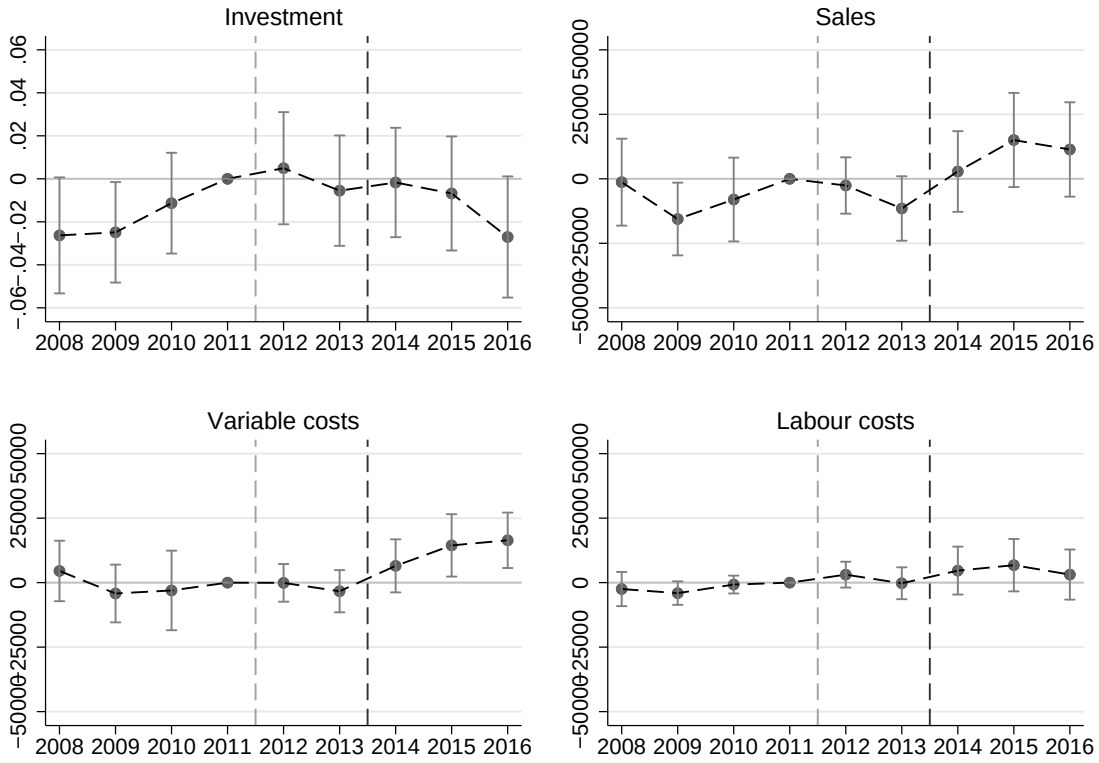
Note: Figure shows the share of new firms relative to the total number of existing firms for both corporations and partnerships. We define firm as a new firm based on the year when the firm is first observed in our tax record data.

Figure 8: Estimates for firms with cash-to-assets ratio below median



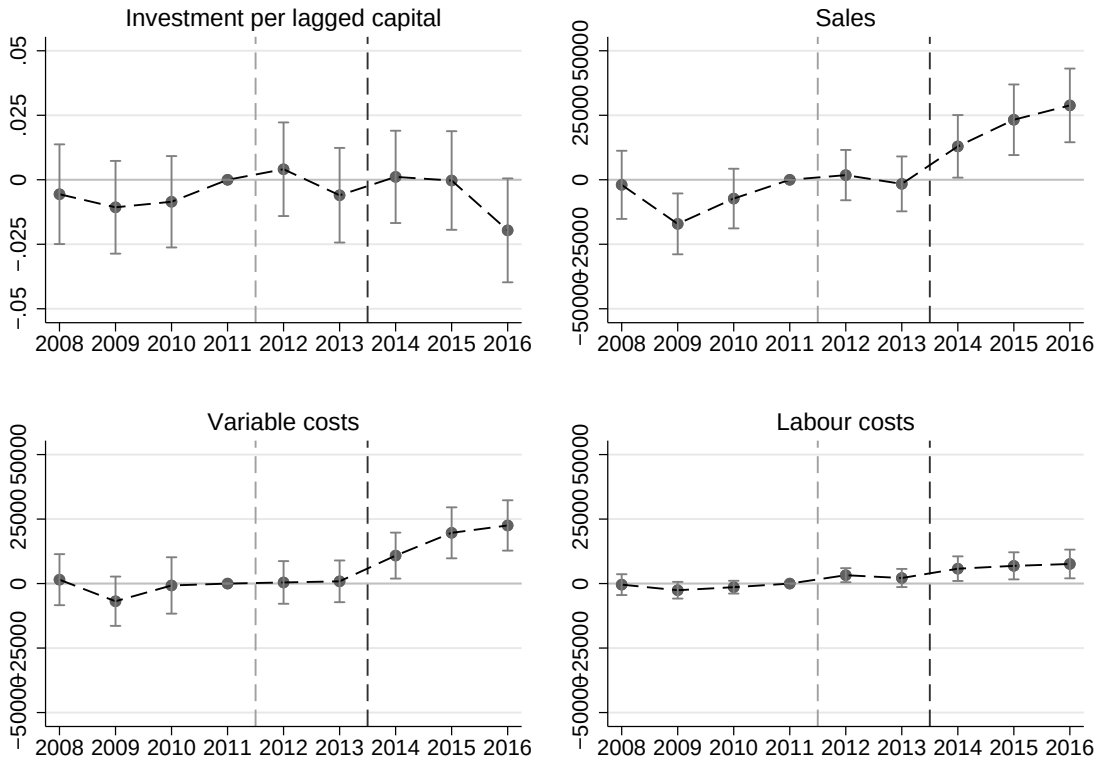
Note: Figure shows the differences-in-differences estimates for investments per lagged capital, firm-level sales, variable costs and labor costs relative to year 2011 for corporations with cash-to-assets ratio below median using the baseline restricted sample in 2008–2016. The regressions include firm fixed effects and uses the re-weighting strategy presented in Section 3. The first vertical line denotes the small tax cut in 2012, and the second line the larger tax rate cut from 24.5 to 20% in 2014.

