Journal of Public Economics 212 (2022) 104704

Contents lists available at ScienceDirect

Journal of Public Economics

journal homepage: www.elsevier.com/locate/jpube

The effects of corporate taxes on small firms ☆

Jarkko Harju [a,b], Aliisa Koivisto [c], Tuomas Matikka [b,d,*]

[a] Tampere University, Finland
[b] VATT Institute for Economic Research, Finland
[c] UNU-WIDER, Finland
[d] Arkadiankatu 7, 00101 Helsinki, Finland

ARTICLE INFO

Article history:
Received 11 February 2022
Revised 9 June 2022
Accepted 10 June 2022
Available online 25 June 2022

JEL classification codes:
G31
G38
H21
H25

Keywords:
Corporate taxation
Investments
Business activity
Small firms

ABSTRACT

We study the impact of corporate taxes on firm-level investments and business activity by exploiting a 6 percentage-point reduction in the corporate tax rate in 2012–2014 in Finland. We use detailed administrative data and a difference-in-differences method comparing small corporations (tax rate cuts) to similar partnerships (no change in taxes). We find no significant average investment responses but do observe an average increase in annual sales (1.6%) and variable costs (2%) when comparing years before (2008–2011) and after (2014–2016) the tax rate cuts. These effects are driven by more cash-constrained firms and firms where the main owner actively works in the firm.

© 2022 The Author(s). Published by Elsevier B.V. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

1. Introduction

Over the last decade, many developed countries have reduced their corporate tax rates in order to stimulate firm-level investments and economic activity. For example, in 2017, the US cut its corporate tax rate from 35% to 21%. 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 prompted 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 (Yagan, 2015; Bond and Xing, 2015; Suarez and Zidar, 2016; Zwick and Mahon, 2017; Ohrn, 2018; Fuest et al., 2018; Maffini et al., 2019; Liu and Mao, 2019; Ohrn, 2019; Curtis et al., 2021; Moon, 2022; Boissel and Matray, 2022; Love, 2022).

Despite this recent surge in quasi-experimental evidence, many key questions are still unanswered or understudied. There is only scarce evidence on the impacts of statutory corporate income taxes, a central parameter in the policy debate, on firm-level investments and growth. Many earlier papers focus on analyzing investment subsidies that are often targeted at specific types of firms or industries, such as bonus depreciations or accelerated depreciations. Consequently, there is a lack of knowledge on how changes in incentives that apply to the universe of the firm population, such as a corporate tax cut, affect investments and economic activity. Also, most of the earlier literature focuses on studying larger firms. Evidence on the impact of financial incentives among younger and smaller firms is more limited, even though it has been argued that particularly young and growing firms play a key role in spurring economic growth and employment (see e.g. Decker et al., 2014). In addition, recent evidence shows that the human capital of the owners of closely held businesses has a significant impact on firm performance (see Smith et al., 2019).

☆ We thank Sebastian Camarero, Paul Demeré, Seppo Kari, Tomi Kyyrä, Jukka Pirttilä, Eric Ohrn, Håkan Selin, Maximilian Todtenhaupt and several conference participants for their helpful comments. We are grateful to the Academy of Finland (grant No. 346252) for the funding for this project. Matikka also gratefully acknowledges funding from the Academy of Finland (No. 322074).

* Corresponding author at: Arkadiankatu 7, 00101 Helsinki, Finland.
E-mail address: tuomas.matikka@vatt.fi (T. Matikka).

https://doi.org/10.1016/j.jpubeco.2022.104704
0047-2727/© 2022 The Author(s). Published by Elsevier B.V.
This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

We contribute to the literature by providing credible evidence of the effects of a corporate tax rate cut on small firms. We study a considerable 6 percentage-point (23 percent) reduction in the corporate tax rate from 26% to 20% in 2012–2014 in Finland. The tax rate on corporate profits was first reduced from 26% to 24.5% in 2012 and then further to 20% in 2014. Also, the corporate tax rate cut was combined with a dividend tax increase that left the effective dividend tax rate, including both dividend and corporate tax, unchanged. This means that the impact of the corporate tax cuts on the owner-level effective dividend tax rate was largely eliminated, allowing us to focus on the effects of firm-level corporate taxes and the associated increase in available cash resources at the firm level after a corporate tax rate cut.[1] Together with high-quality administrative data covering all Finnish businesses, these reforms enable us to analyze the effect of the corporate tax rate on a range of key firm-level variables.

Our main analysis focuses on the immediate effects of the reforms by analyzing the periods right before (2008–2011) and after (2014–2016) the tax rate cuts. We focus on small corporations with annual sales below 2.5 million euros. We restrict the sample because partnership firms that faced no changes in taxes offer a representative comparison group only for relatively small corporations. We use a difference-in-differences method utilizing similar-sized partnership firms operating in similar industries as a control group, allowing for credible and transparent identification of the impact of the reform on small firms. Furthermore, we follow a similar type of weighting estimation approach to those used in Yagan (2015) and Zwick and Mahon (2017) to improve the comparability of the outcomes between these organizational forms. In our empirical analysis, we show that the development of our outcome variables follows parallel trends for the treatment (corporations) and control (partnerships) groups prior to the first corporate tax cut, providing strong supportive evidence on the validity of our empirical approach.

First, we study the effect of the reforms on investments relative to existing capital assets, a main outcome of interest explored in both theoretical and empirical corporate tax literature. We find no significant average investment responses in the stock of productive capital or in the number of firms with new investments in the 3 years following the second reform. However, we find a small positive investment effect for more cash constrained firms (3.3%) and firms younger than 10 years (3.7%), suggesting that the investment decisions of firms with less available cash resources and of younger firms can be more sensitive to corporate taxes.

In addition, we examine the impact of the reform on firm-level business activity measures that are less often studied in the earlier literature. The outcomes studied include sales, labor costs, input use, value added, and firm entry. A corporate tax cut creates a mechanical cash injection for the firm through increased net-of-tax retained earnings that could positively impact business activity beyond capital investments. Such additional cash resources can be particularly relevant for younger and smaller firms that might often face liquidity constraints and have more limited opportunities to acquire other types of funding, but still have available business opportunities to utilize. Also, small firms are often managed by their main owners, who also work in the firm and are closely connected to firm decision-making, implying that the incentives and effort of the owner could be affected through changes in corporate-level tax incentives.

We find a moderate average increase in sales (1.6%) and variable costs (2%) for the treated corporations, implying a slightly higher firm growth rate after the corporate tax rate cuts. These results suggest that the overall business activity of small firms increased after the reform even though overall investments in the stock of productive capital did not. We find that the observed sales and input responses are driven by cash-constrained firms and firms owned by active owner-managers. This indicates that the availability of cash resources and the role and effort of the main owner are important factors in explaining how small firms respond to changes in financial incentives, providing new evidence of the mechanisms behind firm responses to corporate taxes. Moreover, we find no significant effects on firm entry or dividend payouts.

Our study contributes to the existing literature in many ways. First, we contribute to the literature studying the effects of financial incentives on investments. Most of the recent quasi-experimental literature exploits targeted variation in investment incentives, such as temporary bonus depreciation and accelerated depreciation policies, aimed at boosting investments in particular sectors or groups of firms. This branch of literature commonly finds immediate responses to policy changes and distinctively large investment elasticities. For example, Ohrn (2018) uses changes in deduction regulation in the US and finds 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 in the UK.

Only a few previous papers have studied the investment responses of universal business tax reforms using firm-level data. A notable exception is Yagan (2015), who studies the large dividend tax cut in the US in 2003 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. Alstadsæter et al. (2017) find similar results for aggregate investments when studying firm responses to notable dividend tax cuts in Sweden. According to our knowledge, our paper is the first to use firm-level data and quasi-experimental variation to study the effects of a universal change in the corporate tax rate.

In contrast to many recent empirical studies, we find a statistically insignificant average investment response, and according to our preferred estimate, we can reject elasticity of investments with respect to the net-of-corporate tax rate above 0.75 with 95% confidence intervals. Our results indicate that the responses of small firms to a universal cut in the corporate tax rate combined with a dividend tax increase can be very different and lead to different policy implications compared to the impacts of more targeted investment subsidies for larger firms, as analyzed in the previous literature. This also suggests that larger and more capital-intensive firms appear to respond more to even small and temporary changes in investment incentives created by investment subsidy policies, compared to smaller and less capital-intensive corporations.

Another explanation for the negligible average investment effect could be that firms finance their investments primarily with new equity installments, according to the so-called old view of dividend taxes. In that case, the simultaneously increased dividend tax would eliminate or at least mitigate incentives for investing (see e.g. Feldstein, 1970 and Poterba and Summers, 1985). Nevertheless, we find no investment effects for older firms which are thought to rely more on retained earnings or debt to fund their investments (Auerbach, 1979), suggesting that the small responsiveness of investments to corporate taxes among smaller firms is likely to explain our findings.

Our results underline that physical capital investments are not the only relevant firm-level margin to consider. These findings along with other recent literature challenge the traditional view that corporate and dividend taxes mainly affect investment decisions of firms through changes in the cost of capital. For example,

[1] In general, firm-level taxes are often considered to be more relevant to new investment and growth. The dividend tax rate does not affect the marginal cost of capital when investment is funded with retained earnings or debt (Auerbach, 1979).

Love (2022) finds that the 2003 dividend tax rate cut in the US boosted the business activity of cash-constrained firms through increased variable costs and intangible investments, whereas there were no significant effects on capital investments or among more cash-rich firms. Our study further highlights the role of increased cash resources caused by the tax cut in affecting the scale of business activity and investments (see e.g. Rauh, 2006), particularly among smaller and more cash-constrained firms. Relatedly, previous evidence from Finland shows that increased cash resources stemming from relaxed social insurance mandates for entrepreneurs helped to scale up the business activity of younger but not older firms (Benzarti et al., 2020).

Furthermore, we make a clear contribution beyond the field of public economics as we study relatively young and small firms, which are argued to play a key role in general economic development and employment growth (Decker et al., 2014). The responsiveness of these firms is highly relevant but still relatively understudied, although there have been some recent exceptions (see e.g. Benzarti et al., 2020 and Alstadsæter et al., 2017). Also, we study the responses for firms with more active and passive main owners in order to better understand the role of the owner behind firm-level decisions. According to our results, the role of the owner-manager can be relevant in explaining how small firms respond to financial incentives, as firms with active owner-managers respond much more actively to reduced corporate taxes compared to firms with more passive owners. Using our detailed data, including information on ownership shares and the role of the main owner in the firm, we bring new evidence to this discussion, in which earlier empirical studies are scarce, particularly for smaller firms. Our evidence closely relates to the findings of a recent paper by Smith et al. (2019), who highlight the importance of active owners for firm performance in the US.

This paper proceeds as follows. In Section 2, we briefly describe the business tax system in Finland and the recent cuts in the corporate tax rate, and in Section 3, we present and discuss our testable hypotheses. In Section 4, we provide the details of the data and discuss our methods. Section 5 presents and discusses the results and Section 6 concludes.

2. Finnish Business Tax System and the Corporate Tax Rate Cuts

In this paper, we study the effects of recent corporate tax rate cuts in Finland. The tax rate on corporate profits was first reduced from 26% to 24.5% in January 2012, and then further to 20% in January 2014.[2] Together these reforms reduced the corporate tax rate by 6 percentage points, or by approximately 23%. These reforms follow the downward trend in corporate tax rates 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, 2013 and 2019, Canada in 2008–2012, and the US in 2017. Also, at the time of the corporate tax rate cuts, the dividend tax rate was increased for most owners of small corporations such that the effective dividend tax rate remained unchanged, which at least partly mitigated the impact of the corporate tax cuts on shareholder-level incentives. Next, we discuss the main features of the Finnish business tax system and the changes in tax rates we exploit in the empirical analysis we introduce below. A more detailed description of the tax system and recent changes in the taxation of corporations and partnership firms in Finland is presented in Appendix C.

The corporate tax rate cuts in 2012 and 2014 affected all public and privately held corporations, but other organizational forms were unaffected by the reform. Therefore, we have an opportunity to use partnership firms as a control group for small corporations in our empirical analysis. Privately held corporation is the most common organizational form in Finland, representing 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 income withdrawn from the firm. In contrast, partnerships are pass-through entities, meaning that their profits are taxed directly at the owner level. Therefore, the corporate tax rate does not affect them.

An owner of a privately held corporation can withdraw income from the firm either as wages or dividends. In Finland, wage and capital income are taxed at different tax rate schedules. The wage tax schedule is progressive, with top marginal tax rates of approximately 55%. The dividend income tax system is rather complicated, including one tax rate kink determined by firm-level net assets (assets minus debts) and another kink based on the euro amount of the dividends withdrawn from the firm.

The profits of partnership firms are taxed directly at the owner level based on a predetermined tax schedule. The owners of partnership firms also have a net asset threshold in their tax schedule, which divides taxable profits into capital income and wage income components based on firm-level net assets. Profits that fall under the net asset threshold are taxed according to the capital income tax schedule, and any income above the threshold is taxed as the owner's wage income.

At the time of the corporate tax rate cuts, the personal dividend tax rate was increased for most owners of small corporations. Therefore, at the owner level, the impact of the reduction in the corporate tax rate was offset by this dividend tax increase. This meant that the effective dividend tax rate, including both the corporate tax and owner-level dividend tax, was 26% both before and after the 2012–2014 reforms. Thus, as we will argue in greater detail below, the corporate tax cuts mainly affected incentives for investment funded from retained earnings or debt, while the cost of capital for new equity (share issues) remained mostly unchanged. However, for the owners of larger firms with large firm-level net assets, the effective dividend tax rate was typically reduced within the 2014 reform (see Appendix C for more details). Nevertheless, as we restrict our sample to small firms, this does not concern our empirical analysis.

There were no significant changes in the taxation of partnership firms during our examination period from 2008 to 2016. Therefore, partnership firms constitute a suitable comparison group for small privately held corporations. Also, there were no other significant changes in business taxation at the time of the corporate tax rate cuts. For example, depreciation rules and the corporate tax base remained unchanged between the firm groups. The depreciation regulations are similar for both organizational forms, and investment costs are depreciated over their lifetime following similar category-specific regulations for both corporations and partnerships.

