Dividend Taxes and Consumption*

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Abstract

Using detailed micro-level administrative data from Norway and a large dividend tax increase, we examine the direct effect of dividend taxation on shareholders' consumption and saving and firms' investment. We find that higher dividend taxes lead to a persistent decline in consumption of owners of private firms and listed firms. We also show that owners partially offset the consumption decline by reducing private savings. Firms increase retained earnings but do not expand productive investment. Instead, they accumulate financial assets, suggesting a reallocation of savings to the corporate level. Our findings highlight the consequences of dividend taxation on consumption and capital allocation.

Keywords: Dividend taxation, consumption, investment

JEL classification: D12, E21, E22, H24, H25

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1 Introduction

Whether taxes on capital income reduce household consumption and affect corporate investment is central for understanding both the welfare and macroeconomic consequences of capital taxation. Dividend taxes reduce shareholders' after-tax income, but whether they ultimately reduce firm owners' consumption is far from obvious. For example, shareholders can smooth temporary income shocks by drawing down accumulated wealth or substitute toward other forms of compensation, while cash-constraint owners may demand higher dividends in the face of higher taxation to maintain consumption levels (e.g. Kaplan and Violante 2014, Jacob, Michaely, and Rossi 2026). These adjustment margins imply that dividend taxes may not affect consumption of shareholders. At the firm level, if dividend taxes cause firms to increase retained earnings and reduce dividends, firms may increase corporate investment due to higher available cash (e.g. Jensen 1986, Korinek and Stiglitz 2016). At the same time, investments may decline because a dividend tax hike makes it more costly for firms to access external funds necessary for investment (e.g., Harberger 1962, 1966, Feldstein 1970) or because firms cut investments as consumption declines (e.g., Giroud and Mueller 2017). Hence, despite the central role of dividend taxation in tax policy debates[1], the expected effects of dividend taxes on consumption and firms' investment are ex-ante ambiguous.

Existing empirical evidence provides little guidance on this important question. At the macroeconomic level, changes in dividend taxation are difficult to separate from other policies and macroeconomic shocks that simultaneously affect consumption and investment. At the microeconomic level, identifying the effect of dividend taxes on consumption requires observing both shareholders' consumption and linked firm-level

[1] For example, George W. Bush argued on January 7, 2003 that *"[a]bout half of all dividend income goes to America's seniors, and they often rely on those checks for a steady source of income*." "*Abolishing double taxation of dividends will leave nearly 35 million Americans with more of their own money to spend and invest*". Ultimately, "*the jobs and growth proposals [..] are a focused plan to encourage consumer spending [and] to promote small business growth*". See, https://georgewbush-whitehouse.archives.gov/news/releases/2003/01/text/20030107-5.html.

responses that determine dividend income. Such data are rarely available. Consequently, a large literature has examined how dividend taxes affect payout and investment policies. There is ample evidence that dividend taxes can affect dividend payout (e.g., Chetty and Saez 2005, Yagan 2015, Jacob and Michaely 2017, Bach et al. 2024). In contrast, the empirical evidence on investments is ambiguous. Several papers (e.g., Becker, Jacob, and Jacob, 2013, Alstadsæter, Jacob, and Michaely 2017) find that only cash-rich firms decrease investment. In contrast, Yagan (2015) and Bilicka, Güçeri, and Koumanakos (2025) find that dividend tax changes only affect payout, but that they have no impact on investment. Finally, there is no direct empirical evidence on whether higher dividend taxes ultimately reduce shareholder consumption, or whether dividend taxes merely reallocate income, saving, and consumption across shareholders and firms.

Exploiting Norway's 2006 dividend tax reform together with uniquely linked administrative data on shareholders and their firms, we can shed light on the impact of dividend taxation on (1) owners' consumption and (2) their firms' responses. The reform increased the dividend tax rate from 0% to 28%, generating substantial heterogeneity in owners' exposure to the reform depending on the pre-reform importance of dividends in their income. Because pre-reform dividend income reflects predetermined ownership stakes, firm profitability, and payout policies, this variation is plausibly exogenous to shareholders' and firms' subsequent responses to the reform. We compare shareholders with high versus low exposure to the 2006 reform in a difference-in-differences design.[2] Our data combine individual tax returns, wealth records, shareholder registers, and firm financial statements, allowing us to jointly examine how dividend taxes affect income, consumption, and saving as well as firms' payout decisions, retained earnings, and use of internal funds. This unique combination of a large tax reform and linked

[2] To ensure that shareholders in the treated and control group are sufficiently similar, we entropy-balance the treatment and control shareholders based on their pre-reform overall income (Hainmueller 2012) and show that both groups exhibit parallel trends in consumption prior to the dividend tax hike.

administrative data enables us not only to estimate the effect of dividend taxes on consumption and investment, but also to identify the margins through which firms and their owners respond to dividend taxes.

We find that higher dividend taxes lead to large and persistent reductions in shareholder consumption. Immediately following the 2006 reform, treated shareholders experience a 33% decline in after-tax income and a 15% decline in consumption. On average over a longer post-reform period, the reform reduces income by 20.6% and consumption by 9.2%. These effects are strongest for controlling owners of privately held firms but are not confined to this group. We also document sizable, albeit somewhat less persistent, consumption responses among non-controlling shareholders, including shareholders of listed firms, indicating that dividend taxation affects a broad range of shareholders.