Figure 9: Estimates for firms with cash-to-assets ratio above median



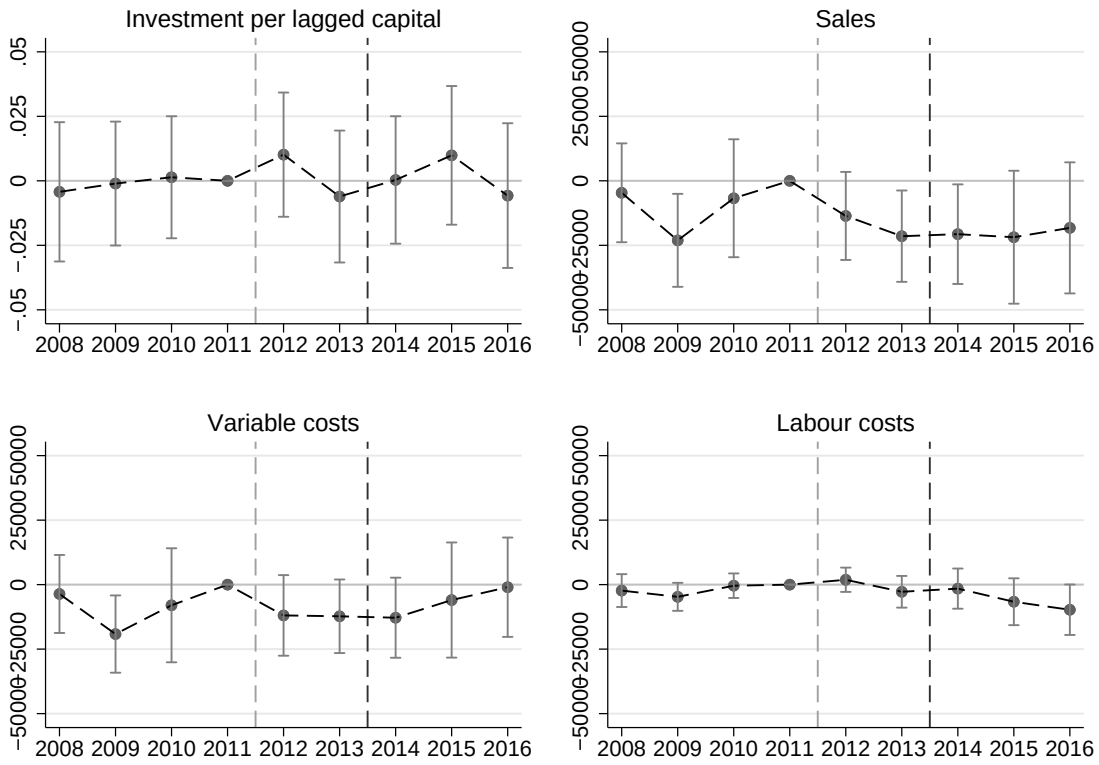
Note: Figure shows the differences-in-differences estimates for investments per lagged capital, firm-level sales, variable costs and labor costs relative to year 2011 for corporations with cash-to-assets ratio above median (0.26) using the baseline restricted sample in 2008–2016. The regressions include firm fixed effects and uses the re-weighting strategy presented in Section 3. The first vertical line denotes the small tax cut in 2012, and the second line the larger tax rate cut from 24.5 to 20% in 2014.

Figure 10: Estimates for active owner-managers



Note: Figure shows the differences-in-differences estimates for investments per lagged capital, firm-level sales, variable costs and labor costs relative to year 2011 for corporations with active owner-managers using the baseline restricted sample in 2008–2016. The regressions include firm fixed effects and uses the re-weighting strategy presented in Section 3. The first vertical line denotes the small tax cut in 2012, and the second line the larger tax rate cut from 24.5 to 20% in 2014.

Figure 11: Estimates for other corporations



Note: Figure shows the differences-in-differences estimates for investments per lagged capital, firm-level sales, variable costs and labor costs relative to year 2011 for corporations with other than active owner-manager as the main owner using the baseline restricted sample in 2008–2016. The regressions include firm fixed effects and uses the re-weighting strategy presented in Section 3. The first vertical line denotes the small tax cut in 2012, and the second line the larger tax rate cut from 24.5 to 20% in 2014.