3. Expected Impacts and Mechanisms

Next, we discuss the changes in incentives created by the reforms and present our hypotheses regarding their general expected impact on investments and business activity. We then discuss how the simultaneous dividend tax rate increase is expected to affect incentives depending on the source of finance, and how the tax cuts could affect firms with different types of owners. Finally, we briefly discuss the expected impacts on firm entry and dividend payouts.

[2] The first reform in January 2012 was officially announced by the government in October and November in 2011 when the Government Proposals regarding next year's corporate taxation were issued. The second reform in January 2014 was announced in November 2013 when the Government Proposal was issued.

3.1. Investments and Business Activity

In general, a corporate tax cut can affect investment decisions by decreasing the cost of capital and increasing the amount of retained earnings available for new investment. Therefore, corporate tax rate cuts incentivize firms to increase their investments. In addition to increasing the overall investment rate, a tax cut can increase the number of firms that invest.

A cut in the corporate tax rate can also affect the overall business activity of small firms in other ways. It induces a mechanical increase in the available cash resources of a firm, so that the firm has more available after-tax profits than before the corporate tax rate cut. If these additional resources within the firm are important for boosting overall business activity, we would expect corporate tax rate cuts to increase sales, input costs and labor costs. In addition, the potential effects on investments and output can affect profitability, which we evaluate by examining the impact on the value added of the firm (sales minus variable costs).

3.2. Sources of Finance and Cash Constraints

As discussed above, the recent corporate tax cuts in Finland were executed together with an adjustment in dividend tax rates such that the effective owner-level dividend taxes, including both the statutory corporate tax and owner-level dividend tax, were unaffected for most of the owners of small corporations in our sample. Therefore, the expected impact of the reform on investment incentives may depend on how small firms finance their investments.

The simultaneous increase in the dividend tax can mitigate incentives to increase investments if these are financed by new equity, as then the effective dividend tax rate defines the rate of return on new investment. In other words, in this case the dividend tax burden is included in the cost of capital. According to the so-called old view of dividend taxes, owner-level (effective) dividend taxes are most relevant for investment decisions (Harberger, 1962; Feldstein, 1970; Poterba and Summers, 1985), and thus, under this hypothesis, the 2012–2014 reforms would not induce a significant increase in investment incentives.

In contrast, it has been argued that dividend taxes are less relevant to investments when new investment is financed by retained earnings or debt (Auerbach, 1979). For example, when retained earnings are used for new investment instead of profit distribution, the dividend tax is reduced on the net cost to the shareholder at the same rate at which the eventual return is taxed. These two effects cancel each other out to leave the required rate of return unaffected by the dividend tax rate. According to the so-called new view in the dividend tax literature, at the margin, new investment is financed by retained earnings or debt, and therefore the dividend tax does not affect investment choices, whereas the corporate tax does (Auerbach, 1979; Bradford, 1981).[3]

There is very limited earlier evidence on the investment behavior of small firms and their sources of investment funding (new equity, retained earnings or debt, or a combination of all of these). Therefore, we have no clear theoretical hypothesis on the expected impact of the reform on investment incentives based on the financial sources of investment. The aim of our empirical analysis of investments is to reveal whether a change in firm-level financial incentives accompanied by a stable owner-level dividend tax rate affected investment decisions (on average), given the available funding sources of small firms.

Nevertheless, we conduct a suggestive test for the role of funding sources by studying the investment responses of older and younger firms in our sample. It has been argued that young and newly established firms are more prone to raise new equity instead of using debt or retained earnings to finance their investments, compared to more mature firms (Auerbach, 1979; Sinn, 1991). Under this hypothesis, older firms should be more prone to respond to the reforms if firm-level financial incentives drive investment decisions. Our detailed data enable us to define the age of the firm and thus analyze how firm age affects investment responses.

Even though the dividend tax increase mostly offsets the incentives created by the corporate tax cut at the owner level, the corporate tax cut still creates a mechanical cash injection for the firm through increased net-of-tax retained earnings. Such additional financial resources can be particularly important for smaller firms. These often face liquidity constraints and have limited opportunities to acquire other types of funding such as new equity and debt, but might still have new business opportunities to exploit. Therefore, the overall business activity of small firms could be affected by the reform even without a direct and instant impact on capital investments such as plants or machinery which typically require significant resources. Our hypothesis is that if such channels are relevant, we should observe an increase in firm-level sales and variable costs after the corporate tax cuts.

Relatedly, as we focus on young and small firms, many of them may face cash constraints. Retained earnings largely contribute to a firm's cash reserves, and after the tax cut net-of-tax retained earnings increased mechanically even absent any behavioral responses. As a result of such a cash injection, liquidity constraints may be loosened and corporations could now have more liquid funds to boost their business activity and investments (see e.g. Rauh, 2006 and Love, 2022). Correspondingly, this would show up as increased investments or business activity after the reforms. In our analysis, we analyze the hypothesis regarding the relevance of cash constraints by studying the impact of the reforms for firms with greater or lesser cash constraints before 2012.

3.3. Active Owner-Managers

The ownership and management structures of firms could affect how they respond to changes in financial incentives and relaxed financial constraints at the firm level. Younger and smaller firms are often managed and organized by their main owners, and therefore the role of the owner can be particularly relevant for them. It has been argued that active owner-managers are likely to be more able and eager to affect firm-level decisions and business activity compared to more passive owners or investors. For example, Chetty and Saez (2010) build an agency model of the firm, motivated by the observation that the dividend payout responses to the dividend tax cut of 2003 in the US were driven by firms with shareholders in executive positions. Also, recent empirical evidence by Smith et al. (2019) supports the significance of the role played by the firms' owners, as they find that active owner-managers contribute greatly to firm performance in the US.

Also, owners who are more closely connected to their firms are presumably more able to utilize the firm and its cash reserves as a source of private spending (see e.g. Porta et al., 2000 and Bennedsen and Wolfenzon, 2000) and engage in dynamic tax-planning procedures in order to minimize long-run tax payments on income withdrawn from the firm (see e.g. le Maire and Schjerning, 2013). Therefore, improved firm performance and growth have a more direct impact on the available personal

[3] This argument has been further supported by, for example, the evidence presented in Yagan, 2015 showing that firm-level investments in the US did not respond to the large dividend tax cut of 2003. Thus, recent empirical studies on investment effects have been more focused on corporate-level taxes. However, a recent study by Moon, 2022 shows that capital gains tax has an effect on the investments of large firms in South Korea, supporting the old view in the dividend tax literature.

resources of more closely connected owners. Hence, even when the dividend tax is increased, a cut in the corporate tax rate may increase the effort and labor input of an active main owner, potentially leading to greater business activity by the firm after the reform. As our study concerns relatively young and small firms with, on average, only six employees in our baseline sample, the role of the main owner is likely to have a particularly significant impact.

If the management and ownership structures matter to how firms respond to the reform, we expect to observe an increase in investments and overall business activity in our sample. Using our detailed data, including information on ownership shares and the role of the main owner in the firm, we can also study the relevance of the ownership and management structures behind our results. These results increase our current knowledge of the role of active owner-managers behind firm-level decisions where earlier empirical evidence is still scarce.

3.4. Firm Entry and Dividend Payouts

It is often argued that reducing business taxes can encourage new business creation. If this is the case, we should observe an increase in the number of new corporations after the corporate tax cuts, which we can empirically test in our analysis. Furthermore, the corporate tax rate cuts may have increased the incentives for existing partnership firms to change their organizational form to corporations, if the potential gains from changing the organizational form exceed the administrative costs of this change (see e.g. Tazhitdinova, 2020). These types of effects could also invalidate our empirical approach where we compare the outcomes between corporations and partnership firms before and after the tax rate cuts, and we therefore evaluate the changes in organizational forms in the next section in more detail. However, as the owner-level effective income tax rates remained unchanged, it is likely that the effects on firm entry and firms changing their organizational form are small at most.

As the reforms did not change the effective dividend tax rates for the owners in our sample, we do not expect the reform to have a significant effect on the dividend payout decisions or income-shifting responses of the owners of small corporations. Nevertheless, we analyze the development of dividend payments and the composition of income withdrawn from the firm to test whether the reforms are associated with potential changes in dividend payouts.

4. Methods and Data

We use tax record data from the Finnish Tax Administration, including all Finnish privately held corporations and partnerships in 2008–2016.[4] 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 can 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 exclude firms that are owned by other firms, institutional investors, hedge funds, etc. We use these data in an unbalanced panel form.

We use a difference-in-differences method to study the effects of the corporate tax rate cuts in 2012–2014. Our baseline estimable equation is of the following form:

$$Y_{it} = \alpha_1 + \alpha_2(Treat_i \times Post_{2014}) + \alpha_3(Treat_i \times Post_{2012,2013}) + \beta_i + \lambda_t + \epsilon_{it} \quad (1)$$

where Y is the outcome variable of interest, i refers to a firm and t is year. The main outcome we study is investment per lagged capital. We study the effects on other business activity by examining the sales, variable costs, labor costs and value added of the firm. Following the earlier literature studying firm responses to tax reforms (see e.g. Ohrn, 2018 and Saez et al., 2019), we normalize these outcome variables by firm-level sales in 2011, one year before the first reform, to take into account the skewness of the distributions of these variables and differences in levels between the treatment and control groups. As we use sales in 2011 to normalize the variables, our baseline sample includes firms that we observed in 2011.[5]

The treatment group ($Treat_i$) is privately held corporations and the control group is partnership firms. $Post_{2014}$ is an indicator variable for the period after both tax rate cuts (2014–2016), and $Post_{2012,2013}$ for the years right after the first tax cut (2012 and 2013). Coefficient α_2 in Eq. (1) thus captures the impact of the tax rate cuts comparing the periods right before (2008–2011) and after (2014–2016) both reforms which is our coefficient of main interest, and α_3 captures the effect of the first reform separately. We include firm and year fixed effects (β_i, λ_t) in the baseline estimation, and ϵ_{it} is the error term. Standard errors are clustered at the firm level.

The main identifying assumption in our difference-in-differences approach is the parallel trends assumption. This means that in the absence of the reforms, the development of firm outcomes would have been similar among corporations and partnerships. In order to evaluate the validity of this assumption, in Section 5 we examine the evolution of our main outcome variables prior to the 2012 reform for both organizational forms. We find that the trends follow each other well for all the main outcomes that we consider, which mitigates the concern that firms would not be comparable between the organizational forms.

To ensure that the firm groups are comparable, we apply two modifications: we restrict our sample to small firms and use a re-weighting strategy. First, our baseline sample in 2011 includes firms with annual sales between 100,000 euros and approximately 2,500,000 euros, and net assets below 750,000 euros in 2011. We restrict the sample due to the much longer tail of the size distribution of corporations compared to partnerships, stemming from the fact that the majority of large firms in Finland are corporations. Therefore, partnership firms offer a representative 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. To be precise, the upper sales limit is based on the 99th percentile of the sales distribution of partnership firms (2,503,624 euros). The net asset limit is set to ensure that the firms in our sample are affected by the owner-level taxes in a same way, i.e. we do not include the owners of corporations with large net assets (above 750,000 euros) whose effective dividend tax rate was potentially reduced in 2014, as mentioned above in Section 2 and discussed in greater detail in Appendix C. Finally, we winsorize all continuous outcomes at the 1% level by year. In Section 5.5, we discuss the robustness of our results regarding these choices and restrictions.[6]

Table 1 presents the unweighted summary statistics of our main outcome variables for the restricted sample in 2011. Table 2 presents the detailed definition of each variable we use in our anal-

[4] The year 2016 is the last available year in our current data set.

[5] As robustness checks, we also estimate the model using the levels of the outcome variables and using balanced panel data (see Section 5.5).

[6] Table 15 in Appendix B shows the number of observations dropped from the full firm sample after the sample restrictions.

Table 1
Summary statistics, 2011.

	Corporations (sample)			Partnerships (sample)			Corporations (all)
	mean	sd	p50	mean	sd	p50	mean
Sales	531,876	470,076	357,316	348,406	333,949	228,322	996,445
Labor costs	164,057	178,661	106,316	77,624	104,309	44,889	199,567
Variable costs	219,605	305,769	100,968	153,074	234,788	77,772	587,136
Value added	312,271	284,623	219,505	195,331	172,569	140,972	403,251
Investment	30,774	84,304	2,791	22,726	61,015	1,000	40,756
Investment per lagged capital	0.498	1.164	0.0591	0.501	1.195	0.026	0.785
Share with pos. investment	0.616			0.543			0.493
Variable costs (scaled by sales)	0.341	0.260	0.322	0.368	0.247	0.370	
Labor costs (scaled by sales)	0.332	0.198	0.318	0.214	0.164	0.185	
Value added (scaled by sales)	0.659	0.260	0.678	0.632	0.247	0.630	
Share young	0.522			0.293			0.506
Share active owner-manager	0.728						0.593
Cash-to-assets ratio	0.306	0.292	0.242				0.354
Observations	30,958			12,698			59,639

Note: The table shows the unweighted summary statistics for the corporations and partnerships in our restricted baseline sample used in the main analysis, and for all corporations owned by individuals operating in Finland in 2011. The definitions for each variable are presented in Table 2.