The decline in consumption is considerably smaller than the decline in after-tax income, implying that shareholders absorb part of the tax-induced income shock. We find that shareholders partially smooth the income shock by drawing down private savings. The estimated long-run marginal propensity to consume (MPC) out of dividends is 0.45, which is comparable to the MPC reported for representative households in survey-based studies (e.g., Jappelli and Pistaferri 2014), but smaller than the MPC for the firm owners in Di Maggio, Kermani, and Majlesi (2020). These findings indicate that changes in dividend taxation have economically meaningful effects on household spending.

However, shareholder-level adjustments account for only part of the response to higher dividend taxes. The linked shareholder-firm data reveal that part of the adjustment occurs inside the firm. We find that firms reduce dividend payouts and increase retained earnings. However, these retained funds do not finance additional productive investment, consistent with Yagan's (2015) findings using US data around the 2003 dividend tax cut. Instead, we find that firms accumulate cash holdings and reduce long-term debt. Rather than stimulating productive investment, higher dividend taxes primarily shift liquid savings from households to corporate balance sheets.

The linked data further enable us to examine how ownership concentration shapes firms' responses to dividend taxes. We find that such firms held by affected shareholders sharply increase their cost-to-revenue ratios after the reform, leading to lower profitability. This permanent increase in costs is concentrated in expenditures related to consumable cost items. This is consistent with controlling shareholders using the firm's resources to fund personal consumption expenditures. Through this channel, controlling shareholders offset about 80% of the decline in consumption outside the firm. We also find a large increase in firms' wage bills following the reform. This increase is entirely driven by compensation paid to shareholder-managers, indicating that treated shareholders substitute salary income for dividend income by paying themselves higher wages.

Altogether, our findings imply that dividend taxation has economically meaningful effects on consumption, but no impact on investment in productive assets. Higher dividend taxes reduce shareholder spending, shift savings from private to corporate balance sheets, and alter the location of consumption without stimulating productive investment. Extrapolating our estimates to the population of shareholders suggests that the 2006 reform reduced aggregate consumption by up to 0.39% of GDP in the years following the reform, even after accounting for the increase in within-firm consumption among controlling shareholders. The relatively small impact relative to GDP can be explained by the fact that most households are not affected by dividend taxes.

Our findings contribute to the literature on taxation and household consumption (e.g., Poterba 1988, Souleles 1999, 2002, Shapiro and Slemrod 2003, Heim 2007, Romer and Romer 2010, Mertens and Ravn 2012, Cloyne 2013; Nguyen, Onnis, and Rossi 2021). While previous studies examine labor income taxes or tax credits and their effect on consumption, there is little causal evidence on the effect of capital income taxes on consumption. More broadly, our results show that the consumption response to capital taxation cannot be understood without accounting for adjustments available to shareholders. In private firms with controlling owners, higher dividend taxes affect consumption not only

by reducing after-tax income, but also by changing where savings are held and where consumption takes place. Our paper is also related to the concurrent work of Holm et al. (2025). While both papers explore the same reform, they address distinct questions. Holm et al. (2025) use the consumption response between reform announcement and implementation to identify an important structural preference parameter, namely the elasticity of intertemporal substitution of firm owners. We instead study the incidence and transmission of dividend taxation after implementation, tracing how shareholders and their firms adjust consumption, saving, payout, and investment. Our paper further complements theirs along two main dimensions. First, we study a broader set of shareholders, including minority and listed-firm shareholders. Second, in contrast to Holm et al. (2025), we link shareholders to their firms to show how dividend taxes reallocate consumption and saving across the household–firm boundary: firms retain more earnings without increasing productive investment, while controlling owners also substitute toward wages and within-firm consumption.

Our findings thus provide a new perspective on the effects of dividend taxation and contribute to the literature on corporate payout and firm behavior (e.g., Chetty and Saez 2005, Becker et al. 2013, Yagan 2015, Alstadsæter et al. 2017, Jacob and Michaely 2017, Bach et al. 2024, Bilicka et al. 2025). Existing work focuses on how dividend taxes affect firms' payout and investments. However, higher dividend taxes do not simply reduce shareholder income. Rather, they reshape the allocation of consumption and saving. We show that understanding the consequences of dividend taxation requires jointly considering shareholder and firm responses. By linking shareholders to their firms, we trace the transmission of a dividend tax increase from payout decisions to shareholder income, consumption, and saving, and ultimately to firms' balance sheets. We find that for the sample of private firms with controlling owners, higher dividend taxes reduce shareholder consumption, relocate savings to corporate balance sheets, shift part of consumption from households to firms, and alter firms' use of retained earnings without

stimulating additional productive investment.