Tables

Table 1: Corporate tax rates, 2006–2016

2006–2011	26%
2012–2013	24.5%
2014–2016	20%

Note: Table shows the corporate tax rates in 2006–2016.

Table 2: Tax rates of partnership firms, 2006–2016

	Effective tax rate below the 20% net asset threshold	Effective rate above the 20% net asset threshold
2005–2011	26,6%	0-∼55%
2012–2016	28,5/30,4%	0-∼55%

Note: Table shows the tax rates on the profits of partnership firms (taxed at the owner-level) in 2006–2016. The progressive earned income tax rate is applied to profits exceeding the imputed 20% return on firm net assets.

Table 3: Sample restriction – the number of observations excluded from the restricted sample

	Sample restrictions, 2008-2016									
	Restricted		**Below**		**Above**		**Net assets**		**Total**	
	N	Share	N	Share	N	Share	N	Share	N	Share
Corporations	245,436	45.7	95,479	17.8	169,817	31.6	268,73	5.0	537,605	100.0
Partnerships	114,717	37.5	139,879	45.8	43,755	14.3	7,252	2.4	305,603	100.0

Note: Table presents the number and share of observations dropped from the full sample for both organizational forms using pooled data from 2008–2016. Table shows the number and relative share of observations in the restricted baseline sample and the firms dropped from below and above the previous year's sales limit of 100,000–2,500,000, and when excluding firms with previous year's net assets above 750,000 euros, and the total number of observations for both organizational forms in the unrestricted full data.

Table 4: Summary statistics for the restricted sample 2008-2016 (unweighted)

	Corporations			**Partnerships**		
	mean	sd	p50	mean	sd	p50
Sales	558,816	585,737	352,981	337,676	375,074	214,512
Investments	30,333	91,891	1,860	20,746	60,712	0
Labor costs	179,117	209,128	111,701	77,631	111,677	42,999
Variable costs	247,308	390,137	107,477	156,782	267,338	75,081
Employees	6.36	14.21	3	3.90	6.86	2
Individual firms	57,044			22,051		
Observations	245,436			114,717		

Note: Table shows the unweighted descriptive statistics (mean, standard deviation and median) for the key variables in our analysis for corporations and partnership firms included in our baseline restricted sample. The sample includes firms with annual sales between 100,000–2,300,000 euros and previous year's net assets below 750,000 euros. Sales contain gross sales minus VAT and other taxes based on sales volumes. Investments refer to the purchase price of all newly installed capital assets including, for example, machinery and buildings. Labor costs include gross wages and other related costs such as mandatory pension contributions but excludes income taxes. Variable costs include all other costs than fixed costs, including intermediate goods, materials and services used in production. Employees denotes the headcount of employees working in the firm within a year.

Table 5: Definitions of the variables used in the analysis

Variable	Definition
Sales	Gross annual sales of the firm from its primary operating activity minus any discounts given, valued-added taxes, and other taxes based on sales volumes.
Investments	Annual euro value of the gross investments including all newly installed capital assets, such as machinery, buildings and equipment.
Labor costs	Wages and other wage-related compensations paid by the firm, including social insurance contributions paid on wage income but excluding income taxes. This variable is in euros and at the annual level.
Variable costs	Annual euro value of the costs used as intermediate inputs in production, such as materials and services used.
Value added	Annual euro value of sales minus labor costs and variable costs.
Financial assets	Financial assets of the firm include cash, cash in bank, stock holdings, and other liquid funds.
Number of employees	The sum of the number of employees who worked in the firm during the tax year.
Age of the firm	We measure the age of the firm using the first observation in our full tax record data starting from 1998.
Active owner-managers	Active owner-managers include those owners of corporations who, by themselves or together with family members, own at least 30% of the firm and hold an active leading position in their firm. This classification is based on the Finnish pension insurance regulations included in the data. Active owner-managers are insured with different social insurance regulations compared to other corporate owners.

Table 6: Differences-in-differences results: Investment per lagged capital

	(1)	(2)	(3)	(4)
Dif-in-dif estimate	0.003	0.006	0.006	0.008
	(0.004)	(0.004)	(0.006)	(0.006)
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Weighting			X	X
Pre-trend		X		X
Control for 2012 reform	X	X	X	X
Constant	0.286	0.256	0.298	0.279
	(0.002)	(0.010)	(0.003)	(0.013)
r2	0.352	0.352	0.361	0.361
N	324,999	324,999	320,844	320,844
Elasticity	0.229	0.441	0.455	0.580
	(0.298)	(0.308)	(0.419)	(0.428)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Table shows the differences-in-differences estimates and firm-level clustered standard errors (in parentheses) for investments per lagged capital with different estimation specifications. Columns (1) and (2) show the results when not using the re-weighting strategy and when controlling for year and firm-fixed effects and the 2012 reform, and the pre-trend for the period 2008–2013, respectively. Columns (3) and (4) show the same results when using the re-weighting strategy. In addition, the table includes the implied elasticity estimates of investments relative to the net-of-corporate tax rate and the associated standard errors for each specification. None of the elasticity estimates are statistically different from zero.

