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Tax planning and investment responses to dividend taxation

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Abstract

This study explores empirically how business owners respond to dividend taxes in a range of different margins including tax planning and investment. Using administrative tax data on all privately held Finnish corporations, I find exceptionally clear dividend payment responses to tax rate discontinuities and changes. Heterogeneity analysis suggests that more experienced owners and owners with lower income have higher tax base elasticities. Studying the income composition of owners around tax changes reveals clear income shifting between wage and dividends with negligible effect on gross income received from the firm. Evidence on the asset composition of firms indicates that a notable part of the payment response is due to inter-temporal income-smoothing, while changes in the tax schedule did not cause significant real responses in output or investment.

JEL classification codes: G38, H21, H24, H25
Keywords: Dividend taxation, investment, income shifting, bunching

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1 Introduction

Concerns over investment, international competitiveness and growth have led to several countries reducing their taxes on capital income, including dividend taxes. Firms are incremental for innovation and growth[1] and policymakers are rightly concerned about the implications of taxation on business dynamism. Dividend taxes reduce the return on invested capital and the owner's own work, hence decreasing the incentives for new investments and exerting effort. However, business owners have many channels for adjusting their tax burden (e.g. tax planning) and several channels to fund investment, so the distortions can also be small. Understanding the mechanisms of how business owners respond to dividend taxation is essential in planning a good income tax scheme. While equity reasons favor taxing entrepreneurial income as progressively as labour income, these efficiency considerations may suggest a lower rate. Despite the importance of the topic, there are still few comprehensive studies on the range of impacts of dividend taxation. As earlier studies typically focus on one response margin[2], this study empirically brings together the variety of potential responses in a setting with tax thresholds and policy changes.

In this paper, I study how Finnish firms and firm owners respond to dividend taxation in different decision margins, including tax planning and investment. I use discontinuities in the owner's dividend tax schedule as well as changes in tax rates to empirically study the importance of various response channels. I find that business owners adjust their dividend income strongly to match the tax schedule thresholds. The strong observed bunching in different margins implies taxable dividend income elasticities from 0.5 at the threshold for higher capital income tax to 3.6 at the threshold where a progressive labor income tax kicks in. Further investigation suggests that the bunching mainly reflects intra-temporal and intertemporal tax planning, while I do not observe responses in investment when studying changes in the tax brackets. The findings in this study are not only relevant to the discussion on the Finnish tax framework, but also for broader considerations in tax design. In various countries, a prevailing trend involves corporate owners gaining advantages by keeping profits within the company, often due to disparities between corporate tax rates and capital

[1] E.g. Acemoglu (2009)

[2] Studies on income shifting: Harju and Matikka, 2016; Pirttilä and Selin, 2011; Alstadsaeter and Jacob, 2016, studies on inter-temporal income-smoothing: Le Maire and Schjerning, 2013 and on investment: Yagan, 2015; Alstadsæter et al., 2017.

income tax rates.

The Finnish dividend tax schedule provides exceptionally large incentives for firms to respond. The owners of privately held corporations can quite freely choose whether to receive income from the firm as dividends (taxed as profit with corporate tax and at the owner level with dividend tax) or to pay wages (only progressive earned income tax on wages). The dividend tax schedule includes deduction thresholds, effectively causing clearly lower marginal tax rates for certain amounts of dividend income in comparison to e.g. labor income. The dividend tax rate jumps notably at a threshold that is set first at a 9% (2006–2013) then at an 8% (2014–) return on net assets, after which a more progressive labour income tax kicks in. Moreover, there is a monetary threshold for dividends exempted from most capital income tax to alleviate the double taxation of corporate profits.[3] These discontinuities create strong incentives, and both the thresholds and the tax rates have changed over the past decade. I use detailed administrative data to study the responses to these dividend tax schedule discontinuities and to changes in the brackets.

First, I study the incidence of dividend payments at the thresholds using the bunching method, developed by Saez (2010). I find exceptionally clear dividend responses to the dividend tax rate thresholds. I estimate an elasticity of 0.5 at the monetary thresholds. This implies that a 1% increase in the net of dividend tax rate increases taxable dividend income by 0.5%, which is a large response. I find an even larger elasticity of 3.6 at the net asset thresholds. This massive elasticity is likely driven by the fact that above the net asset threshold, dividends are taxed higher or as highly as wages depending on the income level of the owner, so there is no benefit in paying dividends instead of wages. Furthermore, the owner may increase the future net asset position by retaining earnings instead of distributing dividends. These incentives lead to business owners reacting to the net asset threshold very strongly. The strong bunching responses also highlight that business owners are well informed about the tax schedule and find it easy to adjust accordingly. Studying the heterogeneity across individuals suggests that experienced business owners respond more strongly, while in this context, income is not positively connected to the elasticity estimate, as suggested by earlier literature with data on both wage-earners and self-employed(Gruber and Saez, 2002).

[3]For example, the marginal tax rate on dividends (including corporate taxes) jumped from 28% to 40.5% at 90,000 EUR between 2006 and 2011.

Second, I then examine a variety of potential response channels potentially driving bunching at the thresholds, as the bunching elasticity in this type of single tax base setting is clearly not based merely on labor supply decisions as in the original study by Saez, 2010. Moving the dividend tax threshold brings new firms into the range of the higher/lower marginal tax rate and I use that feature as a quasi-experiment to study various outcomes. By studying the income composition of firm owners around the time of tax changes, I observe that owners engage actively in income shifting across wage income and dividends to minimize their tax burden. Analysis of the asset structures of the firms suggests that a notable part of the payment response is due to inter-temporal income-smoothing, as the balance sheet information shows firms at the thresholds accumulating financial assets in the firm. Hence, owners avoid the higher tax bracket by retaining (and withdrawing) earnings in the firm, which is also predicted in earlier literature as the capitalization of dividend tax (Auerbach, 1979). Retaining profits has several tax benefits. In addition to avoiding the higher tax bracket, the retained earnings increase the firm's value by increasing its net assets. Therefore, it allows for a higher amount of dividend to be distributed at the lower capital income tax in the future as the tax schedule in the Finnsih setting depends on the firm's net assets. Also, some forms of capital income are taxed more lightly when received by a firm, so saving by investing through a firm may be lucrative. This is likely to further boost the capitalization of dividend taxes into share values. Finally, I study real economic effects, using changes in the dividend tax thresholds, but I find no statistically significant responses in the investment or output of these firms. While no real effects are found, the evidence presented in this study shows the bunching is mostly driven by tax planning via income shifting and retaining earnings.

The detailed data allow me to trace the dividend income of the owner of a particular firm and to study different outcome variables as potential response channels with more precision than earlier studies have, for example by studying the heterogeneity of responsiveness and including components of the outcomes such as impacts on financial assets. This study builds on several strands of tax literature.

First, I contribute to the bunching literature. I show sizeable responses to the dividend tax schedule in a new institutional context and provide an elasticity estimate, which could be helpful e.g. in policy analysis. Furthermore, the rich data allow me to study the heterogeneity in elasticities within the self-employed. Kinks and notches have been used to study the responsiveness of taxpayers in various income tax bases. Earlier literature has shown that bunching at income tax thresholds ap-

pears to be particularly driven by the self-employed as wage earners are likely to face greater adjustment costs and hours constraints. This literature includes Mortenson and Whitten (2020) on tax credit maximizing kinks in the US, Chetty, Friedman, et al. (2011), who study kinks in the Danish income tax schedule and Bastani and Selin (2014), who find similar results in the Swedish income tax schedule. Kreiner, Søren Leth-Petersen, et al. (2014) and Kreiner, Soren Leth-Petersen, et al. (2016) use the bunching method to study year-end income shifting in Denmark, finding that high-income individuals in particular shift income around the end of the year if tax rates are about to change the next year. Focusing solely on business-owners and the dividend tax base, I show that while experience is linked to higher elasticity estimates, higher income business-owners do not seem to have higher dividend income elasticities. Rather the evidence points in the opposite direction, which is likely driven by the stronger income-shifting incentives due to lower tax rates for wages in lower income groups. Unlike in the literature on labor income tax rates[4], there is no clear connection between gender and tax responsiveness in the dividend tax base.

Second, I contribute to the literature on the tax planning of business owners by describing the income shifting responses to the complex Finnish dividend tax schedule. I show that Finnish business owners shift income both intra-temporarily across income bases and inter-temporarily by retaining and distributing profits in accordance with the tax thresholds and changes. Lindhe et al. (2004) highlight the incentives created by the Finnish system to retain earnings within firms which I now show empirically happening. Including inter-temporal income shifting and real responses as a response margin builds on the earlier evidence by Pirttilä and Selin (2011) and Harju and Matikka (2016), who show that corporate owners in Finland actively shift income between dividend and wage tax bases[5]. Previously, evidence in Le Maire and Schjerning (2013) for Denmark and Miller et al. (2022) for the UK has given empirical support to the theoretical presumption[6] of business owners using retained and withdrawn earnings to adjust their taxation, particularly in response to thresholds.

Finally, I build on the intricate dividend tax literature by exploring the impacts on investment in new capital. Real responses to dividend taxes have challenged

[4]E.g. Blomquist and Selin (2010), Bargain and Peichl (2016) and Jacquet and Lehmann (2020).

[5]Literature showing income shifting between tax bases in other countries includes Tazhitdinova (2020), López-Laborda et al. (2018), Alstadsaeter and Jacob (2016) and Waseem (2018).

[6]Auerbach, 1979.

economists for decades. The so-called new view (Auerbach, 1979 and King, 1974) suggests that dividend tax does not enter marginal investment decisions as marginal investment is funded from retained earnings (or debt). It thus suggests that dividend taxes have no impact on investment and dividend payments mainly reflect responses to inter-temporal incentives to pay dividends, and this leads taxes on dividends to capitalize into share values[7]. Yagan (2015) gives support to the new view empirically by showing that despite the notable dividend windfall (also documented in Chetty and Saez, 2005), there was no increase in investment following a dividend tax cut in the US. However, the so-called old view suggests that dividend taxes affect investment by firms negatively even if the investment is funded from retained earnings (Poterba and Summers, 1985). The reason may be that shareholders do not consider retained earnings as valuable as paid-out profits due to asymmetric information, i.e. principal-agent conflicts[8], and dividend taxation amplifies these principal-agent conflicts of interest by incentivizing the retention of profits (Chetty and Saez, 2010). Alstadsæter et al. (2017) lend support to this point empirically. While finding no average investment response to a dividend tax cut in Sweden, they show that as a response, investment by cash-constrained firms increased relative to cash-rich firms, in line with the principal-agent conflict theory. Evidence in my study lends support to the new view of dividend tax literature: I find no impact on investment or output, while my evidence suggests dividend taxes capitalize into share values via retained earnings.

The rest of the paper is organized as follows. Section 2 outlines the institutions and the data. In Section 3, I present the payment responses to dividend taxation using the bunching method and estimate the corresponding elasticity. Section 4 discusses what the payment responses imply, covering real responses, income-smoothing and income shifting. Section 5 concludes.

Table 1: Dividend tax schedule in Finland

A. Dividend tax thresholds

Years	Kink	Net asset threshold
2006–2011	90,000 EUR	9%
2012–2013	60,000 EUR	9%
2014–2016	150,000 EUR	8%

B. Owner-level tax burden around the tax thresholds

		Effective marginal tax rate	
Years		Below net asset threshold	Above net asset threshold
2006–2011		26%	26–∼55%
2012–2013	Below	24.5%	24.5–∼55%
2014–2016	kink	26–26.8%	20–∼55%
2006–2011	Above	40.5%	26–∼55%
2012–2013	kink	40.36%	24.5–∼55%
2014–2016		40.4–43.12%	20–∼55%

Note: Panel A lists the monetery thresholds and the net asset thresholds in place in the dividend tax schedule in 2006–2016 The earned income tax rate varies depending on the taxpayer's income and municipality. Panel B lists the implied marginal tax rates below and above each threshold in 2006–2016. The highest rate above the net asset threshold depends on the other earned income of the taxpayer. The highest overall marginal earned income tax rate has been circa 55%.

2 Institutions and Data

2.1 Institutions

In Finland, personal capital income, such as capital gains and rental income, are taxed at an almost flat capital tax rate. Other income, such as wages and social benefits, is taxed at a progressive earned income tax rate schedule. The ∼30% capital income tax is lower than the highest marginal tax rates on earned income of ∼55%, and aims to boost capital mobility and to respond to international tax competition. The

[7]For example, Zodrow (1991) describes the capitalization mechanism in more detail.