Finally, we contribute to the literature linking dividend income to household consumption (Carroll and Summers 1987, Di Maggio, Kermani, and Majlesi 2020, Bräuer, Hackethal, and Hanspal 2022, Müller-Dethard, Reinhardt, and Weber 2025). This literature shows that households exhibit higher marginal propensities to consume out of dividend income than out of capital gains. We complement this work by exploiting a plausibly exogenous shock to net dividend income generated by a large dividend tax hike. This allows us to identify the causal effect of dividend-induced changes in disposable income on shareholder consumption. We find that higher dividend taxes reduce consumption both by lowering the after-tax value of dividends and by inducing firms to cut dividends.

2 Institutional Background

In the early 1990s, the Nordic countries Denmark, Finland, Norway, and Sweden implemented dual income taxes that combine progressive tax rates on labor income with flat taxes on capital income (Sørensen 1994). The dual income tax system in Norway imposed a tax rate of 28% on corporate income as well as progressive personal income taxes on labor income of up to 64.7% (see Table 1). For capital gains, an allowance for accumulated retained earnings was applied such that—from a tax perspective—shareholders were indifferent between receiving payouts via dividends or realized gains. Dividends were exempt from taxes, which incentivized profit distributions over retention of earnings (e.g., Sørensen 2007). This exemption reflected the principle of avoiding double taxation of corporate profits with dividend and corporate taxes.[3] Because Norway has no limited-liability corporate form that permits pass-through taxation—that is, taxing corporate profits directly at the owner level as with S-Corporations in the United States—

[3] Several other countries avoided this double taxation by exempting dividend from taxation (e.g., Singapore) or by an imputation credit system (e.g., as previously implemented in Finland, Germany, or France).

this double taxation applied to nearly all public and private corporations in Norway.[4]

One consequence of this system was that it led to income shifting, where business owners reclassified labor income as capital income to exploit the lower tax rates on capital gains and dividends (e.g., Sørensen 2005, Pirttilä and Selin 2011, Alstadsæter and Jacob 2016). Given these income shifting incentives, an expert committee in Norway provided recommendations to the Norwegian government that resulted in a tax reform proposal in 2004, which was subsequently passed by the parliament in 2005. These new rules represented a significant tax hike on dividends. Specifically, dividends and capital gains exceeding a risk-free rate of return on equity became subject to a 28% tax.[5] With this dividend tax hike, Norwegian policymakers aimed at treating labor and capital income in similar ways. As shown in Table 1, the difference in top marginal tax rates between dividend income and labor income became much smaller as of 2006. Hence, the reform substantially reduced net dividend income while reducing firms' incentives to distribute earnings. A common strategy to defer dividend taxes is to establish a holding company that receives dividends from operating companies, as intercompany dividends are generally exempt from taxation.[6] However, this approach merely postpones the tax liability rather than eliminating it. It also does not resolve the shareholder's liquidity constraint, since dividends retained within the holding company must eventually be distributed to the shareholder—and taxed at that point—before they can be used for personal

[4] Hence, while there are some peculiarities in the Norwegian dividend tax system, the dividend tax in Norway shares many features with the dividend tax system in many other countries. Specifically, the double taxation of corporate income with corporate taxes on profits and dividend taxes upon payout is implemented in many countries, including the United States, Canada, Germany, China, Japan, France, and the United Kingdom. Moreover, Norway has tax-transparent unincorporated business forms such as sole proprietorships and partnerships, but these organizational forms generally do not provide limited liability.

[5] The risk-free rate of return was 2.1% in 2006 and 3.3% in 2007. The risk-free rate of return is computed as the arithmetic average of the observed interest rate on treasury bonds with a maturity of 3 months.

[6] We observe this effect in our sample as affected shareholders increasingly use indirect holding structures in the post-reform period (see Online Appendix Figure A.1).

consumption.

3 Data

3.1 Administrative data on firms and individuals

In our empirical analysis we use administrative data obtained from the Norwegian tax authorities. A unique feature of these data is that they allow us to observe both the financial decisions of firms and the income, wealth, and consumption of their owners. Using individual identifiers and firm identifiers, we link tax returns, shareholder registers, wealth records, and corporate financial statements for the universe of Norwegian shareholders. We summarize the main features of the data in the following.

Data on income and wealth. We draw data on income and wealth for the universe of individual taxpayers residing in Norway from their tax returns submitted annually to the Norwegian tax authorities. The income data include the annual amount of taxable income broken down into different types of income (e.g., labor income, interest, dividends, capital gains etc.). The wealth data include the full asset statement of individuals on December 31 of each year, broken down into asset types (i.e., housing, stocks, fixed income assets, deposits, debt). This level of detail is available because Norway levies a comprehensive wealth tax on most relevant asset types[7] throughout the sample period which requires the tax authorities to collect this information. This makes Norway different from other countries that tax wealth but use a limited tax base (e.g., France taxes only real estate wealth). Some wealth items (e.g., real estate owned) are recorded by the tax authorities after adjustments for tax purposes (e.g., valuation discounts). We revert these adjustments to obtain the original asset values (see Online Appendix A.1 for details).