Table 2
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 gross investments including all newly installed capital assets, such as machinery, buildings and equipment. Expenditure on intangible assets, such as patents or IT software, are included in the variable.
Capital assets	Capital assets include balance sheet information on productive capital such as machinery, buildings, equipment and intangible assets such as IT software.
Labor costs	Annual wages and other wage-related compensations paid by the firm, including social insurance contributions paid on wage income but excluding income taxes. The labor cost variable includes the wages paid to the owners.
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 variable costs.
Financial assets	Financial assets of the firm including cash, cash at bank, stock holdings, and other liquid funds.
Age of the firm	We measure the age of the firm using the first observation in our full tax record data starting from 1998. We define the age of the firm based on the year 2013 so that firms older than 10 years were observed in tax record data in 2002 or earlier.
Young firms	We define firms as young firms when they are below 10 years of age based on the measure for the age of the firm presented above.
Cash-to-assets ratio	We define a firm-level cash-constraint measure for corporations based on the share of financial assets relative to the total assets of the firm in 2010–2011, and define an indicator variable of cash constraints using the median (0.24) value of this cash-to-assets ratio.
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. We classify that a corporation is owned by an active owner-manager if the main owner of the firm fulfills this criteria. This classification is based on the Finnish pension insurance regulations included in the data. Active owner-managers are insured under different social insurance regulations compared to other corporate owners.

ysis. Investments refer to the purchase price of all newly installed gross capital assets. These include, for example, investments in machinery, equipment and buildings. On average, annual investments relative to the existing capital stock in the year before, a variable that has been widely used to study firm-level investment responses in the literature (see e.g. Yagan, 2015), were approximately 0.50 for both corporations and partnerships. Roughly 62% of corporations and 54% of partnerships had positive investments in 2011, and these shares remain relatively constant throughout the time period we study, as shown in Fig. 4. The majority of investments for both corporations (81% of all investments) and partnerships (86%) are concentrated in fixed assets such as machinery, equipment and hardware. Furthermore, in Table 1, labor costs include gross wages and other related costs such as mandatory pension contributions (excluding individual-level income taxes). Variable costs refer to all costs other than fixed costs and labor costs, including intermediate goods, materials and services used in production. Value added is defined as sales minus variable costs.

In our sample, 52% of corporations and 29% of partnership firms are below the age of 10 years, which illustrates that a large share of corporations we study are rather young firms. We define the age of the firm based on the year 2013 such that firms older than 10 years were observed in the tax record data in 2002 or earlier. The average cash-to-assets ratio for corporations is 0.31, measured as firm-level financial assets (cash, stock holdings and other liquid assets) divided by the total assets of the firm. Due to the different accounting regulations of corporations and partnership firms, we cannot define a similar measure for cash constraints for partnerships. 73% of corporations had an active owner-manager as their main owner. We use a readily available classification in our data to divide corporate owners into active and passive: active owner-managers include those who, by themselves or together with family members, own at least 30% of the corporation and hold an active leading position in their firm, such as CEO or chairman of the board, and passive owners are the rest.[7] We cannot divide our control group of partnership firms into those with active vs. passive owners, as all main owners of partnerships are labeled as active.

In addition, Table 1 presents the summary statistics for all corporations owned by individuals in Finland. As we focus on smaller

[7] This classification is based on mandatory pension insurance regulations in Finland, as active owner-managers are insured under different regulations compared to other corporate owners. See Benzarti et al. (2020) for more details on pension insurance regulations and evidence of how entrepreneurs in Finland respond to changes in insurance contribution rules.

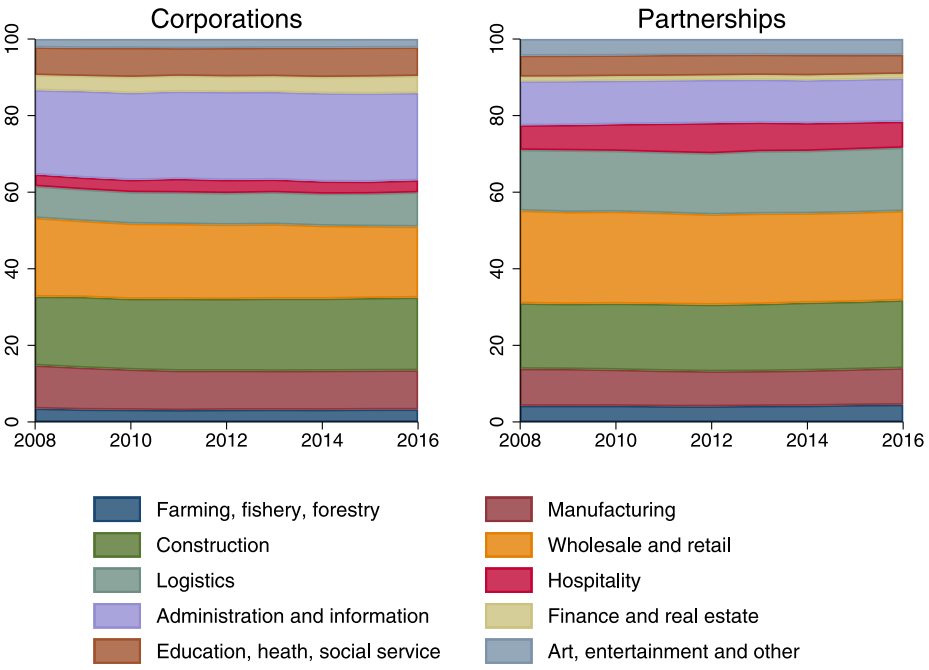

Fig. 1. Shares of firms in different industries (corporations and partnerships). Note: The figure presents the shares of firms in different industry categories for both corporations and partnerships in the restricted sample in 2008–2016.

firms in this study, the average values of the main variables are naturally larger for all corporations compared to our sample. Overall, our sample of small corporations accounts for approximately 8% of investments and 5.5% of value-added of corporations, but contains 52% of all corporations in Finland.

Table 1 shows that the partnership firms are smaller on average compared to the corporations in our baseline sample. However, scaling investments by lagged capital assets and other business activity outcomes by firm-level sales makes these outcomes notably more similar to each other between the firm groups. Both corporations and partnerships operate in similar industries, as shown in Fig. 1, but there are some differences in the shares of firms in each industry category between the organizational forms. In our baseline regression specification, we follow Yagan (2015) and Zwick and Mahon (2017) and use a non-parametric re-weighting strategy based on DiNardo et al. (1996) to control for any size or industry-specific shocks. First, we assign each observation to one of the 10 industry categories presented in Fig. 1. Then we divide each industry category into four size groups based on the previous year's annual sales. This creates 40 different industry-size bins for both organizational forms for each year. Following the approach in Yagan (2015), the sum of sales in each bin is weighted to match the base-year group of privately held corporations in 2011. Intuitively, the weight factor is higher than one if the sum of sales of the firms in a group is lower than in the base group, and vice versa.

As discussed above, the corporate tax rate cut may have induced existing partnership firms to change their organizational form to corporations. This would be a concern for our empirical setting if such changes in the organizational form were prevalent. However, Fig. 11 in Appendix B 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 reforms. Therefore, this does not constitute a major issue for our empirical analysis. The firms that changed their organizational form are included in our sample, and in the regression we include an indicator variable denoting whether a firm has changed its organizational form. However, dropping firms that changed their organizational form does not affect our results in any significant manner.

5. Results

5.1. Investments

Next, we present and discuss the average short-run impact of the corporate tax cuts on investments. Fig. 2 describes the development of investments per lagged capital in 2008–2016 for corporations and partnership firms using the re-weighting strategy described in Section 4. The figure illustrates that there is no difference in the development of investments between corporations and partnerships before the first corporate tax rate cut in 2012, demonstrating that the pre-reform trends are parallel between the groups. The figure also shows no clear response to the first tax rate cut after 2012. After the larger corporate tax cut in 2014, the development of investments remains parallel between the firm groups, indicating no significant investment response to the reforms. Fig. 3 shows the associated difference-in-differences estimates with 95% confidence intervals in each year in 2008–2016 relative to 2011. The figure clearly supports the visual observations from Fig. 2, implying parallel pre-trends and no investment responses to the corporate tax rate cuts.

Table 3 quantifies the estimates following the estimation strategy presented in Section 4. Column (1) shows the estimates with firm and year fixed effects, and column (2) also includes the re-weighting approach. The difference-in-differences estimates ($Treat_i \times Post_{2014}$) are very close to zero, −0.03 and −0.17 percentage points, respectively. These estimates represent −0.06 and −0.35 per cent changes in investments per lagged capital relative to 2011. Neither of the estimates are statistically significant, and using our preferred estimate in Column (2) we can reject investment increases larger than 2.2 percentage points with 95% confidence intervals. Therefore, the regression results confirm the graphical evidence presented above. We observe that the estimate for the interaction of the years 2012 and 2013 and the treatment

Fig. 2. The development of investment per lagged capital, 2008–2016. Note: The figure plots the development of the ratio of investment per lagged capital assets (in $t-1$) in 2008–2016 for corporations and partnerships using the restricted sample of firms in 2011, the re-weighting procedure presented in Section 4 and firm fixed effects. The first vertical line denotes the smaller corporate tax cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014.

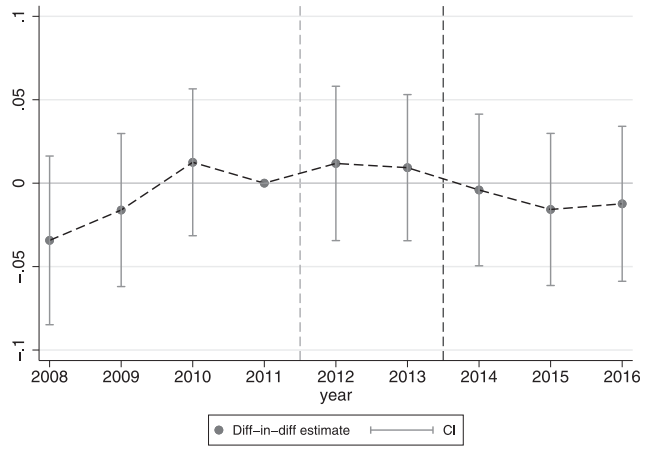

Fig. 3. Difference-in-differences estimates for investment per lagged capital, 2008–2016. Note: The figure shows the difference-in-differences estimates and 95% confidence intervals for investments per lagged capital relative to year 2011 using the baseline restricted sample. The specification in the figure includes firm fixed effects and uses the re-weighting strategy presented in Section 4. The first vertical line denotes the smaller corporate tax cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014.

group indicator, $Treat_i \times Post_{2012,2013}$, has a small positive coefficient which is borderline statistically significant at the 95% level, suggesting a small increase in investments right after the smaller tax rate cut in 2012. However, as our main difference-in-differences estimates suggest, the corporate tax rate cuts do not cause investment responses in the 3 years following both tax rate cuts.[8]

Our implied point estimates for investment elasticity with respect to the net-of-corporate-tax rate presented in Table 3 are −0.012 and −0.056, and statistically insignificant in both specifications. The estimates imply that we can reject the elasticity of investments greater than 0.754 using 95% confidence intervals.

Table 3
Difference-in-differences results: Investment per lagged capital.

	(1)	(2)
$Treat_i \times Post_{2014}$	−0.0003	−0.002
	0.010	0.012
$Treat_i \times Post_{2012,2013}$	0.024*	0.019
	0.011	0.013
R2	0.181	0.192
N	292,307	292,307
Firm FEs	X	X
Year FEs	X	X
Weighting		X
Investment elasticity	−0.012	−0.056
	0.345	0.405

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

Note: The table shows the difference-in-differences estimates and firm-level clustered standard errors for investments per lagged capital with different specifications following the estimation procedure presented in Section 4. $Treat_i \times Post_{2014}$ presents the full effect of the 2012–2014 tax rate cuts, and $Treat_i \times Post_{2012,2013}$ the short-run effect of the first reform in 2012 for the years 2012–2013. Column (1) shows the results when the re-weighting strategy is not used, and Column (2) shows the results when the re-weighting strategy is used. Investment elasticity denotes the elasticity of investments per lagged capital relative to the change in the net-of-corporate tax rate in 2012–2014 and the associated standard errors.

The corporate tax rate cut might also affect the number of firms making investments. Fig. 4 presents 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 significant change in the share of corporations investing after 2014. We find a small and insignificant difference-in-differences estimate for corporations with positive investments relative to partnerships, further suggesting no significant extensive margin responses to the corporate tax rate cuts.

Our findings on the small responsiveness of investments are in contrast to a large body of earlier quasi-experimental literature that estimates distinctively large investment elasticities with respect to the cost of capital, ranging from 6 to 7 (see e.g. Maffini et al., 2019; Ohrn, 2018; Zwick and Mahon, 2017, and House and Shapiro, 2008). Most of the earlier studies utilize variation in investment incentives stemming from various investment subsidy policies, such as bonus depreciations or accelerated depreciations. Our results highlight that the average responses of small firms to a cut in the statutory corporate tax rate can be very different and lead to different policy implications compared to the findings in this literature.

One potential feature that could explain our insignificant investment response compared to the earlier quasi-experimental studies is that in our setup all firms face a cut in the corporate tax rate regardless of their investment behavior. Bonus depreciation and accelerated depreciation policies utilized in the previous studies cited above are typically granted only for new investments that fall into the specific program categories, and the tax reductions provided by these programs are materialized only when and if a firm invests. By affecting the relative price of investment as well as the relative price between different investment projects, such targeted stimulus policies are potentially more likely to spark larger observed investment elasticities for investment categories that are qualified for the subsidy, compared to a universal cut in the corporate tax rate. Hence, the implications of these various types of reforms (general corporate tax rate cut vs. targeted investment subsidies) could be different even though their theoretical effects on the cost of capital might be similar in nature.

Relatedly, part of the larger investment responses to investment subsidy policies could stem from the fact that the firms targeted by these policies are often much more likely to invest compared to other firms, particularly younger and smaller firms. For example,

[8] Our measure for aggregate firm-level investments includes investments in intangible assets such as patents and IT software, whereas most of the earlier literature is focused on analyzing only tangible assets such as machinery and hardware. The share of these types of expenditures is small for small firms, and in our data they comprise only 2.7% of all investments in 2011. Therefore, it is not likely that including investments in intangible assets would significantly affect the comparison of our results to the investment definitions often used in the earlier literature.