[8]Dividends signal the true value of the firm, and retaining earnings leaves more cash under the control of managerial choices, and thereby disincentivizes the close monitoring of managers, potentially leading to unproductive investments using retained earnings.

dividends of privately held corporations[9] face a somewhat complicated tax scheme, with both capital and earned income tax schedules applied, depending of the size of the dividends. Furthermore, owners of privately held firms can quite freely choose whether to receive their income as wages or dividends, or leave income in the firm as retained earnings.[10]

To prevent extensive income shifting, the tax rate on dividends from a privately held corporation depends on the level of net assets of the firm: only the amount of distributed dividends below a predetermined rate of return on the firm's net assets, 8% since 2014, is taxed at the lower capital income tax rate. Moreover, for dividends below the net asset threshold, part of the capital income tax is deducted in order to reduce the double taxation of distributed profits. This creates an additional monetary threshold in the tax schedule. The monetary kink is applied at the individual level and not at firm level, so for owners receiving income from multiple privately held corporations their dividends are added up. The overall tax burden on distributed dividends includes both the flat corporate tax rate, 20% from 2014 onward, and personal dividend taxes. In 2006–2011, dividends below both the net asset threshold and the monetary threshold were taxed at an effective tax rate of 26%, including both corporate and dividend tax. Dividend payments above the monetary threshold but below the net asset threshold are taxed at a 40.5% effective marginal tax rate. Dividend payments above the net asset threshold are taxed at the progressive earned income tax rate, implying an effective marginal tax rate above around 55% at most. The earned income tax is applied to 75% of excess dividends to reduce double taxation, causing the higher effective tax rates to nearly equal the tax on wages, and for lower income levels, wages effectively face a lower tax than dividends above the net asset threshold[11]. The earned income share of the dividends is added to the other earned income of the owner when calculating the effective tax rate.

Table 1 collects the parameters of the dividend tax schedules in use in 2006–2016. Panel A compiles the thresholds in the tax schedule and panel B displays the effective tax rates around each threshold in each period. The first column in Table 1 B features

[9]Dividends from publicly traded firms face a different dividend tax scheme.

[10]The Finnish dividend tax system varies depending on the organizational form of the company. In this study, I focus on privately held corporations that are limited companies owned by a single person or a group of individuals. The privately held corporation is the most common corporate form in Finland, covering nearly half of all firms.

[11]For example in 2008 the highest earned income tax rate kicked in at 62,000 EUR.

the marginal tax rates below and above the monetary kink for dividends below the net asset threshold. For example, from 2006 to 2011, the effective tax rate below the monetary threshold was 26% as capital tax was fully exempted, and above the 90,000 EUR kink the effective tax rate rate was 40.5%[12]. The marginal tax rate above the net asset threshold in the second column depends on the owner's other personal income, as dividends above this threshold face the progressive earned income tax schedule, with the highest rates around 55%.

While there were two consecutive changes in the parameters during the period, the first was originally intended as a permanent rather than a temporary change (Government proposal 50, 2011). An active discussion around corporate and dividend taxation continued after the change and the government changed the parameters already after two years (Government proposal 185, 2013). Both policy changes were motivated by the aim of shifting the tax burden of businesses from firm level to the owner level in order to incentivize investments and to respond to international tax competition. The permanent nature of the changes is important as owners are likely to react to temporary changes in taxes via inter-temporal tax arbitrage (Korinek and Stiglitz, 2009).

To sum up, the key features of the schedule are: i) below the net asset threshold the effective dividend tax rate including corporate tax is clearly lower (max. $\sim 40\%$) than the highest ($\sim 55\%$) income tax rates on wages. This means that excluding low levels of wage income[13], it is optimal to pay dividends instead of wages up to the net asset threshold. ii) Above the net asset threshold the difference in tax between paying dividends or wages is negligible after reaching the highest tax bracket for earned income (below that wages face a lower tax). This means that iii) the net asset threshold creates additional incentives to shift income to wages or to retain earnings exceeding the net asset threshold in the firm as they increase the firm's asset position, enabling higher dividend payments in the lower tax bracket in the future. This complex system creates a challenging tax-minimization puzzle for the owner. I study bunching caused by both the monetary and the net asset threshold in order to estimate dividend tax elasticities. I then use the changes in the tax schedule to study

[12] 0.26+(1-0.26)*0.7*0.3. Above the monetary threshold the capital tax rate has been applied to 85% of excess dividends since 2014, and before 2014 to 70%.

[13] It is usually optimal to pay wages until the marginal tax reaches the level of the dividend tax. The optimal low amount of wage depends on the particular year and municipality (more detail in the Appendix) as well as the amount of dividend, but the tax rate was always lower for wages than for dividends for wage income of below 20,000–25,000 EUR at the time.

the mechanisms driving the elasticity.

2.2 Data

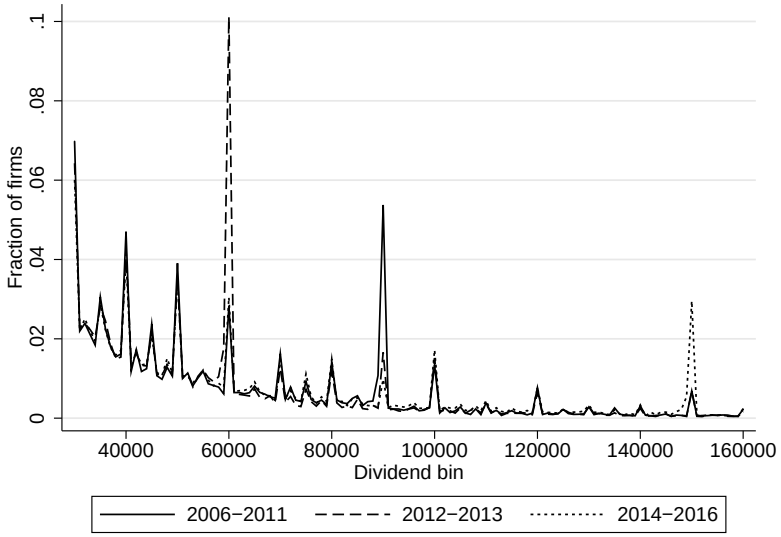
Table 2: Summary statistics of the data 2006, 2011 and 2016

				Firm level					
	2006			**2011**			**2016**		
	mean	sd	p50	mean	sd	p50	mean	sd	p50
Turnover	1125410	8381004	241015	992964	7120131	202573	1156016	11536122	201493
Profit	104884	584402	21222	79296	450167	14025	170311	14030253	15114
Net Assets	501911	4255174	104207	560925	4969151	112843	849292	14312194	147004
Financial assets	320556	2749007	69913	341785	2649446	77216	490535	7021860	95587
Investment	54236	329184	2897	47634	269958	1732	58389	639241	1300
No. owners (all)	2.71	53.53	2.00	3.04	216.13	2.00	5.34	290.23	2.00
No. owners	2.65	51.81	2.00	2.95	206.70	2.00	5.08	276.99	1.00
				Owner level					
	2006			**2011**			**2016**		
	mean	sd	p50	mean	sd	p50	mean	sd	p50
Dividends	21769	75496	7624	27752	136389	8500	28943	284546	9642
Wages	18887	22926	13500	23055	27778	16414	26792	32143	19360
Share female	0.18			0.19			0.19		
Age	50.05	10.68	50.00	51.35	11.29	51.00	52.65	11.69	53.00
Taxable income	73836	274745	40275	81928	343194	46477	92633	408572	56880
Observations	49101			59947			62589		

Note: This table provides summary statistics for the data in 2006, 2011 and 2016. Turnover refers to annual sales, profit is the taxable income of the firm, net assets refers to the book value of assets after depreciation, and investment refers to additions to depreciating assets, such as newly installed fixed capital. The first value of the number of owners includes all owners of the firm and the second variable only owners that are individuals, i.e. not firms. The owner with the highest share of stock is considered the main owner and each firm has only one main owner in the data. Dividends and wages refer to the main owner's income from the firm. By the nature of the tax record data, all firms in the data paid dividends to their main owner. Taxable income includes both taxable capital income and earned income and also income from other sources than the firm in question.

I use firm- and owner-level tax filing data that cover all privately held Finnish corporations with a matched main owner. Thus, each observation is a firm-owner pair. As the data are constructed based on tax records of firms' reported income, it leaves out firms for which the main owner did not receive any income. The data cover the years 2006–2016 with three different dividend tax schedules in use. The data are obtained annually from the Finnish Tax Administration and are maintained by Statistics Finland. Annual firm-level tax data are matched with tax return data

Fig. 1: Dividend payment distributions during the three tax schedules (nominal)



Note: This figure plots the distribution of dividend payments to the main owners during three dividend tax schedules. The vertical line shows the fractions of firms in each 1000-euro dividend bin. In addition to round number bunching during each schedule, there is a clear spike at the prevailing monetary threshold. In 2006–2011, the monetary threshold was at 90,000 EUR, in 2012–2013 the threshold was at 60,000 EUR, and in 2014–2016 it was at 150,000 EUR.

for the main owners of the firm and are combined into a panel. The data include one main owner for each firm and this title is assigned based on having the highest ownership share. Firms with another firm as the main owner are excluded from the data.

The data include information on dividends and wages paid to the owner from the particular firm, and firm-level variables such as turnover, net assets and new investment. The detailed owner-level tax data allow me to calculate the marginal tax rates for different forms of income. Therefore, while the dividends and wages referred to in Table 2 cover only those from the firm concerned, I also have information on taxable income from other sources including wages and dividends from other firms that e.g. allow me to calculate effective tax rates. Table 2 describes yearly summary statistics for the years 2006, 2011 and 2016[14] in nominal terms. Turnover refers to the firm's annual sales, profit is the taxable income, net assets refers to the book value of assets after depreciation, and investment refers to additions to depreciating assets such as newly installed fixed capital. Owner-level dividends and wages refer to those

[14]Table A1 in the Appendix describes the pooled data covering all years in the panel.

received from the corporation studied, i.e. if the owner receives wages or dividends from other firms, those are not included in this value. The full data include more than 600,000 observations during the research period and 113,835 distinct firms.[15]

Figure 1 shows the dividend payment distributions during the three dividend tax schedules studied. The interest of this paper lies in the highest spikes, which are driven by the thresholds. The figure also shows clear round number bunching, suggesting that the dividend payout choice is not random and there is some behavioral aspect to it. In the following section, I describe the bunching at the thresholds in more detail.

3 Dividend Payment Responses

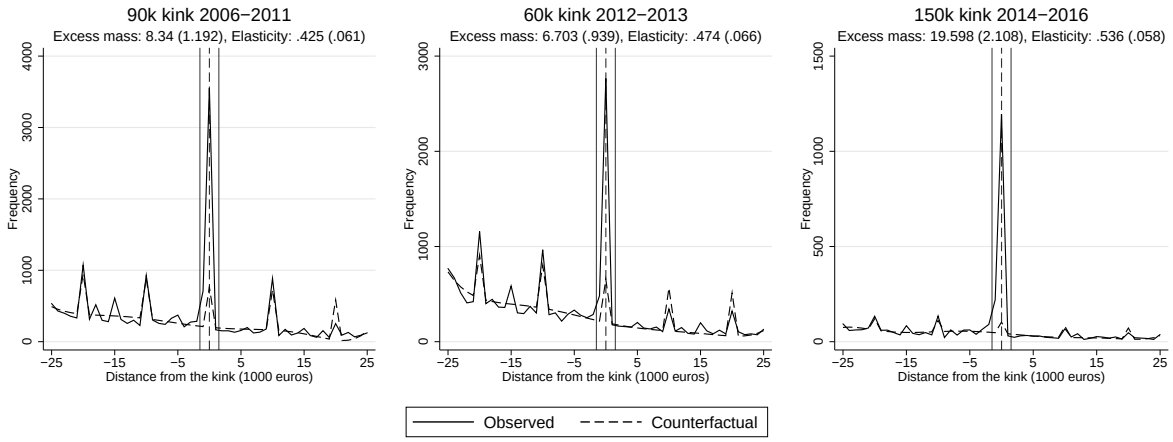
I estimate the extent of excess mass and the associated elasticity of taxable income using the bunching method, developed by Saez (2010)[16]. The elasticity of taxable income (ETI) is the ratio of a percentage change in taxable income to a percentage change in the net-of-tax income rate (one minus the tax rate). The bunching method uses the excess mass at a tax schedule discontinuity to estimate the corresponding elasticity of taxable income. Appendix A1 explains the methodology applied in more detail. When interpreting the results, it is important to bear in mind that the bunching elasticity in this type of single tax base setting is of a very reduced form. Unlike in the original estimator proposed by Saez (2010), the bunching response in this case reflects not only the owner's labor supply/effort decisions, but captures margins such as income shifting, retained earnings etc. Furthermore, these dynamic incentives may differ at the monetary and net asset thresholds. I will discuss these points further in the following sections.

Figure 2 provides the excess mass estimates together with the corresponding elasticities at different monetary thresholds in place. A substantial excess mass takes place at each of the tax kinks studied, and the corresponding elasticities range around 0.5. The exact elasticities at each kink are 0.43, 0.47 and 0.54 for the 90,000 EUR, 60,000 EUR and 150,000 EUR kinks respectively. All estimations use the pooled data

[15]The owner can postpone redeeming dividends from the firm. Thus, the dividend tax is paid according to the tax rate of the year when the dividend is redeemed, not based on the year of distribution of dividend. Therefore, some of the owners have several dividend observations for the same company and year. By way of a solution, dividend observations for an owner-company pair in a single year have been aggregated.