Shareholder Register and National Population Register. Individual ownership data are obtained from the shareholder register (*aksjonærregisteret*) which contains

[7] The wealth tax exempts conditional rights, time-limited rights, goodwill, know-how and claims to salary, interest or dividends on securities. One natural limitation is that we cannot capture underreporting.

information on the number of shares, share capital, share premium, distributed dividends, and other relevant details for all Norwegian corporations. It also includes data on the universe of shareholders, their holdings, and the received dividends. Moreover, the data contain details on acquisitions and sales of shares (e.g., price per share, date, amount). The shareholder register is maintained in its current form since 2004. For the years 2002–2003, we approximate holdings of listed and unlisted shares by adjusting the corresponding items in the individual wealth tax data using capital gains derived from the national financial accounts reported by Statistics Norway. Although this approach introduces some measurement error at the individual level, it ensures that aggregate holdings are, on average, consistent with the national accounts. Financial individual-level data are complemented by information on individuals' year of birth and gender from the national population register (*folkeregisteret*).

Firm-level balance sheet data. The firm-level data cover balance sheets and income statements of Norwegian firms obtained from the Norwegian Corporate Accounts database which collects information from all private and public limited liability firms in Norway sourced from the Brønnøyesund registry, the employer registry of the Norwegian unemployment insurance, and the shareholder register (Mjøs and Selle 2023). Using the balance sheet data, we have information on assets, equity, retained earnings, and liabilities of the firm. The income statement data provide information on firms' operating revenue and cost. Importantly, if a firm is owned by another firm, the Norwegian Corporate Accounts database contains the identifier of the direct parent firm for each year of observation. Hence, we can observe ownership links across firms and can identify direct and indirect holdings of individual shareholders (see Online Appendix A.2 for details).

Linking datasets. All datasets contain unique identifiers for firms (*organisasjonsnummer*) and individuals (national identity number, *fødselsnummer*) which allows us to link firms to their individual owners using the shareholder register.

3.2 Measuring consumption

We follow recent advances by Kolsrud et al. (2020) and Eika et al. (2020) in measuring individual consumption from administrative data. We define consumption as individual consumption expenditure, which excludes the consumption value of non-monetary flows such as housing services or services from other durable goods. Specifically, we define individual *i*'s consumption in year *t* ($Consumption_{it}$) as income during *t* minus the change from the end of year *t-1* to the end of year *t* in net wealth (assets minus liabilities) net of capital gains. Hence, only realized assets (i.e., inflows and outflows of deposits, sales and acquisition of stocks, etc.) affect our consumption measure which captures the residual cash flow available to the individual that is not used for investment in financial or real assets.[8] Consumption derived from this identity has been shown to closely track survey-based measures of consumption (Browning and Leth-Petersen 2003) and exhibit a high level of accuracy when compared with alternative benchmarks (Baker et al. 2022). We compute $Consumption_{it}$ as:

$$Consumption_{it} = Income_{it} - Tax_{it} - \Delta SharesDom_{it} - \Delta SharesFor_{it} - \Delta CapInv_{it} - \Delta Bonds_{it} - \Delta Deposits_{it} - \Delta RealEstate_{it} + \Delta Debt_{it}. \quad (1)$$

We define $Income_{it}$ as the sum of salary income, business income, interest income, dividends, and other income of individual *i* in year *t*. Tax_{it} is the sum of income and wealth taxes for individual *i* in year *t*. We do not include realized capital gains—which are already contained in the change in assets—in the income measure to avoid double-counting of income.

For nominal assets (i.e., debt, deposits) the observed change in levels corresponds to the net cash flow into the individual's accounts. Hence, $\Delta Deposits_{it}$ is the change in foreign and domestic deposits and $\Delta Debt_{it}$ the change in debt.

With regard to tradable assets (i.e., shares, bonds and real estate), we require the

[8] By including debt as a source of funding for consumption, we allow firm owners to borrow against unrealized gains to fund their consumption, known as a "buy, borrow, die" strategy (Fox and Liscow, 2025).

actual cash flows from transactions in these assets (e.g., receipts from the sale or acquisition of shares) rather than changes in value (e.g., the appreciation of shares). Computing $\Delta SharesDom_{it}$, $\Delta SharesFor_{it}$, $\Delta Bonds_{it}$, and $\Delta RealEstate_{it}$ from wealth tax returns thus requires further adjustment because stocks, bonds, and real estate are valued at their end-of-year market prices for wealth tax purposes. Part of the observed changes in these asset types are thus attributable to changes in market prices that do not reflect changes in resource allocation and are unrelated to consumption.

$\Delta SharesDom_{it}$ is the difference in the annual sum of acquired and sold shares in domestic firms valued at the transaction price. We subtract the change in the face value of stocks (e.g., equity issuances) held at the beginning of the year ($\Delta CapInv_{it}$) to account for reinvestments into firm equity paid out of dividends. The relevant transactions are directly observed in the shareholder register. By using the transaction price of *realized* shares only, we ensure that our consumption measure is not mechanically affected by increases in *unrealized* firm value due to higher retained earnings following a decrease in dividends. This approach ensures that share repurchases—as an alternative to dividend payouts—are only reflected in consumption to the extent they are consumed. If they are not consumed, a share repurchase triggers a decrease in $\Delta Shares_{it}$ that is exactly matched by an increase in $\Delta Deposits_{it}$, keeping the right-hand side of equation (*1* unchanged.