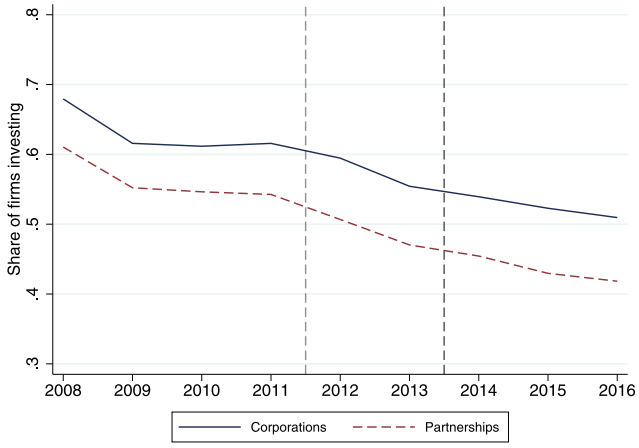

Fig. 4. Firms with positive investments (extensive margin), 2008–2016. Note: The figure shows the shares of firms with positive annual investments for both corporations and partnerships in the sample in 2008–2016. The difference-in-differences estimate for corporations with positive investments relative to partnerships estimated following the estimation procedure presented in Section 4 is 0.013 (0.006). The first vertical line denotes the smaller corporate tax rate cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014.

in a recent paper by Zwick and Mahon, 2017 studying bonus depreciation policies in the US, the share of firms with eligible investments is 92% in their estimation sample. In comparison, the share of firms with new investments in 2011 in our sample is approximately 62% among corporations. Therefore, it could be that increased investment incentives targeted at firms that are inherently more likely to invest induce larger investment responses.

However, the discrepancy between the observed investment effects in this study and the earlier literature cannot be easily explained by the magnitude of the change in financial incentives. For example, relative changes in incentives caused by investment subsidy policies are typically modest and much smaller compared to the statutory corporate tax cuts we study. A federal bonus depreciation policy in the US reduced the present value of qualified investments by approximately 5.5% and state-level bonus depreciations by 1.1% (Ohrn, 2019). In contrast, the corporate tax cuts in Finland reduced the statutory tax rate by approximately 23%. However, our investment results do align with recent studies that find no significant average response in capital investments to large cuts in dividend tax rates in the US (Yagan, 2015) and Sweden (Alstadsæter et al., 2017).

Another explanation for the negligible average investment effect could be that small firms in our sample finance their investments primarily with issuing new equity. In that case the simultaneously increased dividend tax would eliminate or at least mitigate incentives for investing. We discuss this potential issue and other aspects regarding the heterogeneity of responses in Section 5.3.

To sum up, we find that the corporate tax rate cuts did not cause a significant average increase in investments among small firms, at least within the 3 years following the reforms. Nevertheless, as we only focus on relatively small firms, we of course cannot rule out the possibility that larger firms not included in our analysis that might, for example, have less limited access to equity or debt financing could have increased their investments because of the tax cuts.

5.2. Business Activity

Next, we focus on other outcomes that reflect the overall business activity of firms. Fig. 5 shows the development of sales, variable costs, labor costs and value added scaled by firm-level sales in 2011 for corporations and partnerships relative to the year 2011 using the re-weighting strategy. Fig. 6 presents the associated difference-in-differences estimates in each year in 2008–2016 relative to 2011 with 95% confidence intervals. These figures clearly confirm that the comparison between partnerships and corporations is feasible, as the trends in the outcomes for both firm groups follow each other closely before the reforms.

The figures show that the firm-level sales of corporations increase relative to partnerships right after the large corporate tax cut in 2014. Similarly, we find an increase in variable costs. However, we do not detect any effects on labor costs and no visible increase in value added, measured as the difference between sales and variable costs.

Table 4 presents the difference-in-differences estimates for all four outcomes following the estimation strategy presented in Section 4. These results confirm the visual observations above: there is an increase in sales and variable costs after 2014. In terms of magnitudes, the sales response represents a 1.6% increase relative to the mean sales of corporations, and a 2.4% increase in variable costs. The point estimates for both labor costs and value added are very close to zero and clearly statistically insignificant.

The observed increase in sales suggests that the tax cuts boosted overall firm production, as there were no other simultaneous shocks in the Finnish economy that could be clearly associated with an increase in the business activity of small corporations relative to similar-sized partnership firms operating in similar industries. Moreover, an increase in sales together with a simultaneous increase in variable costs indicates that this business activity effect is likely to represent a real response instead of a potential reporting response related to tax evasion.

The negligible effect on labor costs is likely to stem from the fact that a rather large share of the small firms in our sample do not have any employees, and the average number of employees is relatively small. Almost 19% of the firms in our sample do not have any employees, and approximately 53% of the firms have less than four employees. Therefore, it is not perhaps surprising to find a negligible effect on labor costs in this context.

The zero effect on value added suggests that even though both sales and variable costs increased after the tax rate cuts, they did not have a significant effect on profitability, measured as the difference between firm-level sales and variable costs. This is also evident given the larger relative response in variable costs compared to sales. One potential explanation for our findings regarding value added is that once the corporate tax rate is reduced, it increases the incentives to engage in business activities that yield a smaller pre-tax profit margin, as firms can now generate similar after-tax profits with a smaller profit margin when the corporate tax rate is reduced.

Our evidence tentatively suggests that despite the scaling effect on sales and variable costs, the reforms had no significant impact on the size of the corporate tax base of small firms, when using value added to approximate taxable profits. However, we cannot evaluate this aspect in greater detail due to differences in the exact definitions of taxable profits between the organizational forms, stemming from the fact that corporations are separately taxliable and partnerships are pass-through entities (profits taxed at the owner-level).

Our results above show that small corporations responded to the corporate tax rate cut by scaling up their overall production, but not by increasing their investments in productive capital. An increase in sales and inputs without an increase in investments may seem unintuitive given that there was no change in the effective dividend tax rate. However, the corporate tax cut creates a mechanical cash injection into the firm through increased net-of-tax retained earnings. Such additional resources can be particularly

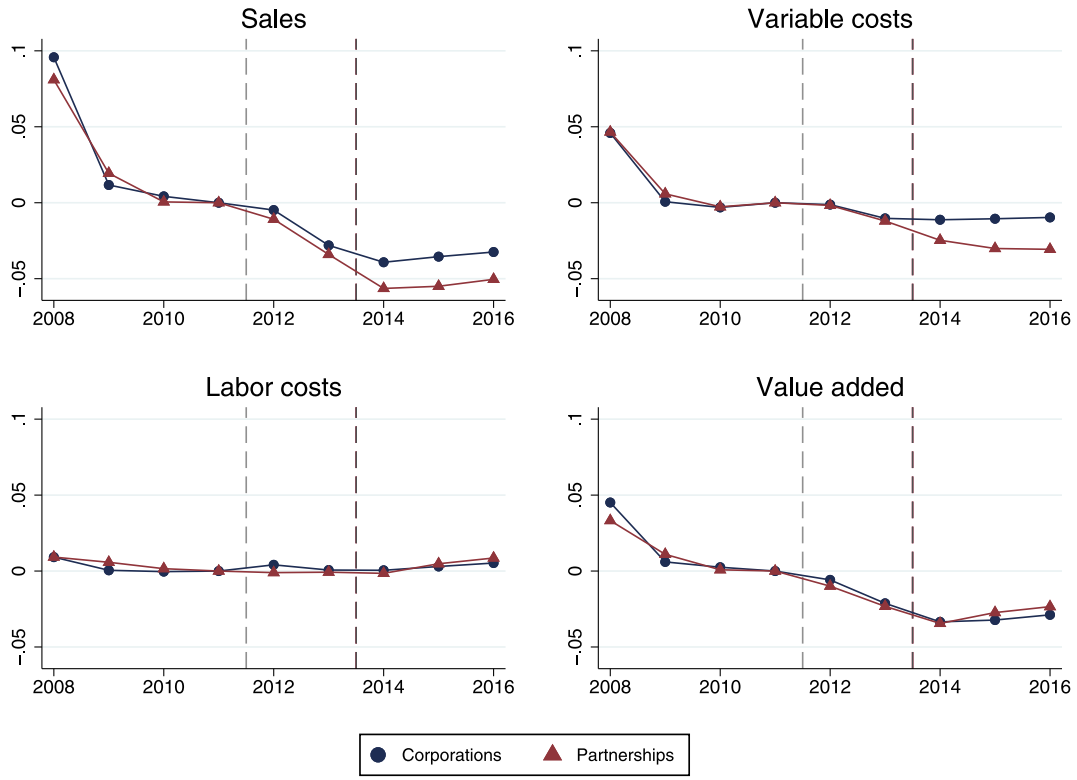

Fig. 5. Development of sales, variable costs, labor costs and value added, 2008–2016. Note: The figure plots the development of sales, variable costs, labor costs and value added scaled by firm-level sales in 2011 for corporations and partnerships using the baseline restricted sample and the re-weighting procedure with firm fixed effects. The development of each variable is presented relative to year 2011 (normalized to zero in the figure). The first vertical line denotes the smaller tax rate cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014.

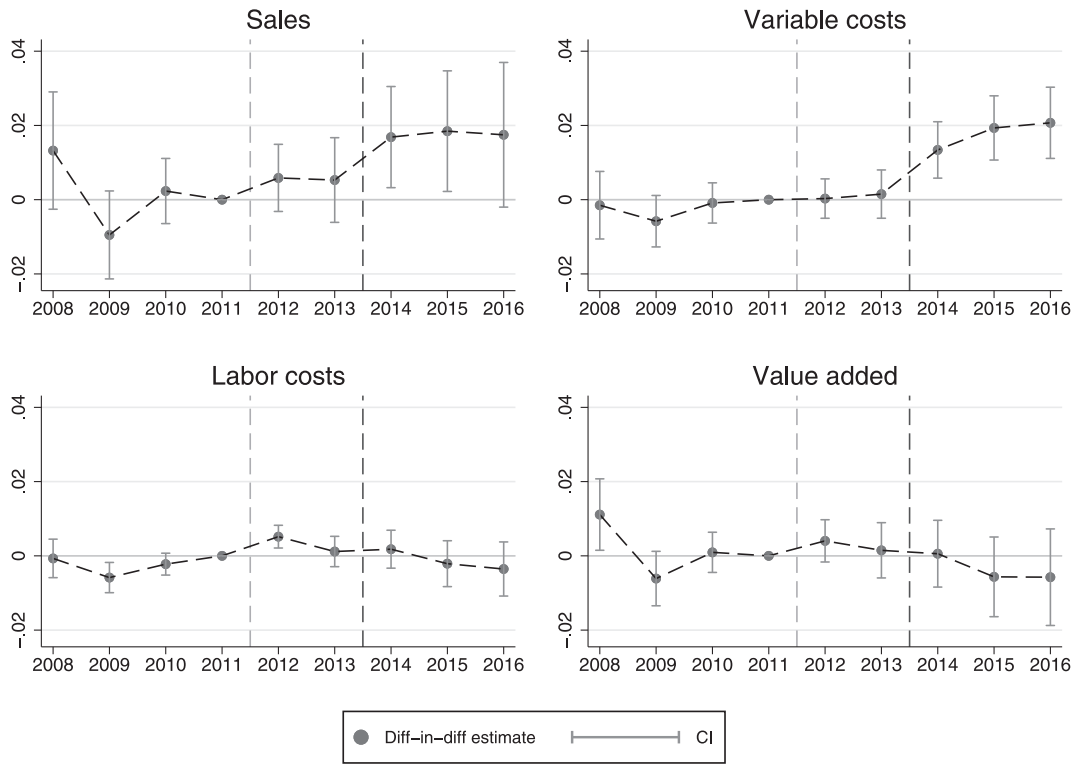

Fig. 6. Difference-in-differences estimates for sales, variable costs, labor costs and value added, 2008–2016. Note: The figure shows the difference-in-differences estimates and 95% confidence intervals for firm-level sales, variable costs, labor costs and value added relative to year 2011 using the restricted sample. The specifications include firm fixed effects and use the re-weighting strategy presented in Section 4. The first vertical line denotes the smaller corporate tax cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014.

Table 4
Difference-in-differences results: Business activity outcomes.

	Sales	Var.costs	Labor costs	Value added
$Treat_i \times Post_{2014}$	0.016*	0.020***	0.001	−0.005
	0.008	0.004	0.003	0.005
$Treat_i \times Post_{2012,2013}$	0.004	0.003	0.005**	0.001
	0.006	0.003	0.002	0.004
R2	0.424	0.683	0.746	0.648
N	326,415	326,415	326,415	326,415
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Weighting	X	X	X	X
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				

Note: The table shows the difference-in-differences estimates and firm-level clustered standard errors for firm-level sales, variable costs, labor costs and value added following the estimation procedure presented in Section 4. $Treat_i \times Post_{2014}$ presents the full effect of the 2012–2014 tax rate cuts, and $Treat_i \times Post_{2012,2013}$ the short-run effect of the first reform in 2012 for the years 2012–2013. All regressions include firm and year fixed effects and the re-weighting procedure.

important for smaller firms that might have limited opportunities to acquire other types of funding such as new equity or debt, but may still have new business opportunities to exploit. Fig. 13 in Appendix B further illustrates the increased cash resources due to the reforms. The figure describes that, on average, firm-level corporate taxes scaled by firm-level sales dropped right after both tax reforms in 2012 and 2014, suggesting that the corporate tax cuts increased the available funds within the firms. Therefore, the sales and inputs of small firms could still be affected by the reforms even without an effect on physical capital investments which typically require much greater resources. Below we discuss in greater detail the mechanisms that might further explain these results.

5.3. Heterogeneity of Response

Source of Finance and Age of the Firm. An important feature of our institutional setup is that the dividend tax rate was increased at the same time as the firm-level tax cut, indicating that the owner-level effective dividend tax rate remained constant. As discussed above in Section 3, this implies that if the investments of small firms are financed primarily by new equity, the observed small investment response can potentially be explained by a negligible change in the (effective) investment incentives of the owners.

In contrast, the simultaneous increase in the dividend tax rate is irrelevant for investment incentives if investments are financed by retained earnings or debt. Therefore, another feasible explanation for our finding is that the investments of younger and smaller firms are in general less responsive to changes in firm-level financial incentives, at least when compared to larger and more capital-intensive firms that are observed to actively increase their investments after the implementation of various investment subsidy policies analyzed in the earlier literature. Also, the responses in outcomes other than investments imply that the negligible average investment effect cannot be easily explained by unawareness or inattention to the reforms, or that the corporate tax rate cuts were in general irrelevant for firms.