[16]Kleven (2016) provides a review of the method and its indications.

Fig. 2: Bunching at the monetary threshold

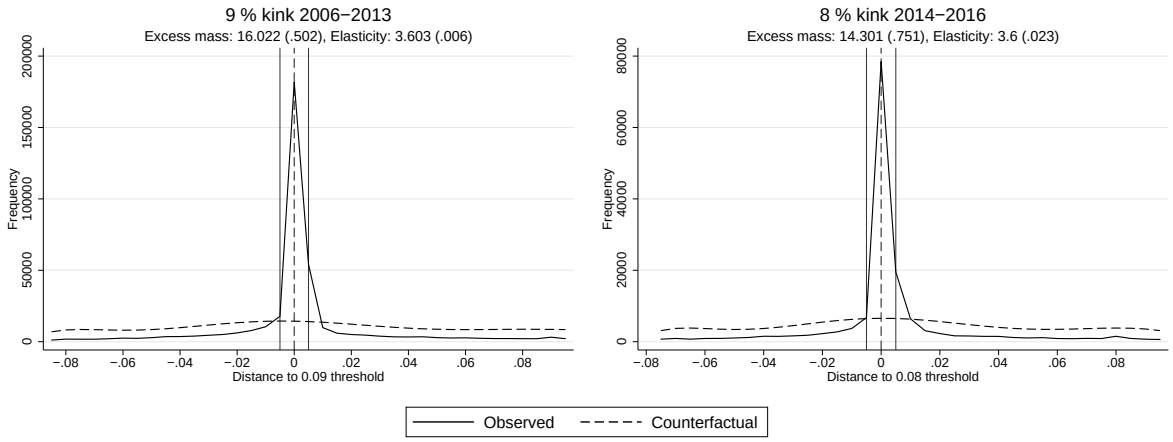


Note: These graphs plot the actual distribution of observations, represented by the solid line, and the counterfactual distribution, represented by the dashed line, in 1000-euro bins around the 90,000 EUR threshold in 2006–2011, the 60,000 EUR threshold in 2012–2013 and the 150,000 EUR threshold in 2014–2016. The vertical solid lines show the bunching region. The estimated excess mass and the corresponding elasticity estimate are reported above each graph together with the standard errors.

covering all firm-year observations for the period in question. The horizontal axis is the dividend amount relative to each kink. The frequency of firms in each 1000-euro bin is shown on the vertical axis. The solid line in the figure is the actual observed dividend distribution in the region. The dashed line is the estimated counterfactual distribution, which takes into account bunching at round numbers and excludes the area near the kink. The vertical lines around the kink show the bunching range $[-R; R]$ that is used to estimate the excess mass and elasticity.

Figure 3 shows the bunching estimates at the net asset thresholds. The horizontal axis is now the dividend amount relative to the firm's net assets. The estimated elasticity of taxable dividend income is 3.6 in both estimations. The elasticity estimate reported is the mean elasticity of individual elasticities estimated using personal tax rates and the excess mass. Even though the excess mass at the threshold does not differ greatly in comparison to the monetary kinks, the elasticity estimate is clearly larger. Mathematically, this is due to the lower tax difference for many of the taxpayers in comparison to the tax rate difference at the monetary kink. Table 3 collects all the elasticity estimates. The estimated excess masses vary when the tax rates around the thresholds vary, but the corresponding elasticities are notably stable.

Fig. 3: Bunching at the net asset threshold



Note: These graphs plot the bunching mass at the 9% net asset threshold in 2006–2013 and at the 8% net asset threshold in 2014–2016. The elasticities are first estimated for each buncher individually based on their respective tax rates around the kink using the aggregate excess mass. The final elasticity reported above the graph is a mean of all the individual elasticities. The capital income tax rate below and above are chosen using dividend income only, i.e. the higher capital income tax brackets in later years are only used when taxable dividends below the net asset threshold exceed the monetary limit (eg. 2015–2016: 30,000e).

The elasticity estimates at the monetary thresholds are lower than the estimates at the net asset threshold, so firm owners seem to respond more strongly to the net asset threshold. There are some clear reasons for this. First, for higher income levels, the tax rate above the net asset threshold is in principle the same as for wages, so the owner may just as well pay wages. Furthermore, for wages below the higher earned income tax brackets, it is actually optimal to receive wages rather than dividends exceeding the threshold. Income shifting responses are discussed more in Section 4.1. Second, even though the owner cannot affect the marginal tax rates around the threshold, he/she can affect the position of the threshold in euros. That is, retaining earnings in the firm increases the net assets of the firm, thereby allowing for a larger amount of dividends to be distributed in the future at a lower tax rate. This incentive to increase the firm's net assets by retaining earnings is particularly present at the net asset threshold. I will discuss this channel of retaining earnings and its implications further in Section 4.2. Third, the earned income tax schedule is a lot more complex than the capital income tax schedule, so the marginal tax rate above the net asset threshold may be less salient for the owner.

Considering both tax planning channels captured in the bunching response - intertemporal and tax base income shifting - the elasticity estimates of a single tax base capture more than the real economic impacts of taxation and should obviously not be interpreted as structural elasticity estimates[17]. However, the elasticity estimates enable a comparison of the strength of the different incentives at the different types of thresholds (net asset vs kink) as well as a comparison at similar thresholds. In addition, studying the response heterogeneity in different margins informs us about whether certain types of taxpayers are found to be more responsive than others. I will study the heterogeneity of the responses in Section 3.1. Finally, the estimates enable the revenue impacts of tax changes to be simulated.

Table 3: Elasticity estimates

Years	Threshold	Elasticity estimate (SE)
2006–2011	90,000 EUR	0.425 (0.061)
2012–2013	60,000 EUR	0.474 (0.066)
2014–2016	150,000 EUR	0.536 (0.058)
2006–2013	9% of net assets	3.603 (0.006)
2014–2016	8% of net assets	3.600 (0.023)

Note: This table collects all the elasticities estimated with different thresholds and data periods.

3.1 Heterogeneity

The rich data allow me to study the response heterogeneity in different margins to see if certain types of taxpayers are found to be more responsive than others. To study the heterogeneity I take three findings from earlier elasticity literature and try out whether similar observations can be made in this context. I focus on experience, income and gender as potential sources of heterogeneity.

3.1.1 Experience

Søgaard (2019) discusses optimization frictions as a source of lack of bunching and raises learning as one source of friction. In the case of business owners, too, it seems

[17]Kleven (2016) provides a good introduction to bunching and how frictions and tax planning limit the use of the bunching elasticity as a structural parameter to estimate the effects of policies.

likely that learning to navigate the tax system takes some time. I test this by dividing owners into two groups by the time they have been acting as the main owners of the corporation according to the tax data. The median time of ownership in the data is seven years[18]. Table 4 reports the bunching estimates at each threshold separately for more recent and more experienced owners. The elasticities are systematically higher for the more experienced owners, suggesting that learning as a source of friction can play a role in explaining variation in tax responsiveness. To test another measure of experience, I divide the data by median age of the owner. Table 5 reports the findings. This division also suggests, that more mature owners have higher elasticities, alhough not all elasticity estimates at different thresholds are statistically different by age group. However, both of these measures of experience can also be correlated with some other reason for more bunching, such as selection by ability (business survival).

Table 4: Elasticity estimates by years in the data

		Below median experience	Above median experience
Years	Threshold	Elasticity estimate (SE)	Elasticity estimate (SE)
2006–2011	90,000 EUR	0.344 (0.056)	0.460 (0.052)
2012–2013	60,000 EUR	0.313 (0.054)	0.538 (0.072)
2014–2016	150,000 EUR	0.394 (0.076)	0.566 (0.055)
2006–2013	9% of net assets	3.423 (0.007)	3.810 (0.009)
2014–2016	8% of net assets	3.457 (0.049)	3.628 (0.026)

Note: This table collects elasticities estimated with different thresholds and data periods for owners who have been in the data for up to six years and for owners who have been in the data for over seven years (median).

3.1.2 Owner income

Earlier research including Gruber and Saez (2002) suggests that elasticities may grow with income. However, a prominent reason for that in earlier empirical literature has been the increasing availability of income shifting and tax planning channels for high income earners. As I focus solely on business owners, the large dataset allows me to

[18]The data include information on firm-owner pairs starting in 1998, and the main dataset I use starts only in 2006, allowing me to split the data by the median years as owner of the particular firm.

Table 5: Elasticity estimates by owner age

		Below median age	Above median age
Years	Threshold	Elasticity estimate (SE)	Elasticity estimate (SE)
2006–2011	90,000 EUR	0.431 (0.069)	0.436 (0.053)
2012–2013	60,000 EUR	0.451 (0.065)	0.494 (0.072)
2014–2016	150,000 EUR	0.514 (0.068)	0.552 (0.062)
2006–2013	9% of net assets	3.595 (0.008)	3.614 (0.008)
2014–2016	8% of net assets	3.469 (0.033)	3.703 (0.031)

Note: This table collects elasticities estimated with different thresholds and data periods for owners below and above median age (51).

study the heterogeneity in elasticity within a group with more or less equal access to income shifting. To test how income is associated with the bunching elasticities among business owners with equal income shifting opportunities, I divide the data into tertiles based on the total taxable income of the owner. The findings are reported in Table 6.

Unlike in the earlier literature, the connection between the elasticity estimates and income goes in opposite directions: the lower the income in the group, the higher the elasticity estimate. The excess mass estimates are similar across the groups[19], so the difference in the elasticity estimates is driven by the difference in the marginal tax rates at the threshold reported in part B of Table 6. Due to the relatively low income, the increase in the income tax rate is not necessarily very high at the threshold in the group on average, leading to higher elasticity estimates. However, as brought up in Section 3, the incentives for income shifting and income smoothing are particularly high at this threshold, and these may also be in connection to income.

First and foremost, the incentives for income shifting to wages are a plausible reason for the finding, since for lower levels of wage income in particular, it is optimal to receive wages rather than dividends exceeding the net asset threshold. There are also other reasons that may be contributing to this. For example, due to the complexity of the system, the effective marginal tax rates for earned income may be

[19] 16.255 (0.475), 16.138 (0.496) and 15.624 (0.437) for the 9% threshold and 14.384 (0.942), 14.489 (0.790) and 13.988 (0.623) for the 8% threshold.

opaque for owners causing kind of overreaction to the threshold. Second, income may be connected to how strongly the owner wants to improve the net asset position of the firm by retaining more earnings. Finally, the payout decision may be in closer connection to the owner in smaller firms. However, this might also show as higher bunching in the lower income groups but the excess mass estimates are similar across groups.

To sum up, for most owners there is little reason to pay dividends above the net asset threshold as lower tax rates can be achieved by paying wage instead (for lower incomes at least) or by retaining earnings and rather paying out later with a lower rate. Thus, owners that are aware of this primarily retain from exceeding the threshold despite their income level. If they have a low income then the marginal tax rates around the threshold have a smaller difference leading to higher local elasticity estimate. Thus at this decision margin, the relevant tax difference may actually be the tax difference to income received as wage.

Table 6: Elasticity estimates and marginal tax rates above threshold by income tertile

A. Elasticity estimates

		1st tertile	2nd tertile	3rd tertile
Years	Threshold	Elasticity estimate (SE)	Elasticity estimate (SE)	Elasticity estimate (SE)
2006–2013	9% of net assets	5.261 (0.013)	3.008 (0.005)	2.500 (0.005)
2014–2016	8% of net assets	4.342 (0.057)	3.683 (0.022)	2.66 (0.021)

B. Marginal tax rates above the threshold

Years	Threshold	Mean MTR above (SD)	Mean MTR above (SD)	Mean MTR above (SD)
2006–2013	9% of net assets	0.383 (0.090)	0.457 (0.042)	0.489 (0.054)
2014–2016	8% of net assets	0.357 (0.083)	0.436 (0.049)	0.480 (0.058)

Note: This table collects elasticities estimated with different thresholds and data periods for owners in three income tertiles based on total taxable income in the data (note that this does not include tax-free dividends, but it is still indicative of the income group). The tertile limits are 34,409.53 and 60,110.86 for the first threshold period and 42,665.4 and 74,029.44 for the second period. The average marginal tax rates are calculated for the next euro at both thresholds.

3.1.3 Owner gender

Research on labor supply suggests that labor supply elasticities are higher for women than for men (see e.g. Blomquist and Selin, 2010; Bargain and Peichl, 2016; Jacquet and Lehmann, 2020). The reasoning in the earlier studies arises from social preferences of married women and single mothers in particular. However, the meta-analysis in Bargain and Peichl (2016) notes that the elasticities for this group have been declining over time (in the US at least). As business owners are likely to be a very selected sample of individuals and dividend tax elasticities in this case also reflect other margins than labor supply decisions, it is interesting to know whether the difference in elasticities among men and women is also visible among business owners and in a single tax base. For this purpose, I split the data by the owner's gender. The share of female main owners in the data has been around 20%, as reported in Table 2.