$\Delta SharesFor_{it}$ is the change in wealth held as shares in foreign firms, discounted by changes in the MSCI World Index. Foreign shares make up only a small share of total wealth and are not included in the shareholder register. We hence take this information from the wealth tax statement.

$\Delta Bonds_{it}$ is the change in domestic (foreign) bonds and bond funds observed in the wealth tax statement, discounted by the change in the 10-year government bond interest rate in Norway (the Euro area). $\Delta RealEstate_{it}$ is the change in real estate due to acquisitions, sales, or investments. It is computed by reverting adjustments in the real estate value recorded in the wealth tax statement and adjusting the growth in real estate value

for the average housing price change in the municipality of the individual provided by Statistics Norway (see also Online Appendix A.1). To validate that our data exhibit similar properties as aggregate consumption measures in the national accounts, Online Appendix Figure A.2 reports the average consumption levels in the control group—which was unaffected by the 2006 reform—over time. Consumption in our control group closely mirrors the trends in per capita household consumption derived from national accounts.

3.3 Sample selection

We start our sample period in 2003 to maintain sufficient distance to a one-time dividend tax hike in 2001 and end it in 2014 to avoid overlap with subsequent corporate and dividend tax reforms. We include only working-age adults (e.g., between 18 and 62 years of age) to avoid measuring consumption behavior of pensioners and drop individual-year observations with zero income or missing consumption. Moreover, we drop individuals for which we have data on positive consumption for less than 8 consecutive years as well as those for which we observe extreme changes in consumption (i.e., log growth rates above the 99th percentile) or negative after-tax income. The latter arise for individuals with large amounts of wealth and hence high wealth tax payments but little income.[9] To ensure common support in average gross income over 2003–2004, which serves as the matching variable in our entropy-balancing procedure, we exclude individuals whose average gross income in 2003-2004 falls within the bottom or top 1 percent of the income distribution in either the treatment or the control group. After these steps, our sample covers 285,960 individuals.[10]

In our empirical analysis, we distinguish between controlling and minority shareholders. Controlling shareholders are individuals who owned at least 25% of the shares in at least one firm in the last pre-treatment year, 2004, corresponding to the tax

[9] In these cases, wealth taxes are often paid out of existing wealth (e.g., by reducing share capital in firms).
[10] In Online Appendix Table A.1, we provide a detailed summary of the individual sample selection steps and their effect on the sample size.

administration's definition of beneficial ownership. This group comprises 13,623 individuals. Minority shareholders, by contrast, are individuals who did not own more than 25% of the shares in any firm in 2004 and comprise 272,337 individuals.

3.4 Treatment and control group

In our empirical approach, we exploit differences in the treatment intensity.[11] Specifically, we compare individuals that, prior to the 2006 dividend tax hike, generate more of their income through dividends (treatment group) to individuals with similar gross income but with a smaller share of dividend income (control group). Specifically, we define individuals as treated if the share of total taxable dividend income earned between 2003 and 2004 is larger than 20% of their total gross income earned during that period. In our definition of treatment and control group, we disregard the last pre-reform year 2005 because the reform was announced in 2004 leading to extraordinary dividend payouts to benefit from the tax exemption of dividends one final time in 2005 (see also Figure 1). Individuals in the control group are those with similar total income, but that generate less than 5% of their gross income in the form of dividends between 2003 and 2004. Excluding individuals with a dividend share in their gross income between 5% and 20% ensures that the two groups are sufficiently distinct in their exposure to the reform. In our main sample, this leaves us with 7,543 treated individuals and 278,417 control individuals.

The threshold of 20% is arguably ad hoc. In additional analyses, we thus verify that our results are robust to increasing or decreasing this threshold, while maintaining the general notion of exploring differences in the treatment intensity.[12]

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[11] A possible alternative is to exploit Norway's pre-2006 split model, under which owners holding more than two-thirds of a firm were assigned imputed labor income taxed as labor income regardless of dividend distributions. For these shareholders, the 2006 reform should have had only a limited effect on the tax burden on corporate income. However, ownership shares are endogenous, and the split model was prone to avoidance strategies, such as allocating shares to relatives to fall below the threshold. We therefore do not use this setting for identification.

[12] The results of the robustness tests using other thresholds are shown in Online Appendix Figure A.3, Figure A.4, Figure A.5, and Table A.2.

3.5 Descriptive statistics

In Table 2, we provide summary statistics of our sample of all individuals (Panel A), controlling shareholders (Panel B), and firms (Panel C).[13] The average individual in our sample is 46 years old, 72% are married, and 58% are male. Gross income averages NOK 542,171 (about $80,210), including average labor income of NOK 519,993 (about $76,930) and dividend income of NOK 12,431 (about $1,839). The average after-tax income is NOK 385,572 ($57,040), while the average consumption amounts to NOK 488,950 ($72,334). Average consumption thus exceeds average disposable income. This reflects that many individuals in our sample, who are between 18 and 62 years old, finance part of their lifetime consumption through borrowing, for example by taking out mortgages to purchase owner-occupied housing, rather than relying only on current income.