Table 7: Differences-in-diffferences results: Investment per lagged capital by firm age

	Firms aged 0–10		Firms older than 10	
	(1)	(2)	(3)	(4)
Dif-in-dif estimate	0.026*	0.026*	0.006	0.006
	(0.012)	(0.012)	(0.006)	(0.006)
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Weighting	X	X	X	X
Pre-trend		X		X
Control for 2012 reform	X	X	X	X
Constant	0.343	0.343	0.274	0.274
	(0.007)	(0.007)	(0.003)	(0.003)
r2	0.362	0.362	0.306	0.306
N	116,302	116,302	170,315	170,315

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Table shows the differences-in-differences estimates and firm-level clustered standard errors (in parentheses) for investments per lagged capital for firms of different age using different estimation specifications. Columns (1) and (2) show the results for firms that are younger than or equal to 10 years old, and columns (3) and (4) for firms that are older than 10 years. We define the age of the firm based on the first observation in our full sample tax record data from the year 1998 onward.

Table 8: Differences-in-differences results: Economic activity outcomes

	Sales	Var.costs	Labor costs	Value added
Dif-in-dif estimate	20,798**	16,554***	5,863	5,219
	(6,372)	(4,837)	(3,791)	(3,718)
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Weighting	X	X	X	X
Pre-trend	X	X	X	X
Control for 2012 reform	X	X	X	X
Constant	478,987.32	219,312.32	273,874.40	27,5475.05
	(13,235)	(7,979)	(7,559)	(7,524)
r2	0.86	0.84	0.87	0.87
N	354,461	332,699	332,699	334,666

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Table shows the difference-in-differences estimates and firm-level clustered standard errors (in parentheses) for firm-level sales, variable costs, labor costs and value added. All regressions include firm and year fixed effects, the re-weighting procedure, pre-trend controls and controls for the 2012 reform. Labor cost variable in the table includes the wages paid to the main owner. Excluding owner-level wages reduces the labor cost estimate to 2,437 (2,552). Differences-in-differences estimates when not including the pre-reform trends are similar but slightly larger, being 25,021(6,355) for sales, 18,460(4,819) for variable costs, 8,322(3,782) for labor costs and 7,200(3,710) for value added (standard errors in parenthesis). As shown in Figure 14 in the Appendix, regressions not including the re-weighting procedure are likely to produce inconsistent estimates due to an increasing pre-trend in the outcomes prior to the reform. Overall, the point estimates when not using the weighting strategy are significantly larger than those presented in this table.

Table 9: The share of new firms relative to existing firms (unrestricted sample), 2008–2016

Year	Corporate form									
	Old corp.		Old part.		New corp.		New part.		Total	
	N	%	N	%	N	%	N	%	N	%
2008	46,681	50.7	34,623	37.6	7,517	8.2	3,214	3.5	92,035	100.0
2009	49,061	53.0	34,653	37.4	6,862	7.4	2,062	2.2	92,638	100.0
2010	51,298	55.3	33,679	36.3	5,816	6.3	2,011	2.2	92,804	100.0
2011	53,867	56.9	33,128	35.0	5,798	6.1	1,907	2.0	94,700	100.0
2012	56,028	57.7	32,559	33.5	6,668	6.9	1,813	1.9	97,068	100.0
2013	59,363	60.0	31,720	32.0	6,338	6.4	1,592	1.6	99,013	100.0
2014	55,656	60.7	30,820	33.6	3,882	4.2	1,364	1.5	91,722	100.0
2015	56,105	61.3	29,766	32.5	4,472	4.9	1,193	1.3	91,536	100.0
2016	57,445	62.6	28,435	31.0	4,753	5.2	1,064	1.2	91,697	100.0
Total	48,5504	57.6	289,383	34.3	52,106	6.2	16,220	1.9	843,213	100.0

Note: Table shows the number of existing firms (old) and newly established firms by year in 2008–2016 separately for corporations (corp.) and partnerships (part.) using the unrestricted data. We define firm as a new firm based on the first observation in our unrestricted tax record data.

Table 10: Differences-in-differences results: Firms with cash-to-assets ratio below median

	Investment	Sales	Var.costs	Labor costs
Dif-in-dif estimate	0.006	28319.605**	18142.022**	8355.096**
	(0.008)	(9093.128)	(5989.994)	(3182.075)
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Weighting	X	X	X	X
Pre-trend	X	X	X	X
Control for 2012 reform	X	X	X	X
Constant	0.301***	657570.901***	317632.513***	179464.469***
	(0.004)	(3088.405)	(2201.605)	(938.049)
r2	0.362	0.860	0.829	0.903
N	152162	165116	156832	159630

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Table shows the difference-in-differences estimates and firm-level clustered standard errors (in parentheses) for investment per lagged capital, firm-level sales, variable costs and labor costs. All regressions include firm and year fixed effects, the re-weighting procedure, pre-trend controls and controls for the 2012 reform. Labor cost variable in the table includes the wages paid to the main owner.