Table 7 reports the bunching elasticities by gender. The evidence is somewhat mixed. Considering the confidence intervals, there is no statistical difference between men and women at the monetary thresholds, while at the net asset thresholds the results do suggest a somewhat higher elasticity for women. However, as the evidence is not consistent, I interpret the findings as somewhat inconclusive. Finding no difference by gender in this type of setting is not very surprising as unlike in the earlier literature, the elasticities are more reflective of other response channels than labor supply decisions.

Table 7: Elasticity estimates by owner gender

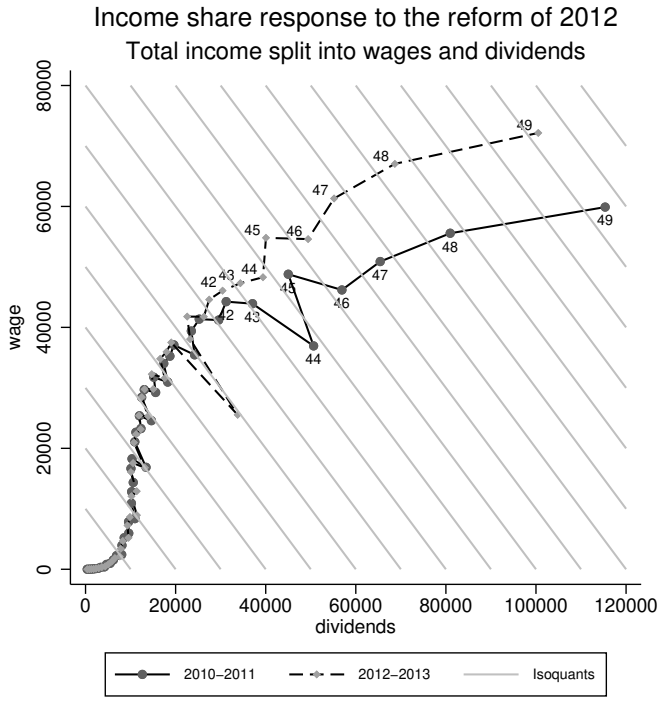
		Female	Male
Years	Threshold	Elasticity estimate (SE)	Elasticity estimate (SE)
2006–2011	90,000 EUR	0.390 (0.060)	0.429 (0.052)
2012–2013	60,000 EUR	0.429 (0.052)	0.481 (0.073)
2014–2016	150,000 EUR	0.586 (0.091)	0.531 (0.059)
2006–2013	9% of net assets	3.981 (0.015)	3.523 (0.006)
2014–2016	8% of net assets	3.915(0.060)	3.521 (0.024)

Note: This table collects elasticities estimated with different thresholds and data periods for female and male owners.

4 Response channels

4.1 Income shifting between tax bases

Fig. 4: Income shifting between wages and dividends



Note: This figure plots the income shifting between wages and dividends as a response to the tax change in 2012, which increased the taxation on dividends above 60,000 EUR. For the figure, the main owners' wages and dividends from the firm are counted together as total income. Then the owners are divided into 50 income quantiles (2-percentiles). Finally, average wages and dividends are calculated for each quantile. The horizontal line shows the average dividends and the vertical line the average wage in each quantile. The isoquant lines show the total income from the firm. The figure shows that as a response to the tax change owners started paying more wages and cut down on dividends.

In this section, I discuss the income shifting responses associated with dividend taxes. Firm owners can quite freely shift income between wage and dividends to minimize their income tax burden. They also do this, as is visible in the data. Figure 4 visualizes how the division into wage and dividends shifts towards higher average wages for higher incomes as the dividend tax for higher dividends increases. The figure shows the owner's total income (both wages and dividends) from the firm in 50 income quantiles. The benefit of looking at the data in quantiles is that the evi-

dence is not distorted by mean reversion, which would be an issue when considering individual taxpayers. The position of each quantile depicts how the income splits between wage and dividends on average in the income quantile. The horizontal axis describes the average dividends in each income quantile, and the vertical axis the average wage earned by the owner within a particular income quantile. The gray isoquant lines indicate the total income level, so that, for example, the 44th quantile received approximately 70,000 EUR from the firm. In 2010–2011, the monetary threshold in the dividend tax schedule was 90,000 EUR. In 2012, the threshold moved down to 60,000 EUR. Income affected by the tax change, i.e. income above 60,000 EUR, clearly shifts towards more wages in comparison to dividends. The position of the quantiles in relation to the isoquant lines reveals that, despite the tax increase and the ensuing reduction in dividend income, the inflation-adjusted income stays the same in the affected quantiles. It is just the division into wages and dividends that changes. There is no similar pattern when there is no tax change, as shown in Figure A5 in the Appendix.

The income shifting between tax bases can also be demonstrated in a difference-in-differences setting, where I can use changes in the dividend tax parameters to see how those facing a higher or lower marginal dividend tax rate respond to the tax changes. Dividend payouts are an endogenous choice, so I cannot use the dividend payments as such to assign treatment. Instead, I utilize the variation in the phased dividend tax schedule and ownership shares to study the effects of dividend tax changes on wages and dividends paid.

As the dividend tax rate depends on the net assets of the firm, the way in which main owners of firms with equal net assets are taxed depends on the owner's net asset share. The main owners of equally wealthy firms face different dividend tax rates depending on this share. Thus, when capital income tax brackets change, the tax change only applies in cases where a given owner's net asset share is high enough. In studying the responses to dividend taxation, I use changes in the monetary thresholds as variation and I use the owner's net asset share (=ownership share) to identify owners into treated and control groups. If the marginal dividend tax rate impacts the payment decision, there should be some response in these firms for which the main owner is now shifted into the higher/lower tax bracket. In the control group, the monetary dividend tax thresholds already exceeds the imputed return of 9% of net assets for capital income dividends (later 8%), thus the tax change does not apply to such owners. I apply this difference-in-differences setting in both reforms taking

place in the study period.

In 2012, the monetary threshold for the higher marginal dividend tax rate was reduced from 90,000 EUR to 60,000 EUR. Thus, given the imputed return of 9% for capital income dividends, owners with net asset share in the firm of at least 666K EUR faced a change in the dividend tax schedule ($9\% \times 666K \approx 60,000$ EUR[20]). I restrict the data to firms with net assets between 666K–1M EUR[21] in 2011, just before the tax change[22]. I use variation in the owner's ownership share to assign owners into treatment and control groups: while all firms have a similar net asset position, the treated firms are those with owners whose ownership share of the firm's net assets exceeds 666K EUR, which implies that the maximum capital income dividend based on the 9% net asset threshold is between 60,000–90,000 EUR. Thus they faced a marginal dividend tax increase of 14.36 percentage points (55.2%). I use firms whose main owner's net asset share is below 666K EUR as a control group. For them the maximum capital income dividend was already below 60,000 EUR. Thus, their marginal dividend tax rate decreased by 1.5 percentage points. The assignment into treatment and control groups is illustrated in panel A of Table 8.

I use a similar set-up to study the tax decrease in 2014. The 2014 tax change reduced the dividend tax for firm owners paying 60,000–150,000 EUR of dividends and dividends under the net asset threshold. Such firms had to have net assets of at least 750,000 EUR (8% of 750K is 60K). Again, I use firms of the same size but with a smaller ownership share of the main owner as a control group. The net asset limit for the firm sample is from 750,000 EUR to 1,875,000 EUR[23]. Firms where the main owner's ownership share of the net assets was 750,000 EUR or more are the treated firms and those where the main owner's ownership share was under 750,000 EUR act as a control group, as presented in panel B of Table 8. The corporate tax rate was reduced in both reforms[24]. However, this applied to both the treatment and the control group similarly.

[20]The exact limit used is 666,666.667 EUR.

[21]Owners who were already paying capital income dividends above 90,000 EUR and thus had net assets in the firm higher than 1M EUR did not face a change in the marginal tax rate but only in the average tax rate.

[22]Hence the data are a balanced panel based on the 2011 net asset position.

[23]Owners with a net asset share above 1,875,000 EUR already faced the higher capital income tax bracket, so they were likely only to face a change in their average dividend tax rate and not in the marginal tax rate.

[24]See more in Appendix A.1.

Table 8: Diagram of assignment into treatment and control groups

	Firm turnover	Firm net assets	Main owner's ownership share	Main owner's net asset share	Effective max MTR before	Effective max MTR after
Panel A: 2012 tax change						
Treated	Anything	666-1000K	$\leq 100\%$	666-1000K	26%	40.36%
Control	Anything	666-1000K	$\leq 100\%$	$<$ 666K	26%	24.5%
Panel B: 2014 tax change						
	Firm turnover	Firm net assets	Main owner's ownership share	Main owner's net asset share	Effective max MTR before	Effective max MTR after
Treated	Anything	750-1875K	$\leq 100\%$	750-1875K	40.36%	26-26.8%
Control	Anything	750-1875K	$\leq 100\%$	$<$ 750K	24.5%	26-26.8%

Note: This table describes the basic details of the assignment into treatment and control in the two difference-in-differences settings using the tax rate changes in 2012 and 2014. The assignment is based on the main owner's share of the firm's net assets. The last two columns report the marginal tax rate on the capital income dividend-maximizing dividend before and after the reform. 666K is actually 666,666.667 EUR.

The summary statistics and the number of observations for both tax changes are reported in Table 9. I will use the same setting to study other outcomes in Sections 4.2 and 4.3, so I have included more variables. In terms of turnover, net assets (by definition), investment, and variable costs (spending on inputs, such as materials or intermediate goods), both groups are quite similar. Labor costs, the number of employees and the number of owners differ between the groups, which is to some extent expected, since by definition the number of owners differs between the groups, as the groups are based on the ownership share[25]. There are approximately 1000 yearly observations in each group for the 2012 tax increase and 2000 for the 2014 tax cut.

The net asset position enabling a firm to pay dividends in the lowest tax bracket does not imply that the firm pays the maximum capital income dividend to the owner[26]. The benefit of the set-up is that the treatment is now assigned based on the effective dividend schedule faced by the owner. In that sense the set-up can be thought of in two ways: First, the treatment group includes firms facing a change in their available dividend tax schedule. Second, the assignment is an instrument for

[25]For firms of this size, it is common that the owner also works in the firm.

[26]However, more than 60% of the treated firms did pay dividends between 60,000–90,000 EUR (Table 9).

Table 9: Summary statistics of the DID data (years 2011 and 2013)

Panel A: Year 2011						
	Treated			**Control**		
	mean	sd	p50	mean	sd	p50
Turnover	1541055	2556638	802945	1897639	2383413	1249627
Net Assets	846458	99282	842541	829473	97024	813990
Dividends (main owner)	80094	50810	71601	45592	35840	37524
Marginal dividend tax rate	.338	.108	.260	.364	.115	.260
Owner's wages	24220.25	29493.89	17163.54	32953.31	33111.73	29679
Investment	76105	221196	9774	80363	161792	17920
Investment per lagged fixed assets	0.5617	4.3423	0.0466	0.2985	0.7011	0.0772
Financial assets	538541	398789	507063	580817	441668	528328
Variable costs	1130710	2181940	430710.5	1242189	1981976	648814.7
Employees	10.69	27.59	4	14.84	24.60	8
No. Owners	1.379	1.144	1	3.806	6.044	3
Observations (2011)	1038 (651*)			1394		
Observations (total)	8478			10059		
Panel B: Year 2013						
	Treated			**Control**		
	mean	sd	p50	mean	sd	p50
Turnover	2307248	15076369	967603.8	2444987	3595202	1485020
Net Assets	1226032	325761	1170015	1089996	268768	1024905
Dividends (main owner)	85368	108177	69000	50472	39405	44000
Marginal dividend tax rate	.298	.100	.245	.343	.120	.245
Owner's wages	27697.79	35268.75	19175.97	34973.28	36773.27	30233.21
Investment	101979	279940	16909	92262	215896	19639
Investment per lagged fixed assets	0.3737	2.1292	0.0488	0.3940	2.2299	0.0634
Financial assets	712604	553647	631676	764625	726121	622171
Variable costs	1872973	16714208	586906.2	1655490	3145893	765121.7
Employees	13.207	27.330	4	16.533	24.261	9
No. Owners	1.64	1.15	1	4.27	7.93	3
Observations (2013)	2027 (1513*)			2240		
Observations (total)	10437			10619		

* Number of firms that paid dividends of the amount facing an increase in the marginal tax rate for the main owner (60,000-90,000EUR in 2011 and 60,000-150,000EUR in 2013).

Note: This table provides the summary statistics for the difference-in-differences data in 2011, right before the 2012 tax change, and in 2013, right before the 2014 tax change. Turnover refers to annual sales, net assets refers to the book value of assets after depreciation, dividends and wages are the main owner's income from the firm, and marginal dividend tax rate is that for the last euro of dividend received by the main owner. Investment refers to additions to depreciating assets, such as newly installed fixed capital. Labor costs includes wage and payroll taxes paid by the firm and variable costs other input costs such as materials and intermediate goods, number of workers means the number of employees in the firm in 2011/2013. Each firm has only one main owner in the data. The owner with the highest share of stock is considered the main owner. Due to the nature of the data, all firms paid dividends to their main owner.

a change in the effective marginal dividend tax rate. A common instrument in the earlier tax elasticity literature has been to use pre-reform income as an instrument to assign those facing a tax change (see e.g. Gruber and Saez, 2002). However, such an instrument has some drawbacks, such as mean reversion, anticipation and selection by firm revenue (etc. other characteristics). Using the net asset position of the owner as an instrument provides a new innovative way of circumventing these particular challenges.