The sample of controlling shareholders in Panel B exhibits substantially higher levels of income, particularly dividend income, as well as higher consumption than the full sample. The average controlling shareholder earns NOK 768,121 (about $113,629) in gross income, of which NOK 152,149 (about $22,508) stems from dividends, and reports annual consumption of NOK 720,693 (about $106,615). Controlling shareholders are a bit older (47 years) and are predominantly male (81%). In addition, they hold considerably larger financial assets inside than outside their firms. Average non-operating financial assets amount to NOK 950,000 (about $140,567) inside the firm compared with NOK 282,000 (about $41,718) outside the firm, while average cash and deposits equal NOK 776,000 (about $114,800) inside the firm and NOK 210,000 (about $31,067) outside the firm.

The summary statistics at the firm level in Panel C indicate that the average private firm has total assets of NOK 5.7 million ($836,698), annual sales of NOK 11.7 million ($1.73 million), retained earnings of NOK 1.1 million ($169,163), long-term debt of NOK 1.2 million ($173,332), and employs approximately eight workers. Tangible assets amount

[13] Descriptive statistics on minority shareholders and listed firms are shown in Online Appendix Table A.3.

to NOK 1.3 million ($193,835) on average, while firms hold approximately NOK 1.2 million ($170,921) in cash and deposits but only negligible amounts of marketable securities. Operating expenses account for roughly 94% of revenues, with consumable expenses representing the largest component (56% of revenues), followed by the wage bill (34%). Average annual consumable expenditures amount to NOK 8.0 million ($1.18 million). As is common in datasets covering the full population of private firms—including micro, small, medium-sized, and large firms—the distribution of firm size is highly skewed, as reflected by the substantial differences between the mean and median values and the large standard deviations across most balance sheet variables.

4 Dividend Taxes and Shareholder Consumption

4.1 Inspecting the raw data

Before turning to the regression analysis, we first examine whether the raw data exhibit patterns consistent with theory. If higher dividend taxes reduce both payouts and household consumption, we should observe a sharp decline in dividend income accompanied by a persistent decline in consumption among treated shareholders. Inspecting the raw trends also allows us to check for differential pre-trends that would violate the identifying assumption. We first show the significance of the change in average dividend income in the treatment group from raw data in Figure 1.[14] Individuals in the treatment group received on average more than NOK 350,000 in dividends in 2003-2004 and more than NOK 400,000 (just below $60,000) in 2005. After the tax reform, the average dividend income for the treatment group plummets to less than NOK 100,000 in 2006 before recovering somewhat higher dividends in later years. However, the level of dividend income remains below the pre-treatment level. This decline substantially exceeds the mechanical reduction in after-tax income resulting from the higher dividend tax rate, indicating that the reform also reduced pre-tax income by inducing firms to lower their dividend

[14] Online Appendix Figure A.6 shows the equivalent figures for the sample of controlling shareholders.

payouts. We examine this mechanism in greater detail in the firm-level analysis below.

Next, we look at income and consumption for the full sample. Figure 2 shows the median unadjusted values across NOK 100,000 (approx. $14,800) intervals of pre-reform income. In the post-reform year, both income and consumption drop significantly for the treatment group, while remaining unchanged for the control group. We observe a persistent difference in consumption between treatment and control groups for almost 10 years after the tax reform. This pattern persists across all income intervals. Hence, the graphical evidence is unlikely to be driven by comparisons of individuals with different incomes.[15] Taken together, these statistics provide first indications that higher dividend taxes result in lower levels of consumption and that the parallel trends assumption for the treatment and control group is not violated.

4.2 Estimation methodology

To examine the impact of dividend taxation on consumption, we estimate a weighted difference-in-differences (DiD) model at the individual level, exploiting differences in the exposure to the 2006 dividend tax reform based on the relevance of dividend income relative to gross income prior to the reform.

Because we define treatment and control individuals based on their pre-treatment dividend *share* in gross income, they are inherently different with respect to this variable. To ensure comparability in overall income levels, we compute individual-level balancing weights using the entropy-balancing approach of Hainmueller (2012). Specifically, we reweight control individuals such that the weighted control sample matches the treatment group in both the mean and standard deviation of average gross income over 2003–2004, while minimizing the distance between the resulting weights and uniform weights. Following prior literature, we impose a common support restriction on the matching variable. To this end, we exclude individuals whose average gross income in 2003–2004 falls

[15] The parallel trends as well as the drop in income and consumption in 2006 can also be replicated for the sample of controlling shareholders. See Online Appendix Figure A.6 as well as Figure A.7.

within the bottom or top 1 percent of the income distribution in either the treatment or control group. Online Appendix Figure A.8 shows the distribution of the matching variable for both groups and the corresponding trimming thresholds.

Table 3 compares key characteristics of the treatment and the weighted control group in the pre-reform period. Reassuringly, the weighting procedure yields treatment and control groups that are highly comparable not only in terms of the matching variable (gross income) but also with respect to pre-treatment consumption, gross wealth, and age. This pattern holds both in the full estimation sample as well as in the subsamples of controlling and minority shareholders.