Table 11: Differences-in-differences results: Firms with cash-to-assets ratio above median

	Investment	Sales	Var.costs	Labor costs
Dif-in-dif estimate	0.006	19265.899**	14153.257**	9247.307*
	(0.008)	(7368.483)	(5064.904)	(4122.380)
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Weighting	X	X	X	X
Pre-trend	X	X	X	X
Control for 2012 reform	X	X	X	X
Constant	0.295***	498607.830***	208862.658***	153177.235***
	(0.004)	(2874.347)	(2019.309)	(976.637)
r2	0.360	0.856	0.836	0.904
N	168599	189139	175666	183747

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Table shows the difference-in-differences estimates and firm-level clustered standard errors (in parentheses) for investment per lagged capital, firm-level sales, variable costs and labor costs. All regressions include firm and year fixed effects, the re-weighting procedure, pre-trend controls and controls for the 2012 reform. Labor cost variable in the table includes the wages paid to the main owner.

Table 12: Differences-in-differences results: Firms with active owner-managers

	Investment	Sales	Var.costs	Labor costs	Value added
Dif-in-dif estimate	0.001	32,511***	21,162***	10,686***	13,115***
	(0.006)	(5759)	(3,939)	(2,342)	(3,675)
Firm fixed effects	X	X	X	X	X
Year fixed effects	X	X	X	X	X
Weighting	X	X	X	X	X
Pre-trend	X	X	X	X	X
Control for 2012 reform	X	X	X	X	X
Constant	0.311	567,385	257,242	158,743	328,107
	(0.003)	(2,574)	(1,824)	(772)	(1525)
r2	0.369	0.873	0.852	0.910	0.871
N	263,881	290,347	273,310	284,918	273,310

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Table shows the difference-in-differences estimates and firm-level clustered standard errors (in parentheses) for firm-level investment per lagged capital, sales, variable costs, labor costs and value added including only firms with active owner-managers. All regressions include firm and year fixed effects, the re-weighting procedure, pre-trend controls and controls for the 2012 reform.

Table 13: Differences-in-differences results: Firms with other owners

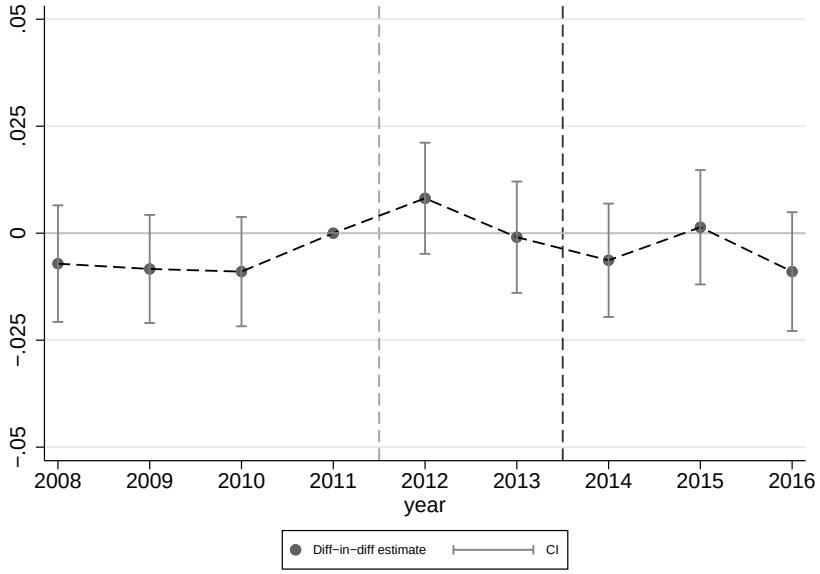
	Investment	Sales	Var.costs	Labor costs	Value added
Dif-in-dif estimate	0.006	-8,528	1,304	-955	-8,306
	(0.008)	(10,116)	(8,212)	(3,876)	(5,656)
Firm fixed effects	X	X	X	X	X
Year fixed effects	X	X	X	X	X
Weighting	X	X	X	X	X
Pre-trend	X	X	X	X	X
Control for 2012 reform	X	X	X	X	X
Constant	0.285	604,467	284,851	170,725	339,833
	(0.005)	(3,626)	(2,724)	(1,230)	(1,995)
r2	0.416	0.874	0.838	0.926	0.915
N	160,619	177,256	166,964	168,515	166,964

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Table shows the difference-in-differences estimates and firm-level clustered standard errors (in parentheses) for firm-level investment per lagged capital, sales, variable costs, labor costs and value added including only firms with passive owners. All regressions include firm and year fixed effects, the re-weighting procedure, pre-trend controls and controls for the 2012 reform.