We provide further suggestive evidence to support the above assertions by analyzing the heterogeneity behind our average results by the age of the firm. As discussed in Section 3, it has been argued that young and newly established firms are more prone to raising new equity instead of using debt or retained earnings to finance their new investments (see e.g. Auerbach, 1979). As we are studying relatively small firms, it could be that young firms relying mostly on new equity are driving the small average response obtained.

We evaluate the heterogeneity of the responses by the age of the firm by conducting a triple-differences estimation where we split our sample by the age of the firm using an age dummy that equals one if firm age is below 10 years, and zero otherwise. Panel A in Table 5 presents these results and the coefficients for $Treat_i \times Post_{2014}$ and this term interacted with the age dummy, illustrating the differences in responses between older and younger firms in the sample, respectively.

The results weakly suggest that younger firms (under 10 years) are more responsive in terms of new investments after the tax rate cut compared to older firms (over 10 years). However, the estimate for younger firms is still rather small (0.037) and statistically insignificant. Therefore, these results do not support the role of the old view in explaining our results, as in that case we would have expected the older firms to be more responsive in terms of investments.

From Panel A in Table 5 we further observe that sales and other business activity responses are slightly larger among younger firms compared to older firms, but again the estimates for younger firms are not statistically significant. These results tentatively suggest that reduced corporate tax rates can help to boost investments and other business activity in younger firms that might have more profitable business opportunities available but more limited resources to finance them. These results are in line with Benzarti et al. (2020), who show that younger firms are more responsive to additional cash injections compared to older firms, but the results provided in this study are weaker than those in Benzarti et al. (2020).

Cash Constraints, Active Owners and Industries. As discussed above, a notable share of the small firms in our sample may face cash constraints, and thus the additional cash resources provided by the corporate tax rate cut can be particularly relevant for them. We evaluate the heterogeneity of the response by the available cash resources by using a dummy variable of cash constraints that equals one if the share of liquid financial assets (cash, cash at bank, stock holdings, and other liquid funds) per total assets of the firm is below the median value (0.24) of this variable in 2010–2011. We then interact the difference-in-differences term ($Treat_i \times Post_{2014}$) with this dummy variable for corporations using an otherwise similar empirical approach as in our baseline analysis. Due to the different detailed accounting regulations of corporations and partnership firms, we cannot define a similar measure for cash constraints for both organizational forms, and therefore analyze

Table 5
Heterogeneity of the responses.

	Investments	Sales	Var. costs	Labor costs	Value added
Panel A					
$Treat_i \times Post_{2014}$	0.003	−0.018*	0.006	−0.011***	−0.024***
	0.013	0.009	0.005	0.003	0.006
$Treat_i \times Post_{2014}$					
× Young firms	0.037	0.025	0.012	0.009	0.012
	0.027	0.016	0.008	0.006	0.010
Panel B					
$Treat_i \times Post_{2014}$	−0.016	−0.004	0.015***	−0.005	−0.020***
	0.013	0.009	0.004	0.003	0.006
$Treat_i \times Post_{2014}$					
× Cash constrained	0.033**	0.044***	0.010**	0.014***	0.033***
	0.011	0.007	0.003	0.002	0.004
Panel C					
$Treat_i \times Post_{2014}$	0.003	−0.134***	−0.032***	−0.053***	−0.102***
	0.015	0.010	0.005	0.004	0.006
$Treat_i \times Post_{2014}$					
× Active owner	−0.006	0.197***	0.067***	0.071***	0.127***
	0.012	0.007	0.004	0.003	0.004

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

Note: Panel A shows the results for older and younger firms using a triple-differences estimator in which we include the terms $Treat_i \times Post_{2014} \times Young_i$, $Treat_i \times Young_i$ and $Post_{2014} \times Young_i$ in Eq. (1), where $Young_i$ is an indicator variable that equals one if a corporation or partnership is younger than 10 years in 2013, and zero otherwise. Panels B and C show the results for more and less cash-constrained corporations and corporations with active and passive main owners, and present the estimates for $Treat_i \times Post_{2014}$ interacted with an indicator variable. These regressions follow the estimation procedure presented in Section 4 but also include the term $Treat_i \times Post_{2014} \times Ind_i$, where Ind_i denotes the heterogeneity indicator (cash constraints, active owners) for the treatment group. All regressions in the table include firm and year fixed effects and the re-weighting procedure, and firm-level clustered standard errors. Definitions for each heterogeneity indicator are presented in detail in Table 2.

the heterogeneity by cash constraints only within the treatment group of corporations.

Panel B in Table 5 presents these results, which show that more cash-constrained firms respond to the reforms more actively compared to less cash-constrained firms. The interaction coefficients are statistically significant for all outcomes, including investments. Overall, these results suggest that firms with less available cash reserves respond more actively to the corporate tax rate cut. A plausible explanation for this finding is that a cash injection induced by the tax cut spurs the business activity of these firms in particular. These results are in line with the recent findings by Alstadsæter et al. (2017), who show that more cash-constrained firms responded to a dividend tax rate cut by increasing their investments in Sweden, even though there was no increase in aggregate investments due to this reform. Also, these results are similar in nature to those by Love (2022) who finds that more cash-constrained firms increased their R&D investments and business activity (variable costs) after the 2003 dividend tax cut in the US, whereas there were no effect for more cash-rich firms.

As discussed in Section 3, improved firm-level financial incentives might be more relevant for firms with more closely connected owners. For example, it has been argued that owner-managers are more actively involved in firm-level decisions and business activity compared to more passive owners or investors (see e.g. Smith et al., 2019), suggesting that they could also respond more strongly to improved firm-level financial incentives.

Panel C in Table 5 presents the results for firms with active and more passive owners using a dummy variable for active owner-managers for corporations and a similar estimation strategy as above for more and less cash-constrained firms. We find that the investment responses do not differ between active and more passive owners, indicating that our insignificant average investment response does not mask any significant investment effects for more active owners.[9] However, we find significantly larger responses for active owners compared to more passive owners for sales, variable costs, labor costs and value added. These results suggest that the responses to the tax cut for these outcomes are closely linked to the role of the owner in the firm. Given that our sample covers relatively small firms with only six employees on average, this evidence also suggests that a corporate tax rate cut could affect the work input and effort of active owner-managers. This evidence aligns with the recent paper by Smith et al. (2019) highlighting the role of the main owner behind firm decisions and performance in the US. However, we view these results as mostly suggestive, as we cannot divide our control group of partnership firms into those with active vs. passive owners (all main owners of partnerships are labeled as active), and we do not have data available to split partnerships by the available cash resources similarly as for the corporations. Therefore, in these heterogeneity analyses we cannot apply a more credible triple-differences approach as we did for younger vs. older firms above.[10]

Table 6 shows the heterogeneity of the results by industry using a similar estimation strategy as above in panel A of Table 5. To keep the analysis tractable, the table shows how the responses differ for firms operating in three major industries, including manufacturing, construction and retail & wholesale, compared to other industries comprising mainly various services and hospitality.

We find no significant differences in investment responses between industries, which supports the view that our negligible average investment response does not mask any significant responses among more capital-intensive sectors such as manufacturing and construction. However, we observe larger responses in sales and variable costs in other industries compared to manufacturing and retail & wholesale. This suggests that the cash injection provided by the corporate tax cut had the largest impact on busi-

[9] Similarly, a recent paper by Moon, 2022 finds no statistically significant difference between the investment responses of firms with different ownership structures to changes in capital gains taxes in South Korea.

[10] Also, interpreting these heterogeneity results could be challenging if the characteristics studied above are strongly correlated with each other in our sample. However, the correlations between the indicators are small. Correlation between the cash constraint and active owner indicators is 0.015, young and active owners 0.025, and young and cash constraint 0.016. Therefore, we believe that the potential concern regarding high correlation between these measures is not a major issue for our analysis.

Table 6
Heterogeneity of the response by industry.

	Investment	Sales	Var.costs	Labor costs	Value added
$Treat_i \times Post_{2014}$	−0.000	0.032***	0.035***	0.004	−0.006
	0.013	0.009	0.004	0.003	0.006
$Treat_i \times Post_{2014}$×Manufacturing	−0.003	−0.039***	−0.024***	−0.019***	−0.014*
	0.017	0.011	0.005	0.004	0.007
$Treat_i \times Post_{2014}$× Construction	−0.020	0.008	−0.006	0.004	0.018**
	0.014	0.009	0.005	0.004	0.006
$Treat_i \times Post_{2014}$×Retail and wholesale	0.013	−0.067***	−0.063***	−0.010***	−0.003
	0.016	0.009	0.005	0.003	0.005
R2	0.191	0.426	0.685	0.746	0.649
N	292,306	326,415	326,415	326,415	326,415
Firm FEs	X	X	X	X	X
Year FEs	X	X	X	X	X
Weighting	X	X	X	X	X

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

Note: The table shows the triple-difference estimates and firm-level clustered standard errors for the main outcomes following the same estimation procedure as in Panel A of Table 5. $Treat_i \times Post_{2014}$ interacted with industry indicators report the coefficients for three major industries (manufacturing, construction, retail & wholesale). Other industries are included in the omitted category, and contain mainly various services and hospitality.

ness activity for less capital-intensive industries and services. Similarly, Love (2022) finds that the 2003 dividend tax rate cut in the US helped to boost the business activity of smaller and less capital-intensive firms compared to more capital-intensive and cash-rich firms. We further discuss the implications of these findings in Section 6.

5.4. Other Outcomes

Firm Entry. In order to ensure that we are not disregarding any potential effects on new business creation, we also examine the entry decisions of firms. Fig. 7 plots the share of new corporations and partnerships relative to existing firms, and Table 7 tabulates the number of all firms and the share of new firms in 2008–2016. Over the last decade, privately held corporation has been a more popular organizational form for new firms than partnerships in Finland, but the share of new firms has been decreasing in both groups over time.[11] More importantly, there appears to be no significant change in this longer-run trend that could be clearly associated with the corporate tax cuts. Therefore, we conclude that the tax cuts did not accelerate new business creation, although we admit that this evidence is mostly descriptive. Note also that as the owner-level effective tax rates remained unchanged, it is likely that the changes in incentives for firm entry induced by the reforms are only small.[12]

Dividends and Income-shifting Between Tax Bases. One additional behavioral margin that could be relevant to firm owners is dividend payouts and income-shifting between tax bases. Such responses are well documented in the recent empirical literature studying the effects of income taxes for business owners and entrepreneurs (see e.g. Chetty and Saez, 2005; le Maire and Schjerning, 2013 and Harju and Matikka, 2016). However, as discussed above in Sections 2 and 3, the tax incentives for withdrawing dividend (or wage) income did not change in the reforms for the owners of small corporations. To illustrate that the reforms did not create any changes in dividend payments and the income composition, Fig. 12 in Appendix B plots the average share of dividends of total income withdrawn from the firm (wages + dividends) for the main owners of corporations in our baseline sample. Evidently, the share of dividend income has been relatively constant before and after the reform, implying no significant dividend or income-shifting responses, as expected.[13]

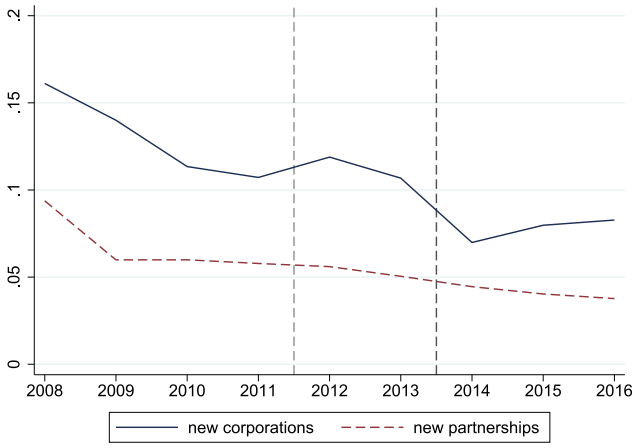

Fig. 7. Shares of new firms, 2008–2016. Note: The figure shows the shares of new firms relative to the total number of existing firms for both corporations and partnerships in 2008–2016. We define a firm as a new firm based on the year when the firm is first observed in tax record data. The first vertical line denotes the smaller corporate tax cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014.

5.5. Robustness Checks

We conduct several additional analyses to assess the robustness of our baseline results. These results are all collected in Appendix A. First, we conduct a difference-in-differences analysis for the business activity outcomes in euros instead of normalizing them by firm-level sales in 2011 as in the baseline analysis. Fig. 8 shows the development of sales, variable costs, labor costs and value added for corporations and partnerships in 2008–2016,

[11] Firm entry rates have also been declining over the last decade in many other developed countries including the US, as documented and discussed in e.g. Decker et al. (2016).

[12] In addition, the corporate tax rate cut could affect the exit of firms if, for example, larger firms bought out smaller firms to a larger extent after the tax cut than before it. However, Table 7 shows that there is no clear reduction in the number of existing firms after 2014, suggesting that this type of effect does not appear to be significant.

[13] The income tax system for the owners of partnership firms does not include similar income-shifting incentives as they do not have the opportunity to withdraw income from their firms in the form of dividends. Therefore, the owners of partnership firms are unable to directly shift income from one tax base to another, and we cannot plot a similar measure for them in the figure. Correspondingly, we cannot plot a figure for the evolution of dividend payments for the owners of partnership firms.

Table 7
New firms of all firms (unrestricted data).