We then estimate the following weighted DiD design:

$$y_{it} = \sum_{j=2003, j\neq 2004}^{2014} \alpha_t Treated_i \times \mathbb{1}\ t = j) + \beta married_{it} + \phi_{birth\ year} \times \phi_t + \phi_{income} \times \phi_t + \phi_{wealth} \times \phi_t + \phi_i + \epsilon_{it} \quad (2)$$

where y_{it} is the dependent variable for individual i in year t. The dependent variable is the natural logarithm of net income or the natural logarithm of consumption. $Treated_i$ is an indicator variable that is equal to 1 for individuals with a dividend share in their pre-treatment gross income of more than 20% (treatment group) and zero if the dividend share in pre-treatment income is at or below 5% (control group). The coefficient α_t estimates the treatment effect of the dividend tax hike on income and consumption in year t relative to 2004 as we interact the *Treated* indicator with year indicator variables ($\mathbb{1}\ t = j$)). If the reform decreases net income or consumption, we expect a negative treatment effect after the dividend tax reform, that is, $\alpha_t < 0$ for $t \geq 2006$.

In the baseline estimation, we include fixed effects for each individual (ϕ_i) to absorb time-invariant determinants of consumption of an individual. We also include birth year × year fixed effects ($\phi_{birth\ year} \times \phi_t$) to capture potentially differential time trends across age cohorts. This ensures that we compare individuals of the same age and thus account for differences in consumption over the life cycle (e.g., Gourinchas and Parker 2002).

Moreover, we include specific year fixed effects for individuals in each of the four tax brackets in 2004 and for individuals in wealth intervals of NOK 2.5 million. These specifications account for differential time trends in consumption and income for individuals at different income and wealth levels prior to the reform.[16] Finally, we control for the marriage status of each individual in each year.

4.3 Results

We begin with the broad sample of all individuals and present the results of the weighted generalized DiD estimation in Figure 3(a). We find little evidence of differential pre-trends between treatment and control groups prior to the reform. Although some pre-reform coefficients are statistically different from zero (which is not surprising given our large sample size), they are economically small relative to the post-reform effects. Following the reform, both net income and consumption of treated shareholders decline sharply relative to the control group. The income effect is immediate and substantial, amounting to roughly 33% in 2006, while consumption falls by around 15%. Over time, both effects attenuate, but remain economically meaningful throughout the sample period. Importantly, the decline in net income consistently exceeds the decline in consumption, suggesting that shareholders partially smooth consumption in response to the income shock induced by the dividend tax increase.

Figure 3(b) presents the results for the controlling shareholders. Again, we find no systematic evidence of diverging trends before the reform. Following the introduction of the dividend tax, controlling shareholders experience particularly large reductions in both income and consumption. The immediate income decline reaches approximately 37%, while consumption falls by around 21%. Although both effects moderate over time,

[16] To avoid missing observations in our regression due to singular individuals in a given fixed effect category, we place individuals aged 20 or younger in the first sample year into one birth year bin as well as all individuals with average gross wealth in 2003-2004 above NOK 10 million into one wealth bin. Our results are robust to dropping these individuals instead.

they remain statistically and economically significant throughout the post-reform period.

Figure 3(c) reports estimates for minority shareholders. The dividend tax hike also leads to sizeable reductions in income for this group, with net income falling by approximately 31% in the first post-reform year. Consumption declines by around 10% initially and gradually recovers thereafter. In contrast to controlling shareholders, the consumption response among minority shareholders largely disappears within several years after the reform, even though the income effect remains negative and significant.

To obtain an estimate of the average effect of the reform on net income and consumption, we re-estimate the model in a standard weighted difference-in-differences framework using the same set of fixed effects and control variables. Table 4 reports the results for all individuals (columns 1–2), controlling shareholders (columns 3–4), and minority shareholders (columns 5–6). For the full sample, the estimated coefficient implies that the dividend tax reform reduced net income by 20.6% and consumption by 9.2% among treated shareholders. Evaluated at the average pre-reform levels of the treatment group, these estimates correspond to an annual decline in net income of approximately NOK 121,500 ($17,978) and a reduction in annual consumption of roughly NOK 63,400 ($9,384). Hence, about one-half of the income shock translated into lower consumption. This points to additional margins of adjustment outside of the firm (e.g., lower savings or slower accumulation of net wealth) that we examine further below.

The consumption and income effects outside the firm are larger for controlling shareholders. Net income falls by 23.4%, corresponding to an annual reduction of approximately NOK 142,000 ($21,002), while consumption declines by 13.1%, equivalent to roughly NOK 93,900 ($13,899) per year. The larger absolute responses are consistent with controlling shareholders being more strongly exposed to the reform and having greater discretion over dividend payout decisions.

We also find substantial effects among treated minority shareholders. For this group, net income declines by 19.1%, corresponding to an annual loss of about NOK

104,900 ($15,518), while consumption decreases by 6.8%, or about NOK 41,700 ($6,175) annually. The presence of a sizeable consumption response among minority shareholders indicates that the effect of dividend taxation is not confined to owner-managers who directly control payout policies. Instead, higher dividend taxes appear to affect the consumption behavior of shareholders with large dividend income more broadly.