Before going into the difference-in-differences results, I calculate first-stage estimates of how well the assignment into treatment is connected to changes in the actual net of marginal dividend tax rate. This will then enable me to calculate elasticities based on the difference-in-differences results. Calculating the impact on the marginal tax rate is not straightforward, as the dividend payout decision is endogenous and thereby the realized marginal tax rate likely responds to changes in the tax schedule. To take into account that not all owners face the tax change reported in Table 8 if their preferred dividend levels are lower, I use the pre-reform dividend amount and assume that, without the change, the owner received the same amount of dividend the year after the reform when calculating the first stage. I then use the pre-change dividend amounts to calculate the impact of the tax change on the net-of-tax rate for dividend. As mentioned, the drawback in using pre-change dividend amounts is that the dividend payments before the tax change may include some anticipation or mean reversion effects. However, at least in this first-stage calculation, the assignment into treatment and control is not based on this income. I find that the assignment into treatment and control groups reliably predicts whether an owner faces a jump or a drop in the marginal dividend tax, as shown in Table 10. The first reform reduced the net-of-tax rate for dividends from the treated firms by 8.5 percent and the second increased the net-of-tax rate for dividends by 6 percent on average.

To estimate the reduced-form difference-in-differences results for the tax changes, I estimate the equation

$$Y_{it} = \alpha_1 + \alpha_2(Treat \times Post) + \beta_i' FE_i + \lambda_t Year_t + \varepsilon_i, \tag{1}$$

where Y_{it} is the outcome variable, α_1 is a constant, $Treat$ is a binary variable with the value 1 for firms in the treated group, $Post$ is a binary variable with the value 1 for firms after the tax change, hence α_2 measures the effect. $\beta_i' FE_i$ is a matrix capturing firm fixed effects and $\lambda_t Year_t$ is a matrix capturing year fixed effects. ε_i is the error

Table 10: First stage: Effective dividend tax change

	Dividend tax cut increase 2012	Dividend tax cut 2014
Dep. var	Net-of-dividend tax change	Net of dividend tax change
β_1	-0.0851***	0.0595***
	0.0028	0.0043
Constant	-0.000	-0.000
	0.009	0.007
r2	0.2787	0.0422
N	2429	4265
F	937.8641	187.9287

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

Note: This table reports the first-stage regression results ($\triangle(1-t) = \beta_0 + \beta_1 Treat + \varepsilon$) for the dividend tax increase in 2012 and the tax cut in 2014. The dependent variable in the specifications is the change in the net-of-dividend tax value ($\triangle(1-t) = \frac{1-t_{post}-(1-t_{pre})}{1-t_{pre}}$) according to the dividend amount in the year before the reform (2011 and 2013).

term, and standard errors are clustered at the firm level.

Table 11 reports the difference-in-differences estimates for the impact of the 2012 dividend tax increase and the 2014 dividend tax cut on the wages and dividends of the main owner. In 2012, the dividend tax rate increased for the main owners in the treated group, and accordingly the main owners reduced their dividend payout. However, there was no corresponding increase in wages within this group. In 2014, the main owners, who faced a dividend tax cut significantly increased their dividend payout and this time also reduced their wages from the same firm. The wage impact on the second reform largely counteracted the dividend increase, suggesting clear income shifting. The last row of Table 11 reports coarse elasticity estimates with respect to the net-of-dividend tax rate change according to the first stage effects reported in Table 10. The dividend elasticities are even higher than the bunching estimates, but with somewhat large standard errors. This further supports the evidence of the bunching estimation that firm owners are able and do respond to dividend tax changes actively.

Table 11: Difference-in-differences results for income shifting between dividends and wages

	2012 Dividend tax increase		2014 Dividend tax cut	
	Dividends (log)	Wage (log)	Dividends (log)	Wage (log)
$\alpha_2(Treat \times Post)$	-0.066**	-0.055	0.079***	-0.083**
	0.020	0.031	0.014	0.025
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Constant	10.782***	10.179***	10.893***	10.273***
	0.006	0.011	0.005	0.008
r2	0.071	0.001	0.050	0.009
N	12288	8804	21056	14862
Elasticity w.r.t net-of-dividend tax change	0.776 (0.235)	0.646 (0.364)	1.323 (0.235)	-1.395 (0.420)

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

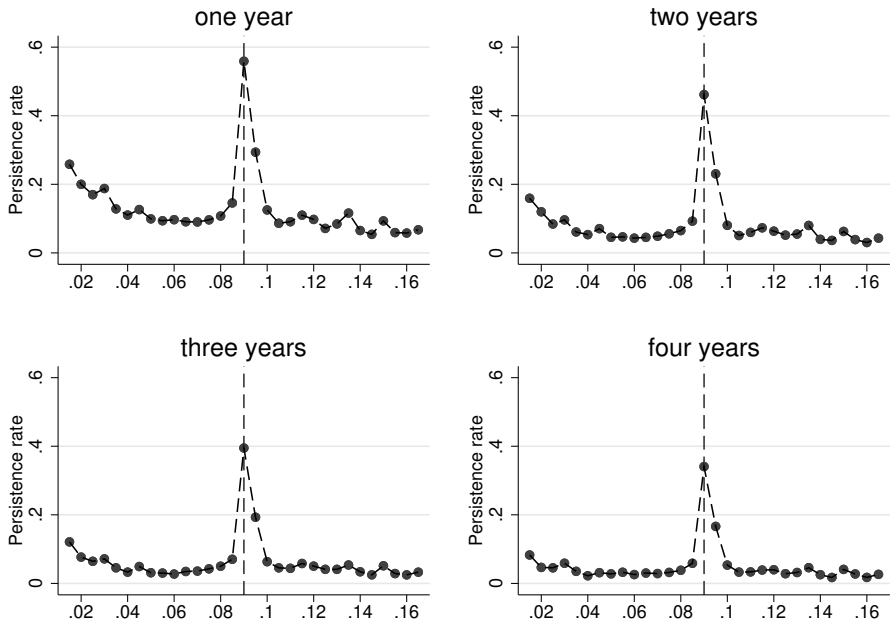
Note: This table reports the regression results estimated following Equation 1 for the tax increase in 2012 and the tax cut in 2014. The dependent variables in the specifications are logarithmic transformation of dividends for the main owner and logarithmic transformation of wages for the main owner (both only from a single firm). The elasticity estimate relates the effect to the net-of-dividend tax rate change of the first stage calculation in Table 10.

4.2 Inter-temporal income-smoothing and net asset accumulation

Owners of privately held corporations obviously do not need to adjust the firm profits to bunch at the dividend tax threshold; they can adjust owner-level taxable income using retained and withdrawn earnings to shift income across years. By smoothing income with retained earnings, tax filers can hold their marginal tax rates constant. Hence, there is likely to be bunching even if taxes have no effect on output. In addition to postponing the payment of dividends, the tax thresholds incentivize owners to spread dividends so as to be paid in advance too. This effectively causes the bunching mass to accumulate not only from above but also from below the threshold. An important aspect to keep in mind is that leaving earnings in the firm does not imply that the earnings are spent on investment in productive capital – they can merely be stored as financial assets (bank deposits, financial investments).

Figures 5 and 6 plot the persistence rates at the 9% and at the 90,000 EUR thresholds respectively. The figures show that the extensive bunching is created by

Fig. 5: Persistence at 9% in 2006-2013 – 1% bins around the threshold

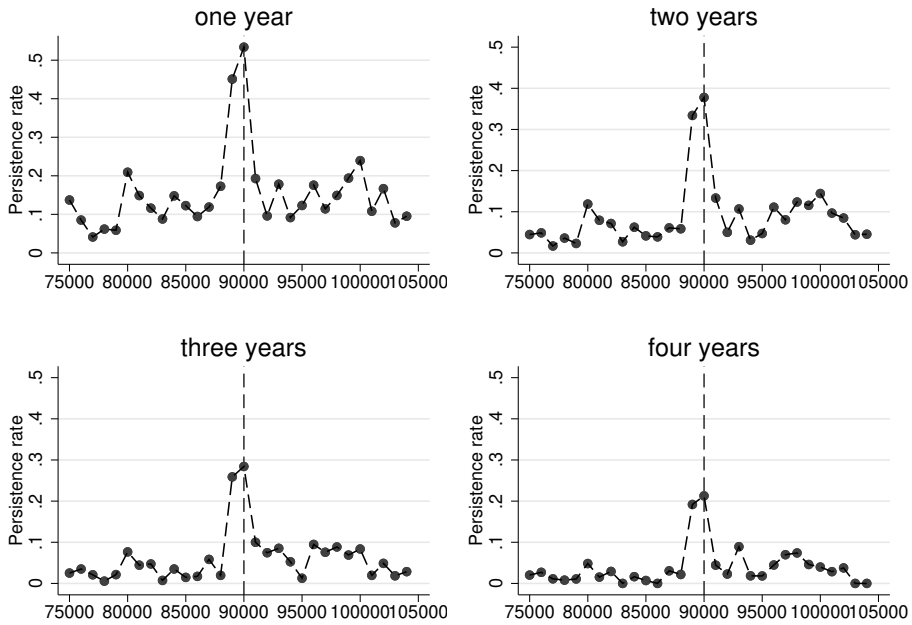


Note: The graph plots the share of the same firms locating in the same 1% bins around the 9% threshold 1 to 4 years later.

the same owners year after year. The share of firms in the bunching region that are also located in the same euro or net asset bin 1-4 years earlier is exceptionally large compared to the surrounding bins. At the 9% net asset threshold, the share of firms bunching for a second year in a row is almost 60% and four years after it is still approximately 30%. At the 90,000 EUR kink the rate is above 50% in the first year and 20% after four years. As the threshold relocates, a large share of the previous bunchers follow the threshold: the share of movers is described in Table A2. Miller et al. (2022) argue that persistent bunchers are more likely to be systematically retaining profits in their firms to take advantage of lower taxes in the future, while intermittent bunching is more likely driven by smoothing income volatility. Following this argument, a notable share of bunchers in the Finnish dividend tax schedule are not merely smoothing for income volatility, but retaining profits consistently to achieve additional tax benefits.

Retaining wealth in the firm has three advantages. First, as mentioned, using retained and withdrawn earnings allows the owner to avoid higher marginal tax rates. Second, savings and returns on savings face a lower tax when received by a firm than

Fig. 6: Persistence at 90,000 EUR in 2006–2011, in 1000 euro bins



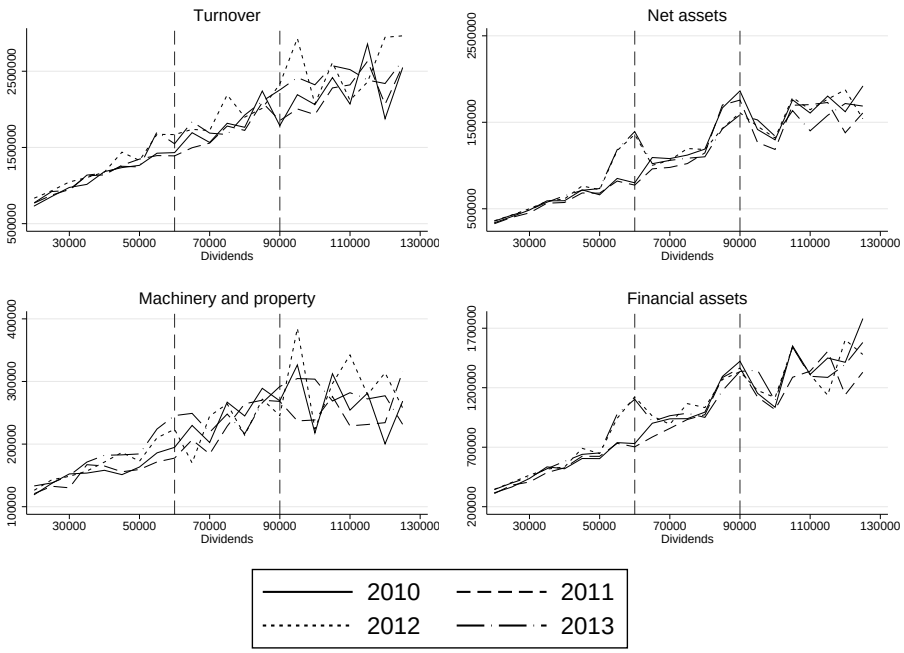
Note: The graph plots the share of the same firms locating in the same 1000-euro bins around the 90k threshold 1 to 4 years later.

at the owner level as the capital gains tax at the individual level is higher than the corporate income tax paid at the firm level[27]. Thus if the owner wishes to save some share of the income, then for tax purposes it may be desirable to keep some of those funds incorporated. Third, by retaining earnings, the owner increases the net assets of the firm, thereby allowing for higher amounts of capital income dividends (lower tax bracket) to be distributed in the future. Then again, there are also arguments against leaving wealth in the firm, such as controlling risk.