Year	Old corp.		Old part.		New corp.		New part.		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
2008	46,656	50.9	34,344	37.4	7517	8.2	3220	3.5	91,737	100.0
2009	49,052	53.1	34,445	37.3	6868	7.4	2063	2.2	92,428	100.0
2010	51,295	55.4	33,543	36.2	5818	6.3	2010	2.2	92,666	100.0
2011	53,865	57.0	32,975	34.9	5774	6.1	1907	2.0	94,521	100.0
2012	56,011	57.8	32,363	33.4	6658	6.9	1813	1.9	96,845	100.0
2013	59,348	60.1	31,542	31.9	6338	6.4	1592	1.6	98,820	100.0
2014	55,642	60.8	30,640	33.5	3888	4.2	1364	1.5	91,534	100.0
2015	56,102	61.4	29,582	32.4	4475	4.9	1193	1.3	91,352	100.0
2016	57,443	62.8	28,241	30.9	4753	5.2	1064	1.2	91,501	100.0
Total	485,414	57.7	287,675	34.2	52,089	6.2	16,226	1.9	841,404	100.0

Note: The table shows the number (No.) and relative share (%) of existing corporations (Old corp.) and partnerships (Old part.) and the number and share of new corporations (New corp.) and partnerships (New part.), and the total number of firms in 2008–2016 in the unrestricted full data.

and Fig. 9 shows the estimates for the differences between the firm groups for these outcomes each year with 95% confidence intervals. The implications from these figures are similar as in our baseline results: the outcomes for both groups follow each other closely before the reforms, and both the sales and variable costs of corporations increased significantly relative to partnerships after 2014. Table 8 presents the associated difference-in-differences estimates, which confirm the findings from the figures. The point estimates imply a 3.8% increase in sales and a 6.8% increase in variable costs after 2014 relative to the mean values in 2011.

Second, Table 9 shows the regression results using balanced panel data, i.e. using a sample of firms which we observe in our tax record data every year in 2008–2016. The estimates for this sample are, on average, slightly larger compared to our main results, but the overall interpretation is similar as in our baseline analysis. It is, however, noteworthy that the size of our baseline sample in the main analysis is twice as large compared to the balanced panel sample. One reason for this is that we are studying small firms that are more likely to exit compared to larger and more mature firms, which leads to a smaller sample size when using fully balanced panel data.

Third, Tables 10 and 11 present the results when varying the winsorizing choices. Table 10 shows that the results without winsorizing are very similar to our baseline estimates with 1% winsorizing, especially regarding the business activity outcomes. However, the investment estimate in the first column highlights the importance of accounting for extreme outliers for small firms with relatively small capital assets, as the standard error of the unwinsorized difference-in-differences estimate is very large, 1.2 in comparison to 0.012 in our baseline model. Table 11 shows that the results are also very similar to our baseline analysis for each outcome with 2.5% winsorizing.

Fourth, Fig. 10 plots the business activity outcomes without using the re-weighting procedure, and Table 12 shows the corresponding difference-in-differences estimates using an otherwise similar specification as in our main analysis. The figure and the estimates indicate that re-weighting does not significantly change the development of the outcomes between the groups before the reforms or the qualitative implications of the results compared to our baseline analysis. However, the point estimates for the business activity outcomes are larger when not using the re-weighting strategy. As shown above in Table 3, the estimates for investments per lagged capital are small and insignificant also when using the unweighted specification. In addition, Table 13 shows the results when we normalize investments by firm-level sales and capital assets in 2011 instead of lagged capital assets. Overall, these results are similar as in our baseline analysis, finding no significant average investment effects.[14]

Finally, Table 14 shows that the exact sample restrictions do not affect our results in a meaningful manner. In the table we vary the sample restrictions by reducing and increasing the upper and lower sales limits of the sample by 20%, but these modifications do not significantly affect the estimates of interest compared to our baseline results presented above.

6. Discussion

In this paper, we provide novel evidence of how small, privately held corporations responded to a sizeable 6 percentage-point corporate tax rate cut implemented together with a dividend tax increase that left the owner-level effective dividend tax unchanged. We find no significant average impact of the tax cuts on investments when comparing small corporations to otherwise similar partnership firms that were unaffected by the reforms. This suggests that reducing the corporate tax rate is not an effective measure for spurring capital investments among small firms, at least in the short run. However, we find a moderate increase in sales and input usage after the tax cut. We find that the observed effects are larger for firms that had less available cash resources before the reforms and for firms that are owned by active owner-managers rather than more passive investors.

Our findings illustrate that small firms can respond to tax cuts on other relevant margins than capital investments. Our results further suggest that the additional cash resources provided by the tax cut are important in explaining these findings. Our results complement the recent finding of Love (2022) that the 2003 dividend tax rate cut in the US helped to boost the business activity of more cash-constrained firms, whereas there were no effects for more cash-rich firms. Relatedly, Zwick and Mahon (2017) find that bonus depreciations in the US were significantly more effective in increasing investments among firms with low cash holdings. Also, Boissel and Matray (2022) find that a large increase in dividend taxes in France cut the dividend payments of privately held firms, but the firms used part of the additional retained earnings to invest more. These findings suggest that more targeted policies aiming at enhancing financial resources among cash-constrained and growing firms with available profitable business opportunities can be a cost-effective way of increasing investments and business activity, compared to universal tax cuts which in many cases tend not

[14] Note that due to slightly different pre-trends in these scaled outcomes, we control for the linear time trends separately for control and treatment firms in these specifications.

to increase investments and business activity among more established cash-rich firms (see e.g. Yagan, 2015 and Love, 2022).

Moreover, our setup provides novel evidence of the effects of a reform including an actively debated shift of the tax burden from corporate taxes toward the personal income taxes of owners (see e.g. Grubert and Altshuler, 2016 and Devereux, 2019). In principle, such a reform could provide a way to increase investments and business activity in a more cost-effective manner if improved firm-level financial incentives are the key factor explaining the business decisions of firms, and if the increased owner-level taxes do not distort investment decisions by a similar magnitude. In other words, the tax revenue losses from the reduced corporate tax rate could be alleviated by an increase in owner-level taxes while simultaneously boosting investments and business activity. However, our evidence shows that such reform does not appear to increase average firm-level investments, but this type of a reform can still increase the scale of other business activity, at least among smaller firms. Our results suggest that increased cash reserves at the firm level after the tax cuts appears to be a key factor behind these responses.

Nevertheless, more empirical and theoretical research is needed in the future to better understand how small and growing firms and their owners respond to changes in financial incentives and available financial resources, and what the important drivers of these responses might be. Declining firm entry rates and productivity in many developed countries (see e.g. Decker et al., 2016) pose serious economic challenges that further underline the need for additional research on the incentives affecting young and growing firms.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Appendix: Robustness Checks

Figs. 8–10.
Tables 8–14.

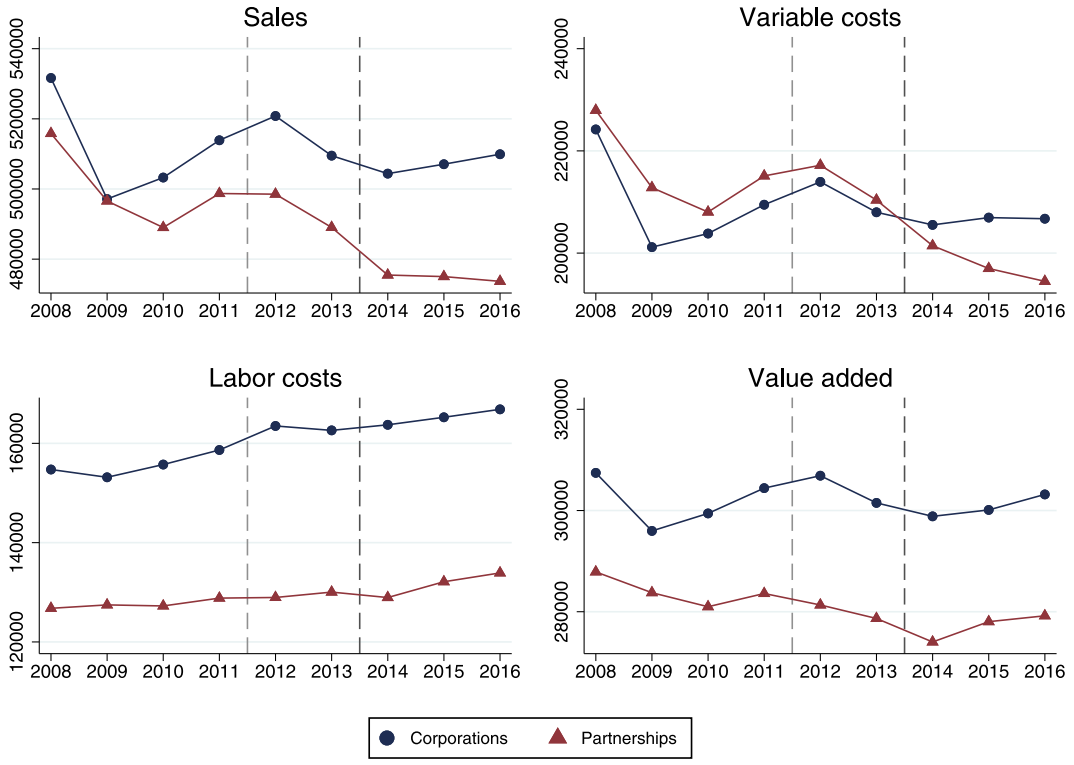

Fig. 8. Development of sales, variable costs, labor costs and value added, 2008–2016: Outcomes in euros. Note: Figure plots the development of sales, variable costs, labor costs and value added in euros in 2008–2016 for corporations and partnerships using the restricted sample in 2011 and the re-weighting procedure with firm-fixed effects. The first vertical line denotes the smaller corporate tax rate cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014. The values are deflated to the price level of 2011.

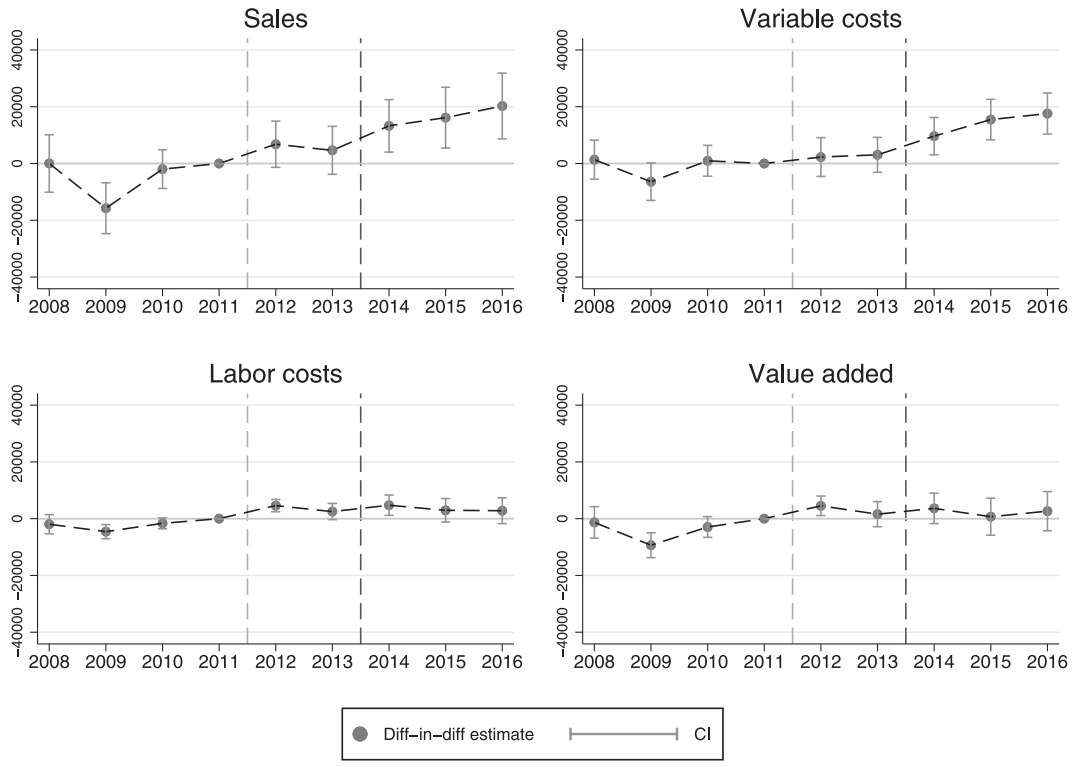

Fig. 9. Difference-in-differences estimates for sales, variable costs, labor costs and value added, 2008–2016: Outcomes in euros. Note: The figure shows the difference-in-differences estimates for firm-level sales, variable costs, labor costs and value added estimated using the levels of the variables (in euros) relative to year 2011 using the baseline restricted sample in 2008–2016. The specifications include firm fixed effects and use the re-weighting strategy presented in Section 4. The first vertical line denotes the smaller tax rate cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014. The values are deflated to the price level of 2011.