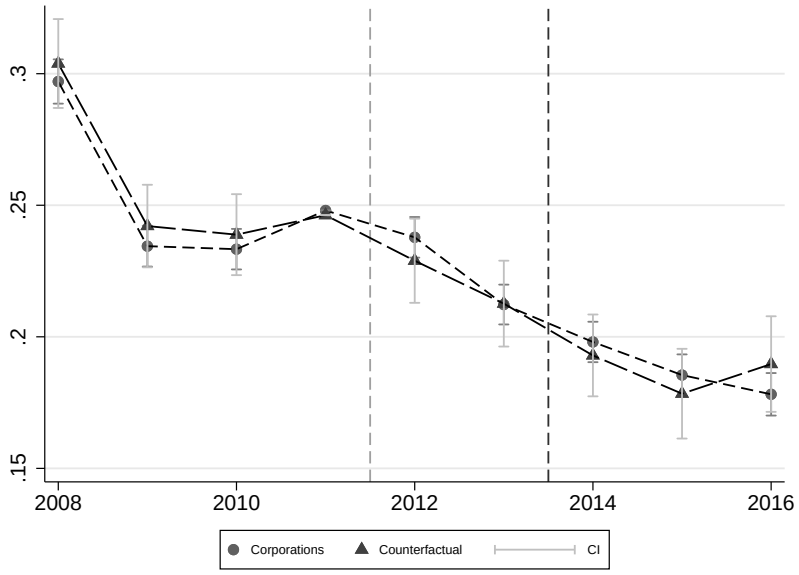
Appendix

Figure 12: Investment per lagged capital - unweighted estimates, 2008–2016



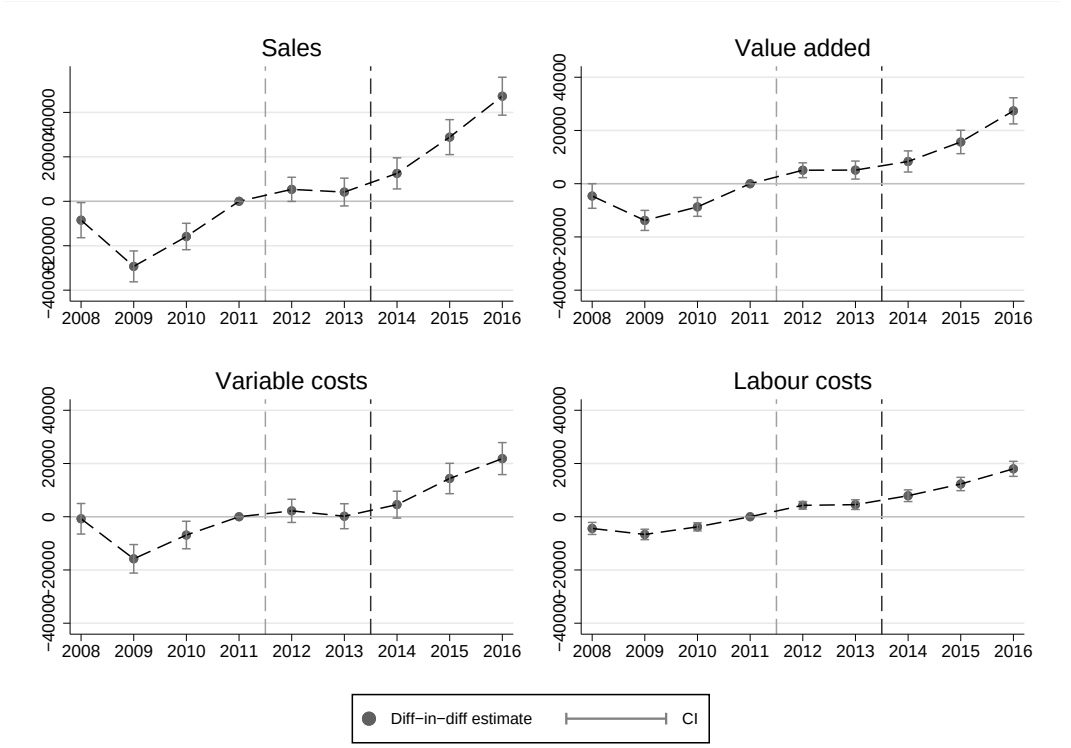
Note: Figure shows the differences-in-differences estimates for investments per lagged capital relative to year 2011 using the baseline restricted sample in 2008–2016. The regression does not use the re-weighting strategy but includes firm-fixed effects.

Figure 13: The development of investment per lagged capital (weighted), 2008–2016



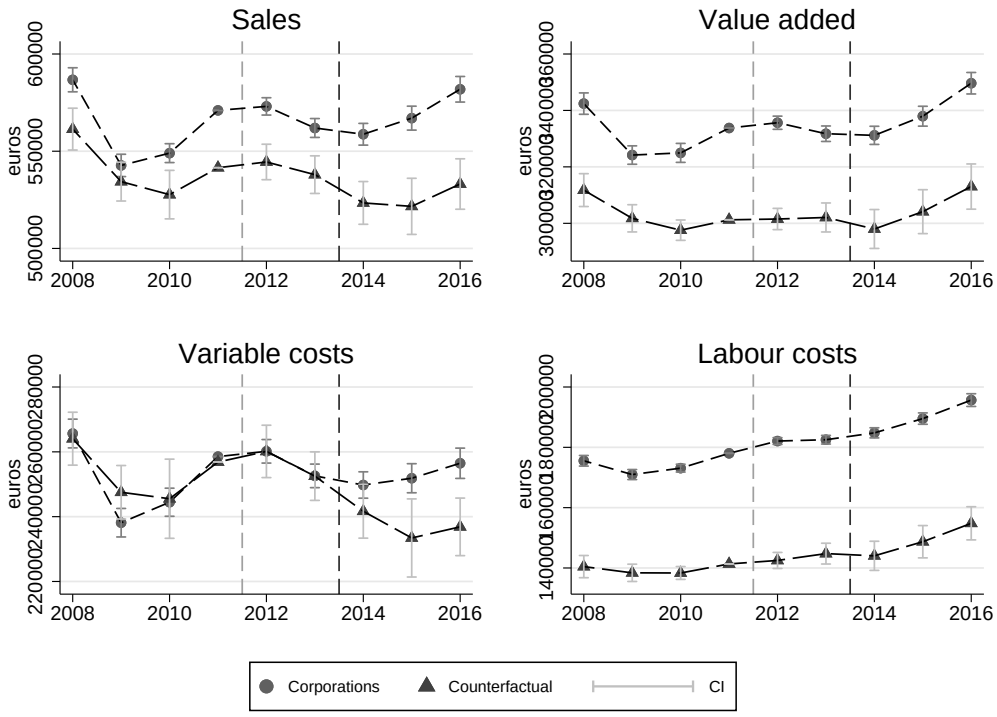
Note: Figure plots the development of the ratio of investment per lagged capital assets in 2008–2016 for corporations and partnerships using the restricted sample using the re-weighting procedure and firm fixed effects.