Figure 7 shows the firm's turnover, net assets, fixed capital (property and machinery), and financial assets on average across the dividend distribution of the main owners (in 5000 euro bins). The upper left panel shows the average annual turnover in each dividend bin. The higher the dividend, the higher the turnover, indicating a positive linear relationship. This linear relationship does not hold in the second panel, which shows the average net assets in each bin. When the monetary threshold was at 90,000 EUR, firms whose owners bunch at the dividend threshold had more net assets on average than firms in the surrounding dividend bins. However, there

[27]Furthermore, potential losses may further reduce the tax on capital gains at the firm level.

Fig. 7: Average firm outcomes in 5000-euro-dividend bins



Note: The figure shows mean firm outcomes in 5000-euro dividend bins (for the main owner). In other words, the horizontal line shows the dividend received by the main owner and the vertical line the outcome in euros. In 2010 and 2011, the monetary threshold was 90,000 EUR, whereas in 2012-2013 it was 60,000 EUR. This figure shows that bunchers have on average higher net assets and especially financial assets, as there is no bunching in fixed capital (machinery and property).

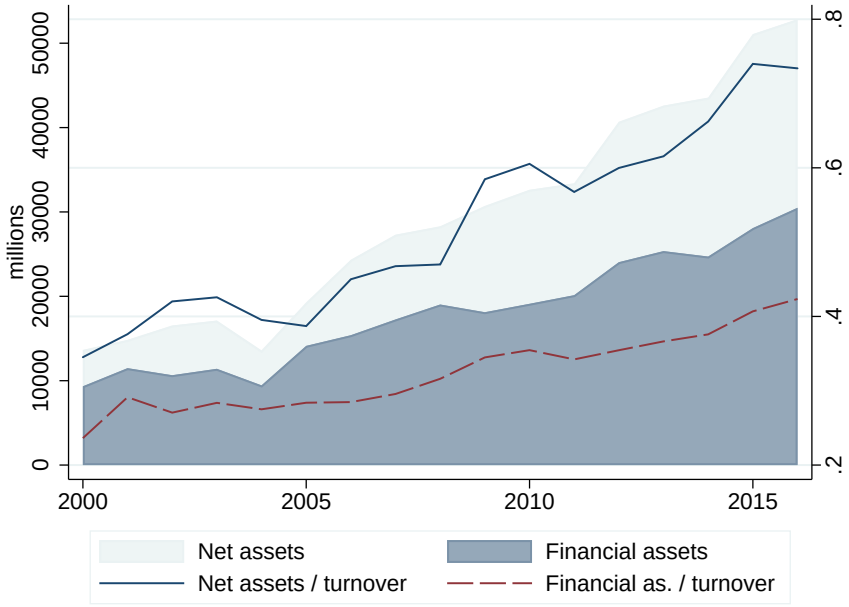
is no similar bunching in reported machinery and property, whereas it does appear in financial assets. Moreover, when the threshold moves to 60,000 EUR in 2012, the net asset and financial asset bunching moves along with the threshold. This suggests that firm owners bunching at the thresholds indeed retain earnings in the firm and may even use the firm to store savings (as financial assets). As an additional detail, Figure A3 in the Appendix shows that firms in the financial industry bunch at the threshold more actively than other industries.

Retaining earnings has led to the accumulation of wealth in firms, which is visible from the reported balance sheet information. Figure 8 shows how the aggregated net assets and particularly financial assets of privately held corporations in Finland have increased. To ensure that this descriptive evidence is not just driven by the increasing number of firms, economic growth or increasing stock market values, I relate this information to aggregate turnover. Even in relation to turnover, there is still substantial growth in the firms' assets. However, this does not appear as higher

net investment or dividend payouts.[28]

Finally I implement the difference-in-differences analysis described in Section 4.1 to see how the financial assets of firms with a main owner facing a dividend tax change responded. Table 12 reports the difference-in-differences results for the financial assets reported in the firms' tax returns. Again, we would expect an increase in the wealth of the firm after the dividend tax increase and a decrease in finances stored in the firm after the dividend tax cut. The signs of the impact estimates follow this prediction, although the estimates are not statistically significant bearing in mind the relatively small sample size.

Fig. 8: Aggregate net asset accumulation, profits and retained earnings



Note: The area plots here depict the aggregate net assets and financial assets of all firms in the data. The lines also plot them both in relation to aggregate sales. The trends show that despite the economic turbulence in recent decades, firms' assets have been steadily increasing since the adoption of the current dividend tax schedule in 2005.

4.3 Real effects

[28]Shown in Figure A4 in the Appendix.

Table 12: Difference-in-differences results for financial assets

	2012 Dividend tax increase Financial assets (log)	2014 Dividend tax cut Financial assets (log)
$\alpha_2(Treat \times Post)$	0.017	-0.019
	0.027	0.020
Firm fixed effects	X	X
Year fixed effects	X	X
Constant	12.940***	13.140***
	0.009	0.007
r2	0.005	0.002
N	11867	20532

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

Note: This table reports the regression results estimated following Equation 1 for the tax increase in 2012 and the tax cut in 2014. The dependent variable in the specifications is the logarithmic transformation of financial assets reported in the firms' tax returns.

Dividend taxes reduce the return on invested capital and the owner's own work effort, hence they may decrease incentives for new investments and the exertion of effort. An ongoing debate in the dividend tax literature is whether dividend taxation distorts investment. The so-called new view on dividend taxation suggests that dividend tax does not enter the marginal cost of investment, since marginal investment is funded from retained earnings or debt (Auerbach 1979; King 1974). The opportunity cost of investing retained earnings is to distribute profits as dividends. In either case you pay the dividend tax - either now or in the future - and therefore the dividend tax rate cancels out from the cost of capital.

Under this new view, dividend payment responses due to tax differentials simply reflect inter-temporal incentives to pay dividends, meaning that dividend taxes are avoided by retaining profits. In response, taxes on dividends may solely capitalize into share values but not affect the decision to reinvest. Thus, an increase in dividend payments in response to a dividend tax cut may simply reflect a firm's response to inter-temporal incentives and so it pays dividends while tax rates are relatively low[29]. The results presented in Sections 4.1 and 4.2 mirror this theoretical literature.

However, a part of the literature, the 'old view', suggests that dividend taxes

[29]For example, Zodrow (1991) describes the capitalization mechanism in more detail and Yagan (2015) shows empirical evidence of a dividend payout windfall following a dividend tax cut in the US, supporting this theory.

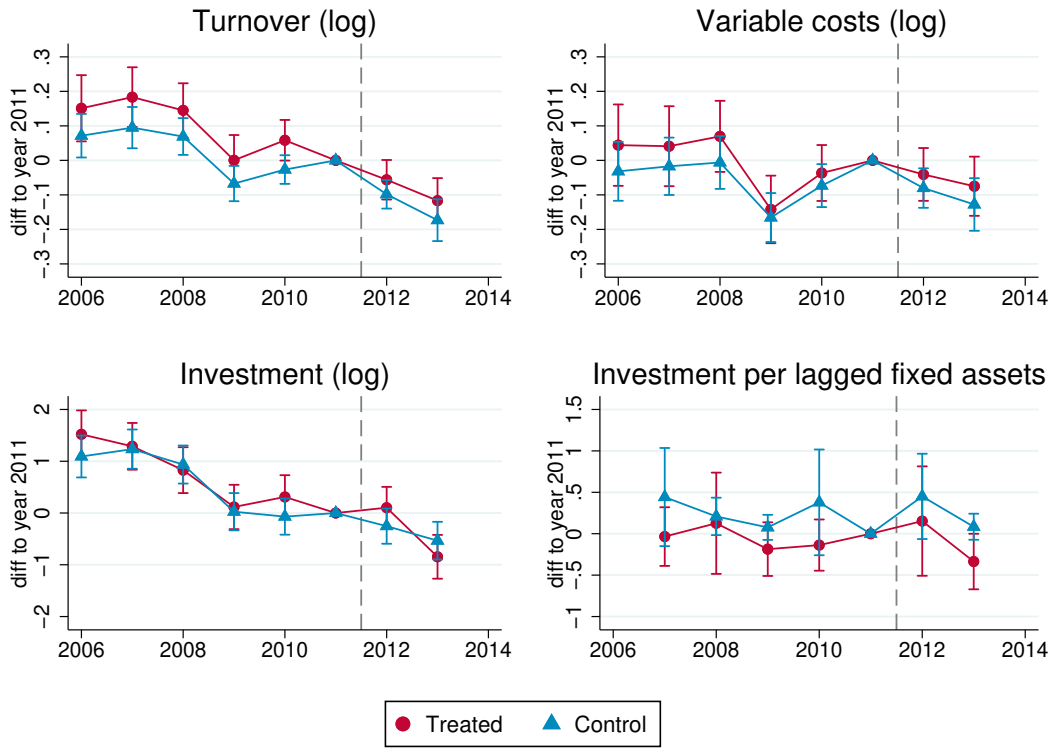
affect the firms' investment choices even if the investment is funded from retained earnings (Poterba and Summers, 1985). The reason may be that shareholders do not consider retained earnings as valuable as paid-out profits due to asymmetric information (principal-agent conflicts), as dividends signal the true value of the firm. Sinn (1991) argues that while the new view holds for mature firms with accumulated capital, for newly established firms in a growth phase dividend taxes may retard growth. The reason is that the firm raises less new equity to fund new capital due to dividend taxation, which distorts its investment choices. Moreover, when dividend taxation is non-linear, neutrality of investment with respect to dividend tax rate does not necessarily hold as pointed out by Kari and Laitila (2014). Finally, the agency model in Chetty and Saez (2010) predicts that dividend taxation may also amplify principal-agent conflicts of interest, as dividend taxation leaves more cash under the control of managerial choices through retained earnings, and disincentivizes the close monitoring of managers. This may lead to unproductive investments using retained earnings.

I next examine whether real economic effects drive some of the responses to dividend taxation as suggested by part of the existing theory literature. To address this question, I again apply the difference-in-differences approach explained in Section 4.1.

Figure 9 shows the development of annual turnover, variable costs and investment around the tax increase of 2012. The plots are regressed year fixed effects with 2011 as the base year and firm fixed effects included. The figure shows that the outcome pre-trends are aligned. The upper panels present sales and input usage, showing that the trends were similar before the tax change, and that there is no notable response in business activity to the dividend tax increase in 2012 in the treated group. The lower panels show logarithmic investment and investment per lagged fixed assets, indicating that there is no statistically significant response in investment to the increase in the marginal tax rate. Table 13 reports the difference-in-differences results suggesting no statistically significant response in any of the outcomes. I perform the same analysis for the 2014 tax change with the treatment group now facing a dividend tax decrease. Figure 10 shows the firm-level development of different outcomes around the tax change and Table 14 reports the difference-in-differences results. Again, the results suggest that there is no statistically significant response to the reduction in the dividend tax among the treated firms in any of the outcomes.

Finding no significant impact on real outcomes suggests that the main mecha-

Fig. 9: Outcomes in treatment and control group relative to year 2011



Note: Coefficients are from a firm-fixed effect regression on the year relative to 2011. The vertical dashed line depicts the time of the dividend tax increase. Variables are used in deflated values with inflation from Statistics Finland. Treatment group: firm's net assets 666,666.667–1,000,000 EUR in 2011 and main owner's share of net assets > 666,666.667 EUR. Control group: firm's net assets 666,666.667–1,000,000 EUR in 2011 and main owner's share of net assets < 666,666.667 EUR.

nisms of response to dividend tax rate changes are through channels other than real economic effects in e.g. investment[30]. While the confidence intervals in the investment responses are large, likely due to the relatively small sample size, and thus do fully rule out investment impacts, it should be noted that new productive investments should likely lead to an increase in sales, which I do not observe. The finding of no effect on average supports the finding in Harju, Koivisto, et al. (2022), which focuses on the investment impacts of the corporate tax cuts of 2012 and 2014 in Finland. However, my setting has limited sample size and does not allow me to investigate for heterogeneity or reallocation responses between more and less cash-constrained firms

[30]The set-up only studies local effects of changes in the current marginal tax rate, so I cannot rule out global effects caused by changes in average tax rates or indirect effects, e.g. through the future tax burden.

Table 13: Difference-in-differences results of the 2012 tax change

	Turnover (log)	Variable costs (log)	Investment (log)	Investment per lagged capital
$\alpha_2(Treat \times Post)$	-0.015	0.003	-0.100	-0.101
	(0.041)	(0.050)	(0.185)	(0.276)
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Constant	13.828***	12.733***	6.807***	0.656***
	(0.020)	(0.025)	(0.109)	(0.164)
r2	0.016	0.005	0.019	0.001
N	16857	15367	18537	13376

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

Note: This table reports the regression results estimated following Equation 1 for the tax increase in 2012. The dependent variables in the specifications are logarithmic transformation of annual turnover (sales), logarithmic transformation of annual variable costs, logarithmic transformation of annual investment (additions to depreciating capital) and annual investment relative to the capital of the previous year.