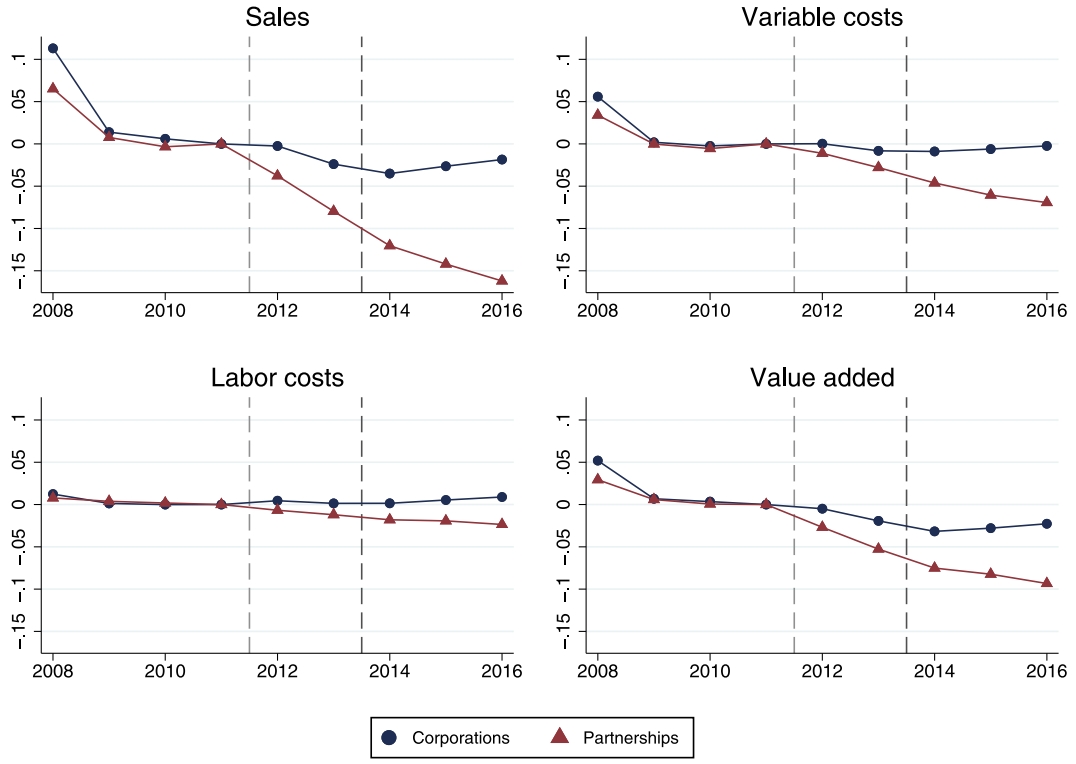

Fig. 10. Development of sales, variable costs, labor costs and value added, 2008–2016: Unweighted. Note: The figure plots the development of sales, variable costs, labor costs and value added scaled by sales in 2008–2016 for corporations and partnerships using the restricted sample with firm fixed effects but without using the re-weighting procedure. The development of each variable is presented relative to year 2011 (normalized to zero in the figure). The first vertical line denotes the smaller corporate tax rate cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014.

Table 8
Difference-in-differences results: Outcomes in euros.

	Sales	Var.costs	Labor costs	Value added
$Treat_i \times Post_{2014}$	20,592***	14,961***	5527**	5631
	5033	3260	1962	3033
$Treat_i \times Post_{2012,2013}$	9958**	3612	5532***	6346**
	3818	2683	1340	2071
R2	0.807	0.772	0.868	0.828
N	326,415	326,415	326,415	326,415
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Weighting	X	X	X	X
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				

Note: The table shows the difference-in-differences estimates and firm-level clustered standard errors for firm-level sales, variable costs, labor costs and value added following the estimation procedure presented in Section 4 and using the euro values for each outcome. $Treat_i \times Post_{2014}$ presents the full effect of the 2012–2014 tax rate cuts, and $Treat_i \times Post_{2012,2013}$ the short-run effect of the first reform in 2012 for the years 2012–2013. All regressions include firm and year fixed effects and the re-weighting procedure. The values are deflated to the price level of 2011.

Table 9
Differences-in-differences results: Outcomes estimated with balanced panel data.

	Investments	Sales	Var.costs	Labor costs	Value added
$Treat_i \times Post_{2014}$	−0.007	0.054***	0.029***	0.013***	0.023***
	0.011	0.008	0.004	0.003	0.005
$Treat_i \times Post_{2012,2013}$	0.011	0.011	−0.001	0.008***	0.012**
	0.014	0.006	0.003	0.002	0.004
R2	0.138	0.356	0.675	0.751	0.644
N	159,996	166,104	166,104	166,104	166,104
Firm fixed effects	X	X	X	X	X
Year fixed effects	X	X	X	X	X
Weighting					
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Note: The table shows the difference-in-differences estimates and firm-level clustered standard errors for investments per lagged capital assets, and firm-level sales, variable costs, labor costs and value added scaled by firm-level sales in 2011 using balanced panel data and following the estimation procedure presented in Section 4. $Treat_i \times Post_{2014}$ presents the full effect of the 2012–2014 tax rate cuts, and $Treat_i \times Post_{2012,2013}$ the short-run effect of the first reform in 2012 for the years 2012–2013.

Table 10
Difference-in-differences results: Outcomes estimated without winsorizing the variables.

	Investment	Sales	Var.costs	Labor costs	Value added
$Treat_i \times Post_{2014}$	0.540	0.027**	0.025***	0.004	0.002
	1.204	0.010	0.006	0.004	0.006
$Treat_i \times Post_{2012,2013}$	0.413	0.007	−0.000	0.009**	0.007
	1.083	0.008	0.005	0.003	0.005
R2	0.133	0.433	0.523	0.673	0.590
N	292,306	326,415	326,415	326,415	326,415
Firm fixed effects	X	X	X	X	X
Year fixed effects	X	X	X	X	X
Weighting	X	X	X	X	X
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Note: The table shows the difference-in-differences estimates and firm-level clustered standard errors in parentheses for investments per lagged capital assets, and firm-level sales, variable costs, labor costs and value added scaled by firm-level sales in 2011 following the estimation procedure presented in Section 4 but without winsorizing the outcome variables (baseline winsorizing at 1% level). $Treat_i \times Post_{2014}$ presents the full effect of the 2012–2014 tax rate cuts, and $Treat_i \times Post_{2012,2013}$ the short-run effect of the first reform in 2012 for the years 2012–2013.

Table 11
Difference-in-differences results: Outcomes estimated by winsorizing the variables by 2.5%.

	Investment	Sales	Var.costs	Labor costs	Value added
$Treat_i \times Post_{2014}$	−0.004	0.017*	0.021***	0.002	−0.004
	0.015	0.008	0.004	0.003	0.006
$Treat_i \times Post_{2012,2013}$	0.024	0.005	0.002	0.006**	0.002
	0.017	0.006	0.003	0.002	0.004
R2	0.184	0.433	0.660	0.735	0.639
N	292,306	326,415	326,415	326,415	326,415
Firm fixed effects	X	X	X	X	X
Year fixed effects	X	X	X	X	X
Weighting	X	X	X	X	X
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Note: The table shows the difference-in-differences estimates and firm-level clustered standard errors in parentheses for investments per lagged capital assets, and firm-level sales, variable costs, labor costs and value added scaled by firm-level sales in 2011 following the estimation procedure presented in Section 4 but by winsorizing the outcome variables by 2.5% (baseline winsorizing at 1% level). $Treat_i \times Post_{2014}$ presents the full effect of the 2012–2014 tax rate cuts, and $Treat_i \times Post_{2012,2013}$ the short-run effect of the first reform in 2012 for the years 2012–2013.

Table 12
Difference-in-differences results: Business activity outcomes, unweighted.

	Sales	Var.costs	Labor costs	Value added
$Treat_i \times Post_{2014}$	0.099***	0.046***	0.025***	0.050***
	0.006	0.003	0.002	0.004
$Treat_i \times Post_{2012,2013}$	0.031***	0.009***	0.012***	0.022***
	0.005	0.003	0.002	0.003
R2	0.406	0.670	0.745	0.637
N	326,415	326,415	326,415	326,415
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Weighting				
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				

Note: The table shows the difference-in-differences estimates and firm-level clustered standard errors for firm-level sales, variable costs, labor costs and value added following the estimation procedure presented in Section 4 but without using the re-weighting procedure. $Treat_i \times Post_{2014}$ presents the full effect of the 2012–2014 tax rate cuts, and $Treat_i \times Post_{2012,2013}$ the short-run effect of the first reform in 2012 for the years 2012–2013. All regressions include firm and year fixed effects.

Table 13
Difference-in-differences results: Investment scaled by sales and capital assets in 2011.

Dependent variable	Investment per sales in 2011	Investment per capital in 2011
$Treat_i \times Post_{2014}$	−0.004	−0.002
	0.003	0.022
$Treat_i \times Post_{2012,2013}$	−0.001	0.008
	0.002	0.016
R2	0.431	0.267
N	326,415	305,334
Firm FEs	X	X
Year FEs	X	X
Weighting	X	X
Linear trend	X	X
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$		

Note: The table shows the difference-in-differences estimates and firm-level clustered standard errors for investments scaled by sales in 2011 in the first column and for investments scaled by capital in 2011 in the second column, following the estimation procedure presented in Section 4. $Treat_i \times Post_{2014}$ presents the full effect of the 2012–2014 tax rate cuts, and $Treat_i \times Post_{2012,2013}$ the short-run effect of the first reform in 2012 for the years 2012–2013. In addition to firm and year fixed effects and weighting, the regressions include linear time trend control separately for control and treatment groups.

Table 14
Difference-in-differences results: Varying the baseline sample restrictions.

Sample restrictions for 2011 annual sales								
Lower limit	100,000	100,000	80,000	80,000	80,000	120,000	120,000	120,000
Upper limit	1,867,689.2	2,801,533.8	2,334,611.5	1,867,689.2	2,801,533.8	2,334,611.5	1,867,689.2	2,801,533.8
Investment per lagged capital								
$Treat_i \times Post_{2014}$	0.002	−0.003	0.001	0.003	0.001	−0.001	−0.000	−0.001
	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
R2	0.190	0.192	0.190	0.189	0.191	0.193	0.191	0.194
N	286,149	296,280	317,139	310,982	321,113	269,806	263,649	273,780
Sales								
$Treat_i \times Post_{2014}$	0.015	0.017*	0.013	0.012	0.016*	0.021*	0.019*	0.022**
	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
R2	0.423	0.425	0.430	0.429	0.430	0.422	0.420	0.424
N	319,585	330,824	355,051	348,221	359,460	300,626	293,796	305,035
Variable costs								
$Treat_i \times Post_{2014}$	0.023***	0.024***	0.022***	0.021***	0.022***	0.025***	0.024***	0.025***
	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
R2	0.681	0.684	0.679	0.677	0.681	0.684	0.682	0.686
N	296,661	307,705	327,551	320,824	331,868	281,204	274,477	285,521
Labor costs								
$Treat_i \times Post_{2014}$	0.000	0.001	−0.001	−0.002	−0.001	0.002	0.002	0.003
	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
R2	0.746	0.751	0.742	0.739	0.744	0.754	0.750	0.756
N	306,671	317,675	339,476	332,785	343,789	289,589	282,898	293,902
Value added								
$Treat_i \times Post_{2014}$	0.002	0.003	0.002	0.001	0.003	0.004	0.003	0.004
	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
R2	0.672	0.681	0.670	0.665	0.674	0.684	0.679	0.688
N	296,661	307,705	327,551	320,824	331,868	281,204	274,477	285,521

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

Note: The table shows the difference-in-differences estimates ($Treat_i \times Post_{2014}$) and firm-level clustered standard errors when varying the sample restrictions for investment per lagged capital, and firm-level sales, variable costs, labor costs, and value added scaled by firm sales in 2011. All regressions follow the estimation procedure presented in Section 4 and include firm and year fixed effects and uses the re-weighting procedure. We vary the baseline sample restrictions by reducing and increasing the upper (2,503,624 euros) and lower (100,000 euros) sales limits of the sample by 20%.

Appendix B. Appendix: Additional Figures and Tables

Fig. 11–13.
Table 15.

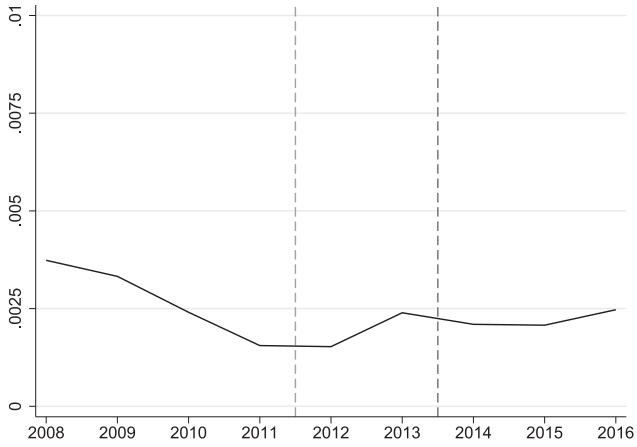

Fig. 11. Share of partnership firms that changed their organizational form to a corporation, 2008–2016. Note: The figure shows the share of partnership firms that changed their organizational form to a corporation in 2008–2016. The first vertical line denotes the smaller corporate tax rate cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014. The figure illustrates that the share of firms changing their organizational form is very small, around 0.25% each year, and that there is no significant change in the share at the time of the corporate tax rate cuts.

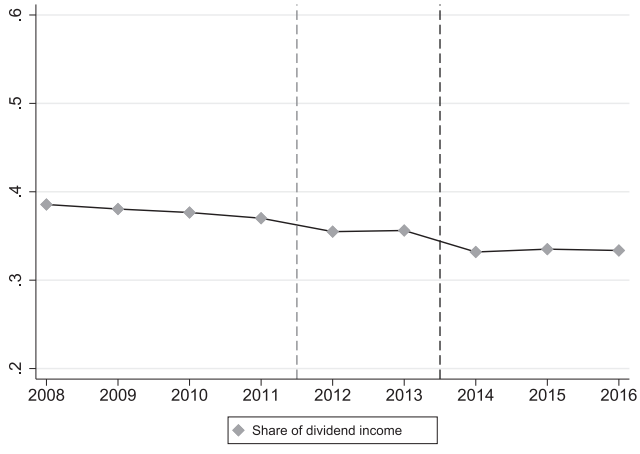

Fig. 12. The average share of dividends of total income withdrawn from the firm (wages + dividends), 2008–2016. Note: The figure plots the average share of dividends of total income (dividends + wages) withdrawn from the firm for the owners of privately held corporations in the baseline restricted sample in 2008–2016. The first vertical line denotes the smaller corporate tax rate cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014. The figure shows that there is no detectable change in dividend payments around the reforms.