Figure 14: Sales, variable costs, labor costs and value added - unweighted estimates, 2008–2016



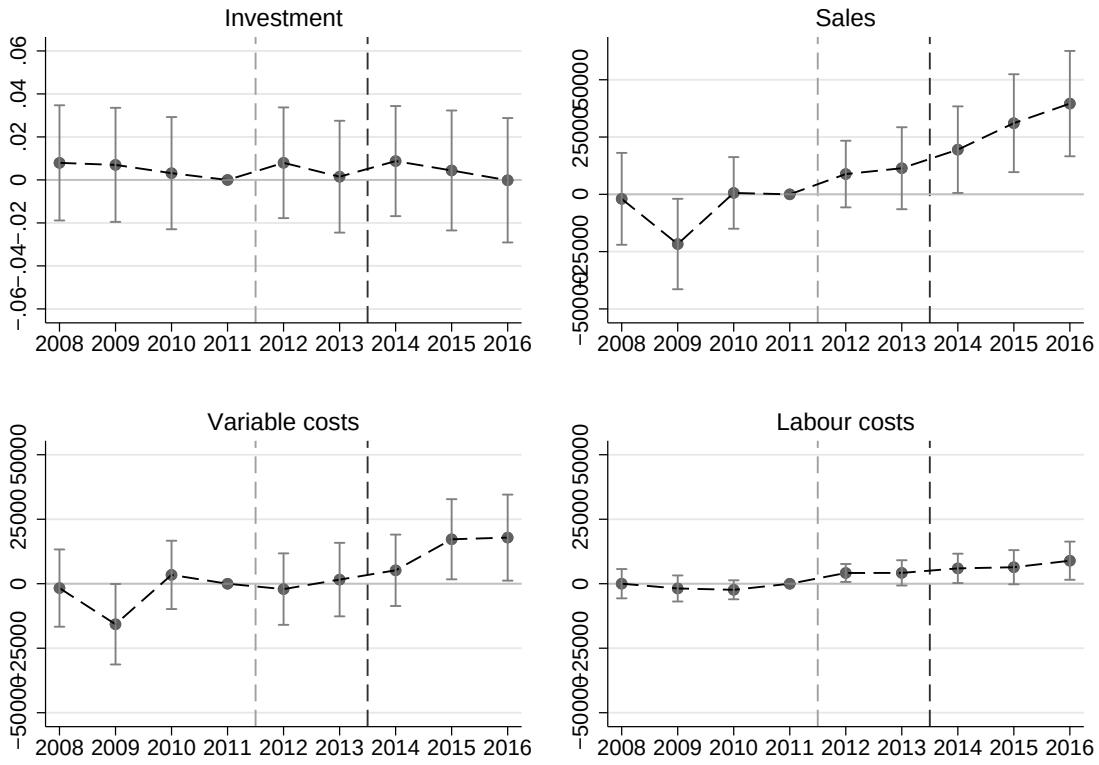
Note:Figure shows the differences-in-differences estimates for firm-level sales, variable costs, labor costs and value added relative to year 2011 using the baseline restricted sample in 2008–2016. The regressions do not use the re-weighting strategy but include firm-fixed effects.

Figure 15: The development of sales, variable costs, labor costs and value added (weighted), 2008–2016