Table 14: Difference-in-differences results of the 2014 tax change

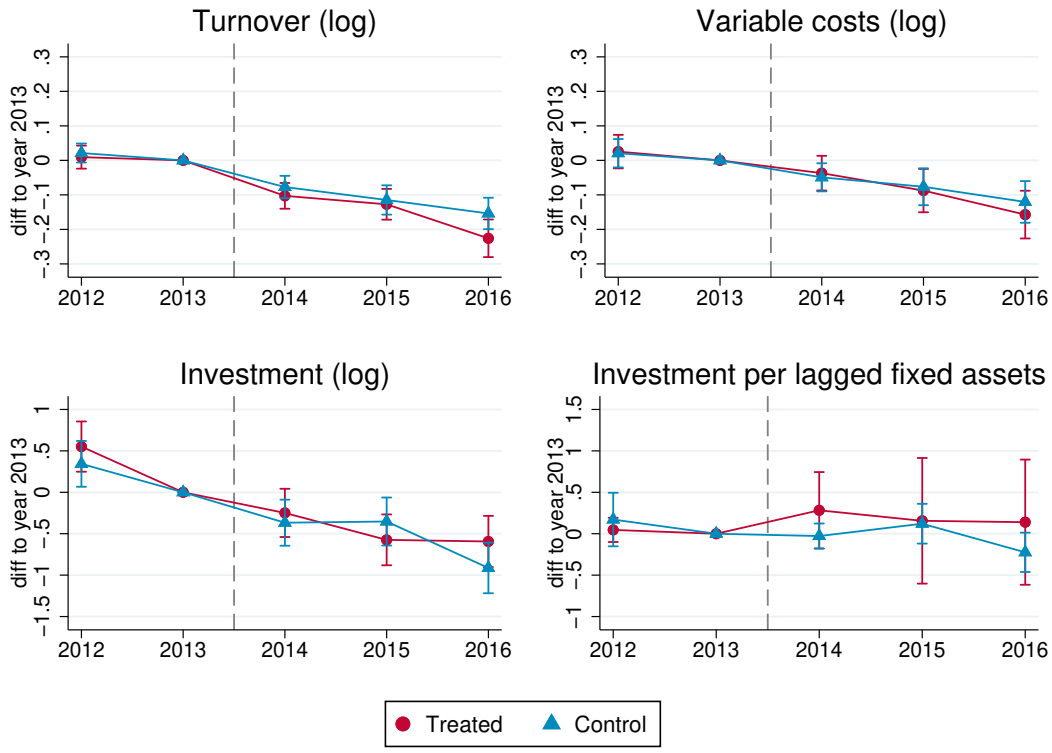
	Turnover (log)	Variable costs (log)	Investment (log)	Investment per lagged capital
$\alpha_2(Treat \times Post)$	-0.030	-0.013	-0.031	0.295
	0.026	0.032	0.146	0.247
Firm fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Constant	13.986***	13.043***	6.003***	0.541***
	0.010	0.013	0.069	0.097
r2	0.017	0.006	0.009	0.000
N	18294.000	16787.000	21056.000	17293.000

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

Note: This table reports the regression results estimated following Equation 1 for the tax cut in 2014. The dependent variables in the specifications are logarithmic transformation of annual turnover (sales), logarithmic transformation of annual variable costs, logarithmic transformation of annual investment (additions to depreciating capital), and annual investment relative to the capital of the previous year.

as suggested by the findings in Alstadsæter et al. (2017) and Harju, Koivisto, et al. (2022).

Fig. 10: Outcomes in treatment and control group relative to year 2013



Note: Coefficients are from a firm-fixed effect regression on the year relative to 2013. The vertical dashed line depicts the time of the dividend tax decrease. Variables are used in deflated values with inflation from Statistics Finland. Treatment group: firm's net assets 750,000–1,875,000 EUR in 2013 and main owner's share of net assets $>$ 750,000 EUR. Control group: firm's net assets 750,000–1,875,000 EUR in 2011 and main owner's share of net assets $<$ 750,000 EUR.

5 Conclusion

Concerns about efficiency and investment have led to lower income tax rates for dividend income in most countries. This study explores empirically how firms and their owners actually respond to dividend taxation in a variety of decision margins. I find high dividend tax elasticities, and I observe that more experienced owners have higher tax base elasticities. I show that the large payment responses to dividend tax thresholds are primarily driven by intra-temporal and inter-temporal income shifting. When studying changes in the tax thresholds, I find clear income shifting between wages and dividends. In addition, the evidence suggests that firm owners postpone dividend payouts: retaining earnings within the firm enables firm owners to avoid higher tax brackets and capitalization is further encouraged by the possibility in the

Finnish tax system to reduce the future tax burden by accumulating net assets in the firm. Leaving wealth in the firm also has some tax benefits, mainly in the return on savings.

Finally, this paper gives evidence of modest investment elasticity of dividend taxes, suggesting that reduced dividend tax rates are not particularly successful in boosting investment. Evidence using difference-in-differences analysis and shifts in the thresholds suggests that bunching at tax thresholds is not driven by real responses e.g. in output or investment, lending support to the new view in dividend tax literature.

These results highlight that large differences in taxation between income bases create behavioral responses with mainly distributional implications. In other words, with business owners already facing lower tax rates in comparison to wage earners, the tax-planning responses to dividend taxation amplify this gap. The extensive income shifting responses underline that, in predicting the revenue impacts of tax changes, the variety of tax bases and the implications for inter-temporal income shifting should be considered. From a tax authority perspective, inter-temporal income shifting may also reduce the cyclicality of business income tax revenue.

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A Appendix

A.1 Additional details of the institutions and data

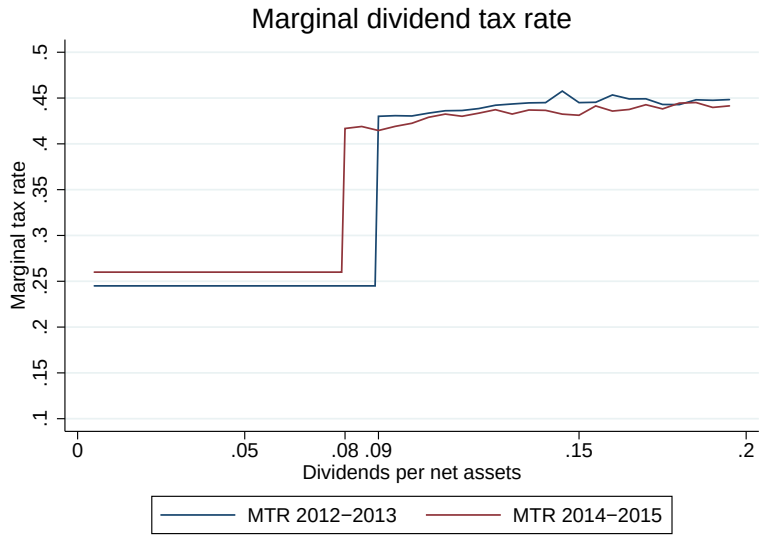
Earned income taxation in Finland includes a progressive government tax, a flat municipal income tax, and pension and social security contributions. Both government and municipal taxes include deductions for low-income individuals, making the effective tax schedule very progressive, with the lowest tax rates approximately zero and the highest around 55%, excluding the payroll tax paid by the employer. In calculating the marginal tax rate on earned income, I calculate the tax rate for one extra euro of the particular income type. I exclude the payroll tax[31], since for most business owners the payroll contribution is not defined by the wage sum, but is based on the so-called entrepreneur's labor income, which is largely decided by the owner[32]. Thus the marginal payroll tax of a business owner is generally not affected by an additional euro of gross income.

The earned income tax rate applied above the net asset threshold varies depending on the taxpayer's income and municipality. Both the municipal and government tax schedules change nearly every year. The lowest government tax rate has been zero over the whole period and, with deductions in the municipal tax for low-income earners, the aggregate earned income tax rate has also been close to zero at the low end of the income distribution. The highest overall marginal earned income tax rate has been around 55%. The government tax rates on earned income decreased over the research period of 2006–2016, especially for low- and middle-income earners. However, municipal income tax has increased; in 2000, the average rate was 17.7%, but in 2015 it was 19.9%. The municipal income tax varies across municipalities; in 2015 it ranged from 16.5% to 22.5%. Figure A1 plots the average threshold created by the net asset threshold. As the tax rate above the threshold depends on the taxpayer's other income, the tax rates above the threshold in the figure are calculated as an average of the marginal tax rates of firm owners in each bin.

[31]Employer's social contributions (työnantajan sairausvakuutusmaksu, työeläkevakuutusmaksu, työttömyysvakuutusmaksu, ryhmähenkivakuutusmaksu) and employee's social contributions (työeläkevakuutusmaksu, työttömyysvakuutusmaksu, vakuutetun sairausvakuutusmaksu).

[32]This so-called YEL system, where the entrepreneur sets the labor income level, applies to all self-employed persons who are taxed according to the self employed person's pension act, implying business owners who, alone or together with family members, own at least 50% of their firm or hold a leading position in the firm and own over 30% of the company's shares. These are the majority of the owners studied in this essay.

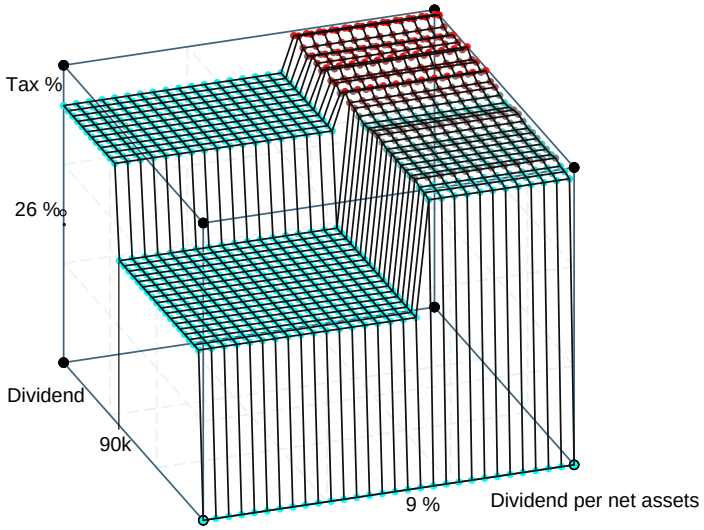
Fig. A1: Average marginal tax rate for firms paying dividends under the monetary dividend tax threshold



Note: The tax rate above the threshold is estimated as a mean of the marginal earned income tax rates in the data. The earned income tax rate varies depending on the taxpayer's income and municipality. Both the municipal and government tax schedules change nearly every year. The lowest government tax rate has been zero over the whole period and, with deductions in the municipal tax for low-income earners, the aggregate earned income tax rate has also been close to zero at the low end of the income distribution. The highest overall marginal earned income tax rate has been around 55%. Overall government tax rates on earned income have been decreasing over the research period of 2000-2013, especially for low- and middle-income earners. However, the municipal income tax has been increasing; in 2000, the average rate was 17.7%, but in 2013 it was 19.4%. The municipal income tax varies across municipalities; in 2015 it ranged from 16.5% to 22.5%.

Figure A2 visualizes the thresholds in marginal tax rates. It is three-dimensional to reflect the fact that the dividend tax rate depends not only on the dividend amount but also on the net asset position of the firm. For an individual firm owner, the entire region is not available, and the firm's net assets define a restriction that slices the three-dimensional dividend tax schedule. For example, a sole owner of a firm with exactly 1 million euros of net assets could locate exactly at the corner of the lowest plane. By receiving more dividends, the owner would face the earned income schedule, which is the high uneven plane in the graph. The earned income tax rates above the threshold are calculated as averages of the individual marginal tax rates of owners at the threshold.

Fig. A2: Marginal tax rate for dividends 2006–2011



Note: This graph describes the thresholds in 2006-2011, when the kink was at 90,000 EUR and the net asset threshold at 9%. Above the net asset threshold, the owner pays earned income tax on 70% of income (85% since 2014) in addition to the corporate tax. The tax rate above the net asset threshold is estimated as a mean of the actual marginal earned income tax rates in each 5000-euro dividend bin.

A.2 Bunching method

I estimate the extent of excess mass and the according elasticity of taxable income using the bunching method developed by Saez (2010)[33]. The elasticity of taxable income (ETI) is the ratio of a percentage change in taxable income to a percentage change in the net-of-tax income rate (one minus the tax rate). The bunching method uses the excess mass at a tax schedule discontinuity to estimate the corresponding elasticity of taxable income.

To measure excess mass, I first estimate a counterfactual distribution that describes what the dividend distribution would approximately be in the absence of the kink point[34]. The counterfactual distributions around the monetary kink points are

[33]Kleven (2016) provides a review of the method and its indications.