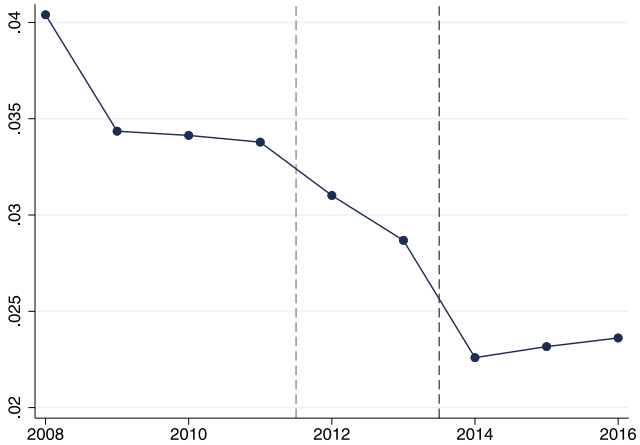

Fig. 13. Development of firm-level corporate tax revenue (scaled by sales), 2008–2016. Note: The figure plots the development of corporate taxes paid by the corporations scaled by firm-level sales in 2011 using the baseline sample. The first vertical line denotes the smaller tax rate cut in 2012 from 26% to 24.5%, and the second line the larger tax rate cut from 24.5% to 20% in 2014. The figure illustrates that the average firm-level corporate taxes per sales reduced right after the corporate tax rate cuts were implemented, which can be expected.

Table 15
Sample restrictions – number of observations excluded.

Corporate form	Total		Sample restrictions							
			Below		Above		Net assets		Sample	
	N	Row %	N	Row %	N	Row %	N	Row %	N	Row %
Corporation	413,696	100.0	134,167	32.4	33,781	8.2	24,559	5.9	221,189	53.5
Partnership	268,359	100.0	151,683	56.5	2,955	1.1	8,409	3.1	105,312	39.2

Note: This table reports the number of observations excluded from the full data covering the tax records of all corporations and partnerships in Finland in 2008–2016. The first column reports the number of observations in the full data. The second column reports the number of observations excluded because the sales of the firm was under 100,000 euros in 2011, the third column reports observation excluded because of the upper sales limit in 2011 and the fourth column reports the number of observations excluded because of the net asset restriction. The final column reports the number of observations in our baseline sample.

Appendix C. Appendix: Business tax system in Finland

In this Appendix, we describe the main features and recent changes in the taxation of privately held (non-listed) corporations and partnership firms.

C.1. Privately held corporations

Privately held corporations are separately tax-liable, meaning that their profits are taxed at the firm level according to the corporate tax rate. Recently, the tax rate for corporate profits was reduced from 26% to 24.5% in January 2012, and after that from 24.5% to 20% in January 2014.

Owners of privately held corporations pay an additional tax on the income withdrawn from the firm. Income withdrawn from the firm can be paid to the owner either as wages or dividends. The wage income tax schedule is progressive, and the tax rates vary between 0–55%. Wage income taxation contains three different parts: a central government progressive tax schedule, proportional municipal-level taxes, and employee's social security contributions. Over the last decade, there have not been any significant changes in wage taxation in Finland.

The dividend tax schedule for the owners of privately held corporations includes many different thresholds and rules. The imputed return on the net assets of the firm, calculated as a fixed percentage share of 8% of firm-level net assets (assets minus debt) divided by the ownership share of the shareholder, defines the amount of dividends that are taxed at an effective tax rate of 26%. This rate includes both owner-level dividend taxes and corporate taxes. This dividend income is 75% tax-free, and 25% is taxed as personal capital income at a rate of 30%. Combined with the corporate tax of 20%, this yields an effective tax rate of 26% (0.20 +(0.8*0.25*0.30)=0.26). The rate increases to 26.8% if the annual personal capital income of the owner exceeds 30,000 euros, since then the personal capital income tax rate increases to 34%. Dividend income above the computational net asset threshold is 15% tax-free, and 85% is taxed according to the progressive wage tax schedule excluding social security contributions. Finally, dividends below the net asset threshold but above a predetermined monetary threshold of 150,000 euros are subject to a tax rate of 40.4% (43.1% if personal capital income exceeds 30,000 euros). This dividend income is 15% tax-free and 85% is taxable as personal capital income.

There have been several changes in these rules and thresholds over the last decade in Finland. Table 16 summarizes the thresholds and rules affecting dividend and corporate tax rates from 2006 to 2016, and Table 17 presents the equivalent effective dividend tax rates over time in different regimes. The computational return on net assets was lowered from 9% to 8% in 2014. Also, the share of dividend income below the imputed return on net assets that was taxed as capital income was increased from zero to 25% at the same time as the corporate tax cut in 2014. This implied that the effective dividend tax rate remained at 26% both before and after the 2012–2014 reforms for dividends below the net assets threshold, as illustrated in the first column of Table 17. Also, the share of dividends taxed as wage income above the net asset thresholds increased from 70% to 75% in 2014, and the share of dividends taxed as capital income above the 150,000 euro threshold but below the net asset threshold increased from 70%

Table 16
Dividend tax thresholds and corporate and capital income tax rates, 2006–2016.

Year	Net asset threshold (NAT)	Monetary threshold (MT)	Tax-exempted D < NAT	Tax-exempted D < NAT & D > MT	Tax-exempted D > NAT	Corporate tax rate	Capital income tax rate	Capital income tax threshold
2006–2011	9%	90,000	100%	30%	30%	26%	28%	0
2012–2013	9%	60,000	100%	30%	30%	24.5%	30/32%	50,000
2014	8%	150,000	75%	15%	25%	20%	30/32%	40,000
2015	8%	150,000	75%	15%	25%	20%	30/33%	30,000
2016–2018	8%	150,000	75%	15%	25%	20%	30/34%	30,000

Notes: D refers to dividends, NAT refers to the net asset threshold and MT refers to the monetary threshold. Tax-exempted share denotes the share of tax-free dividends within each regime. When D > NAT, the remaining share is taxed as labor income, otherwise the capital income tax schedule is used. Capital income tax rate denotes the capital income tax rates below and above the capital income tax threshold.

Table 17
Effective dividend tax rates, 2006–2016.

Year	D < NAT and D < MT	D < NAT and D > MT	D > NAT
2006–2011	26%	40.5%	54.5%
2012–2013	24.5%	40.3%	53.6%
2014	26% (26.4%)	40.4% (41.8%)	53%
2015	26% (26.6%)	40.4% (42.4%)	53%
2016–2018	26% (26.8%)	40.4% (43.1%)	53%

Notes: D refers to dividends, NAT refers to the net asset threshold and MT refers to the monetary threshold. Figures in brackets refer to effective dividend tax rates above the capital income tax threshold.

Table 18
Tax rates of partnership firms, 2006–2016.

	Effective tax rate below the 20% net asset threshold	Effective rate above the 20% net asset threshold
2006–2011	26.6%	0-~55%
2012–2018	28.5 (30.4%)	0-~55%

Note: The table shows the tax rates on the profits of partnership firms (taxed at the owner-level) in 2006–2016. The progressive wage income tax rate is applied to profits exceeding the imputed 20% return on firm net assets. Figures in brackets refer to effective tax rates above the capital income tax threshold.

to 85% in 2014. Nevertheless, combined with the corporate tax rate cuts, these changes did not significantly affect the effective dividend tax rates presented in the second and third columns of Table 17. Furthermore, in 2012, the monetary threshold was first reduced from 90,000 to 60,000 euros in 2012, and then increased to 150,000 euros in 2014. The latter increase in the threshold implied a reduction in the effective dividend tax rate for the owners of large corporations with large firm-level net assets (i.e. for owners with firm net assets divided by the ownership share above 1,125,000 euros) whose dividend income withdrawn from the firm exceeded 60,000 euros.

C.2. Partnership firms

A partnership is a pass-through entity, meaning that its profits are taxed only at the owner level. Owners of partnership firms also have a firm-level net asset threshold in their income tax schedule. Profits that fall under a 20% firm net asset threshold are taxed according to the personal capital income tax schedule, and any income above the threshold is taxed as the wage income of the owner. The net assets of partnership firms are defined as assets - debt + 30% of labor costs, while corporations follow a simpler assets - debt definition. In 2012, the effective marginal tax rate for profits below the net asset threshold was increased slightly from 26.6% to 28.5% (30.4% if capital income exceeds 30,000 euros). There were no changes in the taxation of partnership firms at the time of the corporate tax rate cut in 2014. The effective owner-level tax rates and their recent changes for the owners of partnership firms are described in Table 18.

References

Alstadsæter, A., Jacob, M., Michaely, R., 2017. Do dividend taxes affect corporate investment? J. Public Econ. 151, 74–83.
Auerbach, A., 1979. Wealth maximization and the cost of capital. Quart. J. Econ. 93 (3), 433–446.
Bennedsen, M., Wolfenzon, D., 2000. The balance of power in closely held corporations. J. Financ. Econ. 58 (1), 113–139.
Benzarti, Y., Harju, J., Matikka, T., 2020. Does mandating social insurance affect entrepreurial activity? Am. Econ. Rev.: Insights 2 (2), 255–268.
Boissel, C., Matray, A., 2022. Dividend taxes and the allocation of capital. Am. Econ. Rev. Forthcoming.
Bond, S., Xing, J., 2015. Corporate taxation and capital accumulation: Evidence from sectoral panel data for 14 OECD countries. J. Public Econ. 130, 15–31.
Bradford, D., 1981. The incidence and allocation effects of a tax on corporate distributions. J. Public Econ. 15, 1–22.
Chetty, R., Saez, E., 2005. Dividend taxes and corporate behavior: Evidence from the 2003 dividend tax cut. Q. J. Econ. 120 (3), 791–833.
Chetty, R., Saez, E., 2010. Dividend and corporate taxation in an agency model of the firm. Am. Econ. J.: Econ. Policy 2 (3), 1–31.
Curtis, M., Garret, D., Ohrn, E., Robers, K., Suarez Serrato, J.C., 2021. Capital investment and labor demand. Working Paper.
Decker, R., Haltiwanger, J., Jarmin, R., Miranda, J., 2014. The role of entrepreneurship in US job creation and economic dynamism. J. Econ. Perspect. 28 (3), 3–24.
Decker, R., Haltiwanger, J., Jarmin, R., Miranda, J., 2016. Declining business dynamism: What we know and the way forward. Am. Econ. Rev. 106 (5), 203–207.
Decker, R., Haltiwanger, J., Jarmin, R., Miranda, J., 2016. Where has all the skewness gone? The decline in high-growth (young) firms in the U.S. Eur. Econ. Rev. 86, 4–23.
Devereux, M., 2019. How should business profit be taxed? Some thoughts on conceptual developments during the lifetime of the IFS. Fiscal Stud. 40 (4), 591–619.
DiNardo, J., Fortin, N.M., Lemieux, T., 1996. Labor market institutions and the distribution of wages, 1973–1992: A semiparametric approach. Econometrica 64 (5), 1001–1044.
Feldstein, M.S., 1970. Corporate taxation and dividend behaviour. Rev. Econ. Stud. 37 (1), 57–72.
Fuest, C., Peichl, A., Siegloch, S., 2018. Do higher corporate taxes reduce wages? Micro evidence from Germany. Am. Econ. Rev. 108 (2), 393–418.
Grubert, H., Altshuler, R., 2016. Shifting the burden of taxation from the corporate to the personal level and getting the corporate tax rate down to 15 percent. Natl. Tax J. 69 (3), 643–676.
Harberger, A., 1962. The incidence of the corporation income tax. J. Polit. Econ. 70.
Harju, J., Matikka, T., 2016. The elasticity of taxable income and income-shifting between tax bases: What is real and what is not? Int. Tax Public Finance 23 (4), 640–669.
House, C.L., Shapiro, M.D., 2008. Temporary investment tax incentives: Theory with evidence from bonus depreciation. Am. Econ. Rev. 98 (3), 737–768.
La Porta, R., Lopez-de Silanes, F., Shleifer, A., Vishny, R.W., 2000. Agency problems and dividend policies around the world. J. Finance 55 (1), 1–33.
le Maire, D., Schjerning, B., 2013. Tax bunching, income shifting and self-employment. J. Public Econ. 107 (1), 1–18.
Liu, Y., Mao, J., 2019. How do tax incentives affect investment and productivity? Firm-level evidence from China. Am. Econ. J.: Econ. Policy 11 (3), 261–291.
Love, M., 2022. Equity financing, dividend taxes and corporate non-capital investment. Working Paper.
Maffini, G., Xing, J., Devereux, M.P., 2019. The impact of investment incentives: Evidence from UK corporation tax returns. Am. Econ. J.: Econ. Policy 11 (3), 361–389.

Moon, T., 2022. Capital gains taxes and real corporate investment: Evidence from Korea. Am. Econ. Rev. Forthcoming.
Ohrn, E., 2018. The effect of corporate taxation on investment and financial policy: Evidence from the DPAD. Am. Econ. J.: Econ. Policy 10 (2), 272–301.
Ohrn, E., 2019. The effect of tax incentives on U.S. manufacturing: Evidence from state accelerated depreciation policies. J. Public Econ. 180 (104084).
Poterba, J.M. and Summers, L.H. (1985). The Economic Effects of Dividend Taxation. Recent Advances in Corporate Finance, edited by Edward Altman and Marti Subrahmanyam, pp. 377–380.
Rauh, J.D., 2006. Investment and financing constraints: Evidence from the funding of corporate pension plans. J. Finance 61 (1), 33–71.
Saez, E., Schoefer, B., Seim, D., 2019. Payroll taxes, firm behavior, and rent sharing: Evidence from a young workers' tax cut in Sweden. Am. Econ. Rev. 109 (5), 1717–1763.
Sinn, H.-W., 1991. The vanishing Harberger triangle. J. Public Econ. 45 (3), 271–300.
Smith, M., Yagan, D., Zidar, O., Zwick, E., 2019. Capitalists in the twenty-first century. Quart. J. Econ. 134 (4), 1675–1745.
Suarez Serrato, J.C., Zidar, O., 2016. Who benefits from state corporate tax cuts? A local labor markets approach with heterogeneous firms. Am. Econ. Rev. 106 (9), 2582–2624.
Tazhitdinova, A., 2020. Are changes of organizational form costly? Income shifting and business entry responses to taxes. J. Public Econ. 186 (April), 104162.
Yagan, D., 2015. Capital tax reform and the real economy: The effects of the 2003 dividend tax cut. Am. Econ. Rev. 105 (12), 3531–3563.
Zwick, E., Mahon, J., 2017. Tax policy and heterogeneous investment behavior. Am. Econ. Rev. 107 (1), 217–248.