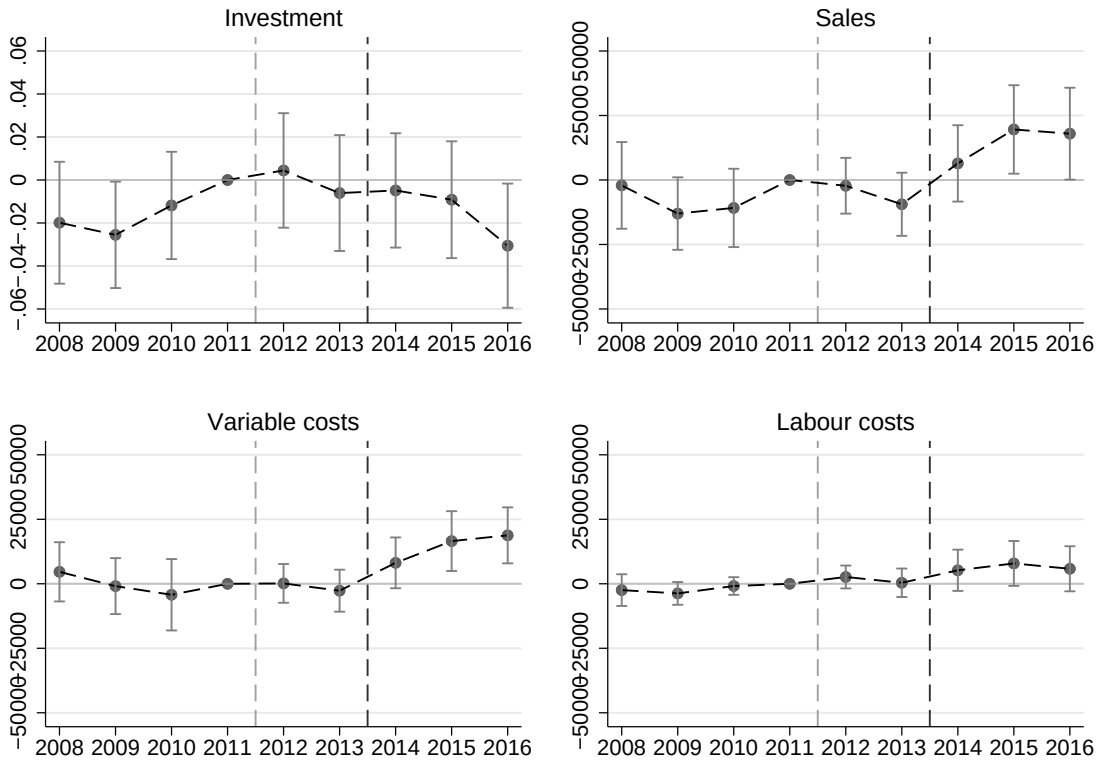
Note: Figure plots the development of sales, variable costs, labor costs and value added in 2008–2016 for corporations and partnerships using the restricted sample using the re-weighting procedure firm fixed effects.

Figure 16: Estimates for firms with active owner-managers and cash-to-assets ratio below median



Note: Figure shows the differences-in-differences estimates for investments per lagged capital, firm-level sales, variable costs and labor costs relative to year 2011 for corporations with cash-to-assets ratio below median using the baseline restricted sample in 2008–2016. The regressions include firm fixed effects and uses the re-weighting strategy presented in Section 3. The first vertical line denotes the small tax cut in 2012, and the second line the larger tax rate cut from 24.5 to 20% in 2014.

Figure 17: Estimates for firms with active owner-managers and cash-to-assets ratio above median



Note: Figure shows the differences-in-differences estimates for investments per lagged capital, firm-level sales, variable costs and labor costs relative to year 2011 for corporations with cash-to-assets ratio above median (0.26) using the baseline restricted sample in 2008–2016. The regressions include firm fixed effects and uses the re-weighting strategy presented in Section 3. The first vertical line denotes the small tax cut in 2012, and the second line the larger tax rate cut from 24.5 to 20% in 2014.

Table 14: Differences-in-differences results: Firms with active owner-managers and cash-to-assets ratio below median

	Investment	Sales	Var.costs	Labor costs
Dif-in-dif estimate	0.001	39423.690***	24166.473***	10749.874***
	(0.008)	(9100.613)	(6049.095)	(3137.637)
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Weighting	X	X	X	X
Pre-trend	X	X	X	X
Control for 2012 reform	X	X	X	X
Constant	0.315***	648252.288***	308218.783***	173320.663***
	(0.004)	(3691.167)	(2600.243)	(1099.149)
r2	0.369	0.872	0.841	0.911
N	124217	134243	127902	131689

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Table shows the difference-in-differences estimates and firm-level clustered standard errors (in parentheses) for investment per lagged capital, firm-level sales, variable costs and labor costs. All regressions include firm and year fixed effects, the re-weighting procedure, pre-trend controls and controls for the 2012 reform. Labor cost variable in the table includes the wages paid to the main owner.

Table 15: Differences-in-differences results: Firms with active owner-managers and cash-to-assets ratio above median

	Investment	Sales	Var.costs	Labor costs
Dif-in-dif estimate	0.001	24641.314***	15967.416***	10746.907**
	(0.008)	(7013.127)	(4796.950)	(3627.945)
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Weighting	X	X	X	X
Pre-trend	X	X	X	X
Control for 2012 reform	X	X	X	X
Constant	0.307***	484553.000***	202965.952***	144557.306***
	(0.005)	(3355.914)	(2336.326)	(1101.383)
r2	0.369	0.867	0.853	0.907
N	139607	155959	145266	153086

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Table shows the difference-in-differences estimates and firm-level clustered standard errors (in parentheses) for investment per lagged capital, firm-level sales, variable costs and labor costs. All regressions include firm and year fixed effects, the re-weighting procedure, pre-trend controls and controls for the 2012 reform. Labor cost variable in the table includes the wages paid to the main owner.