[34]A threshold in the dividend tax schedule creates a kink point in the budget set of received income net of taxes with different amounts of gross dividends.

estimated as

$$\widehat{C_j^0} = \sum_{i=0}^{p} \beta_i^0 \cdot (Z_j)^i + \rho \cdot \mathbf{1}\left[\frac{Z_j}{r} \in \mathbb{N}\right] + \varepsilon_j,\ Z_j \notin [-R; R]\,, \tag{2}$$

where $\widehat{C_j^0}$ is the estimate of the counterfactual distribution in each bin j with dividend income Z_j. β_i^0 are the regression estimates, and p denotes the degree of the polynomial. ρ in the second term captures the round number fixed effect that is observed in Figure 1. $[-R; R]$ is the excluded range of the distribution, which denotes the area where the kink point affects the owners' behavior. Following earlier literature (e.g. Chetty, Friedman, et al. (2011)), this area is selected by visual observation of the data. My results and conclusions are not sensitive to the choice of $[-R; R]$ or the order of the polynomial.

I estimate the counterfactual distribution around the net asset threshold following Equation 3.

$$\widehat{C_j^0} = \sum_{i=0}^{p} \beta_i^0 \cdot (Z_j)^i + \frac{\sum_{j=-R}^{R} C_j}{2A+1} + \varepsilon_j,\ Z_j \notin [-R; R]\,,\ j \in [-A; A] \tag{3}$$

The basic principle is the same as in Equation 2. Given the very strong bunching, the second term is used to spread the bunchers to the surrounding region to make the sum of firms in the counterfactual distribution match that of the realized distribution. For this distribution, there is no need to consider round number bunching. In estimating the counterfactual distribution, I include both the region below and above the threshold, as the system is likely to induce early payments of dividends, as discussed in Kari and Laitila (2014).

The sum of the excess observations in the bunching range is

$$\sum_{j=-R}^{R} \widehat{B}_j = \sum_{j=-R}^{R} \left(C_j - \widehat{C_j^0}\right). \tag{4}$$

The estimate of excess bunching $\hat{b}$ is then the estimated excess mass around the kink relative to the average density of the counterfactual dividend distribution between $-R$ and R

$$\hat{b} = \frac{\sum_{j=-R}^{R} \widehat{B}_j}{\sum_{j=-R}^{R} \widehat{C_j^0}/(2R+1)}. \tag{5}$$

Finally, the excess bunching can be turned into an elasticity estimate. The elasticities at the kink points are estimated as

$$\varepsilon_D = \frac{dD}{d(1-\tau)} \frac{1-\tau}{D} = \frac{\hat{b}}{D^* \cdot \log\left(\frac{(1-\tau_D)}{(1-\tau_D-\triangle\tau_D)}\right)}. \tag{6}$$

D denotes dividend income, τ the dividend income tax rate that jumps at a kink point D^* from τ_D to $\tau_D + \triangle\tau_D$. When estimating the elasticities at the net asset thresholds, I specify the marginal tax rate above the threshold for each firm owner individually. Then I use the aggregate bunching response to estimate the elasticity for each owner and report the mean elasticity.

Following earlier literature, I use the bootstrap method to construct standard errors (see Kleven (2016) for a review). In the bootstrap method, I sample the residuals from the regression a large number of times (300), with replacement, and estimate an elasticity for each draw. Using these elasticities, I calculate a standard error for the original elasticity estimate.

A.3 Additional empirical details

Table A1 gives the summary statistics for the full data. Altogether, the data consist of 641,558 observations across 11 years.

Figure A3 shows how various industries are represented in each bin around the 90,000 EUR threshold. The horizontal dashed line shows the industry's average share in the data. The figure shows that the finance industry is overrepresented among the firms bunching at the monetary threshold.

Table A2 shows the proportion of firms that move together with the threshold. When the monetary threshold moved from 90,000 EUR to 60,000 EUR, 47% of the preceding excess mass firms followed the threshold. At the 150,000 EUR threshold, one third of the observations had previously paid exactly 60,000 EUR of dividends, which was the preceding threshold. At the 8% net asset threshold, 70% of firms had previously bunched at the 9% threshold.

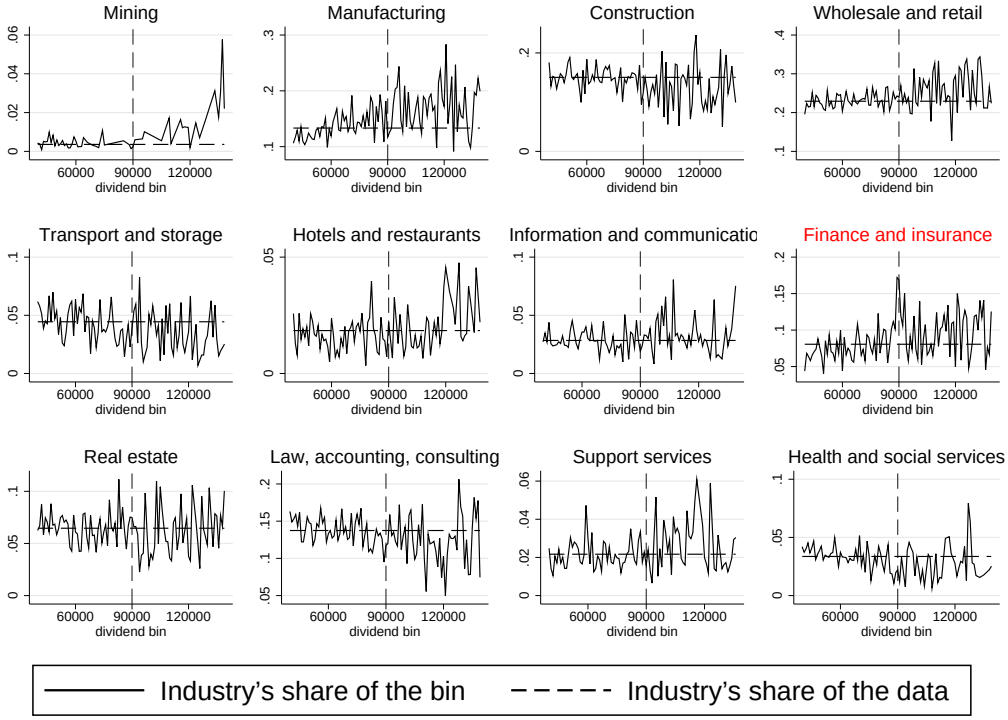
Figure A5 shows the income composition in two consecutive years when there was no tax change. There is now no change in the owners' income composition. The figure acts as a robustness check that the shift observed in Figure 4 was driven by the tax change.

Table A1: Summary statistics of the data 2006-2016

	Firm level		
	mean	sd	p50
Turnover	1074031	8470531	210749
Profit	99678	4566064	15125
Net Assets	639844	8057283	119400
Financial assets	382373	4410980	80450
Investment	54562	672584	1773
No. owners (all)	4.48	272.23	2.00
No. owners (individuals)	4.29	259.43	2.00
	Owner level		
	mean	sd	p50
Dividends	25568	138318	8500
Wages	22931	28290	15660
Share female	0.18		
Age	51.41	11.30	52.00
Taxable income	79488.62	274178.02	48059.42
Observations	641558		

Note: This table provides the summary statistics for the whole pooled panel data covering the years 2006–2016. Turnover refers to annual sales, profit is the taxable income of the firm, net assets refers to the book value of assets after depreciation and investment refers to additions to depreciating assets, such as newly installed fixed capital. Dividends and wages are the main owner's income from the firm. Each firm has only one main owner in the data. The owner with the highest share of stock is considered the main owner. Taxable income includes both taxable capital income and earned income and also income from other sources than the firm in question.

Fig. A3: Industry shares among 90k bunchers 2006-2011



Note: The figure plots the shares of each industry in bins around the 90,000 EUR threshold. The horizontal axis shows the dividend amount and the vertical axis the share of the industry in each bin. The dashed horizontal line denotes the average share of the industry in the data. According to the figure, the financial sector seems to be over-represented at the kink.

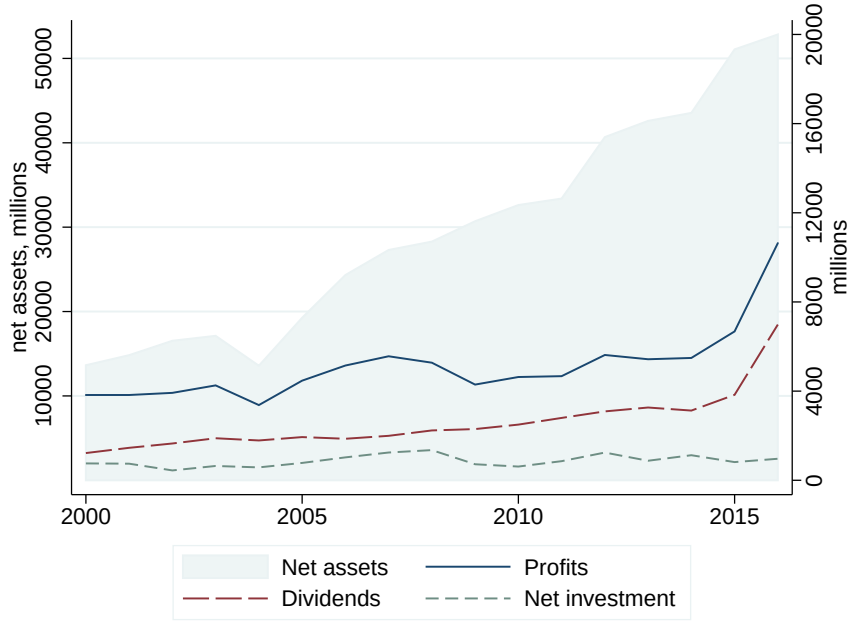
Figure A4 shows the accumulation of aggregated assets in privately held corporations in 2000–2016. Net assets consists of retained earnings, financial assets, and additions to depreciating capital. The figure also shows the evolution of aggregated profits, dividends and net investment in depreciating capital. The figure shows a clear increase in accumulated assets, starting especially after the introduction of the current dividend tax system in 2005. There is no increase in aggregate investment, so this is not likely to solely explain the accumulation of assets.

Table A2: Percentage share of firm owners relocating together with the kink

Tax change	Year	Movers as a share of bunchers before tax change	Movers as a share of bunchers after tax change
90k → 60k	2011/2012	46.72%	24.52%
60k → 150k	2013/2014	8.12%	35.45%
9pr → 8pr	2013/2014	60.33%	70.40%

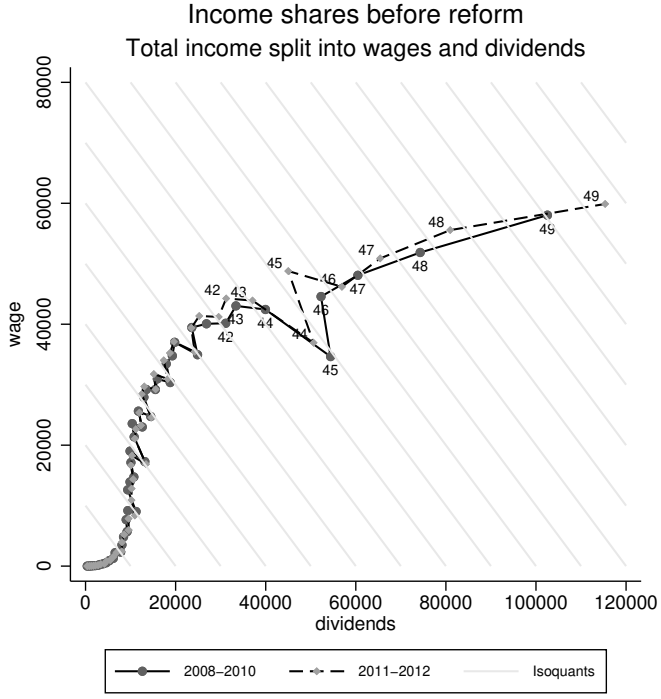
Note: This table reports the share of observations in the bunching region following a threshold change that in previous years bunched at the preceding threshold range. The share is reported as the proportion of bunchers at the preceding threshold as well as the proportion of bunchers after the tax change.

Fig. A4: Aggregate net asset accumulation, profits and retained earnings



Note: This figure shows the accumulation of aggregate net assets among the privately held firms studied in this paper in gray. The blue line shows annual aggregate profits, the red dashed line the main owner's annual aggregate dividends and the dashed green line annual aggregate net investment.

Fig. A5: Income shifting between wages and dividends



Note: This figure plots the income composition between wages and dividends in 2008–2009 and in 2010–2011. For the figure, the main owners' wages and dividends from the firm are counted together as total income. Then the owners are divided into 50 income quantiles (2-percentiles). Finally, for each quantile average wages and dividends are calculated. The horizontal line shows the average dividends and the vertical line the average wage in each bin. The isoquant lines show total income from the firm. The figure shows that when there was no tax change the owners' income composition stayed more or less the same. This figure acts as a placebo check for Figure 4 in the main text.