Across all samples, the decline in consumption is considerably smaller than the decline in net income. We calculate the implied marginal propensity to consume (MPC) out of the income shock as the ratio of the estimated change in consumption to the estimated change in net income. Since Figure 3 indicates that the response attenuates over time, we distinguish between a short-run horizon, which compares the pre-reform years (2003–2005) with the immediate post-reform period (2006–2008), and a long-run horizon, which compares the pre-reform years with the later post-reform period (2009–2014).

For the full sample, the implied short-run MPC is 0.62, indicating that shareholders reduced consumption by about 62 cents for every $1 decline in net income during the first three years after the reform. The corresponding long-run MPC falls to 0.45, suggesting that individuals offset part of the initial consumption decline over time. This figure is very similar to the MPC reported in surveys for representative ordinary households (e.g., Jappelli and Pistaferri 2014). Among controlling shareholders, the short-run MPC is 0.75, implying that three-quarters of the income shock is reflected in lower consumption immediately following the reform. This is close to the MPC of 0.85 in Di Maggio et al. (2020) and their sample of firm owners. However, the long-run MPC declines to 0.59, indicating substantial subsequent adjustment and partial recovery of consumption. For minority shareholders, the estimated MPC is 0.49 in the short run and 0.32 in the long run.

To address concerns that our results depend on the specific threshold used to define treatment status, we re-estimate the main specification for all three samples of shareholders using alternative thresholds for the dividend-income share. As shown in the Online Appendix, the qualitative conclusions remain unchanged when applying thresholds of

10%, 15%, 25%, 30%, and 35%.[17] As expected, the magnitude of the estimated treatment effect varies with the degree of exposure to the reform. Lowering the threshold includes shareholders with weaker exposure and therefore attenuates the estimated effects while increasing the number of treated individuals to 11,501 and 9,291 for the 10% and 15% threshold, respectively. Raising the threshold generates the opposite effect. Nevertheless, the negative consumption response remains robust across alternative definitions of treatment. Importantly, the estimated long-run and short-run MPCs remain remarkably robust across the threshold definitions.

Taken together, these estimates suggest that shareholders initially absorb part of the shock through reduced spending but subsequently rebuild part of their private consumption outside the firm by drawing on accumulated private assets or adjusting private savings behavior. This is consistent with intertemporal consumption smoothing as shareholders shift future consumption out of savings into present consumption.

5 Consumption, saving, and investment responses within closely-held firms

5.1 Firm-level estimation

Another possible response margin to the dividend tax hike is *inside* the firm as shareholders and, in particular, controlling shareholders can smooth consumption not only intertemporally but also across the boundary of the firm by shifting private saving and consumption into the firm. This is because the estimated income shock is the sum of two effects of the dividend tax hike. There is (1) the negative effect of higher taxes on after-tax income and (2) the reduction in dividend payouts (e.g., Chetty and Saez 2005). The reduction in payout is particularly relevant for controlling shareholders who can determine the timing and amount of dividend payouts. This reduction in corporate dividend payment does not necessarily make shareholders poorer in nominal terms. Profits that are not paid out as dividends remain in the firm as retained earnings and

[17] See Online Appendix Figure A.3, Figure A.4, Figure A.5, and Table A.2.

immediately increase the share value. By design, such unrealized increases in valuation are not reflected in our consumption measure which only captures realized capital gains. However, in the medium term, retained earnings can either be saved, invested, or even consumed within the firm by controlling shareholders.

To study within-firm responses to the dividend tax hike, we link individuals to the firms they own. In doing so, we focus on private firms with controlling individual shareholders that can directly affect the use of funds within the firm where agency issues are less of a concern (Jensen and Meckling 1976).[18] We run a DiD analysis where we define treatment and control firms according to their shareholder's exposure to the dividend tax hike. Specifically, we define a firm as treated if, in 2004, at least 50% of its shares are owned by individuals that we define as treated in the individual-level analysis—that is, individuals whose dividend income accounted for more than 20% of their total gross income in the pre-reform years. These are mainly the controlling shareholders in our individual-level analysis but may also include other individuals with a large pre-reform dividend income share. Conversely, a firm is assigned to the control group if at least 50% of its shares are owned by individuals designated as controls in the individual-level analysis. With this approach, we obtain 3,626 firms in the treated group and 4,189 firms in the control group. Importantly, by design, the treatment and control firms differ in the extent to which their *existing* shareholders are exposed to the dividend tax increase but not in the dividend tax burden of *future* investors since the dividend tax applied universally to

[18] We also re-estimate our analysis using the sample of 100 Norwegian listed firms active during our sample period. These firms are substantially larger than the private firms in our main sample and have dispersed ownership structures with many shareholders (see Table A.3, Panel B). We classify firms as treated if more than 50% of their shares are held by domestic taxable shareholders and as controls otherwise. As shown in Online Appendix Figure A.9, the dividend tax increase has no discernible effect on dividend payouts or on firms' equity, liabilities, or total assets. This finding is consistent with prior evidence showing that payout responses to dividend tax increases are concentrated among closely held private firms, i.e., firms where individual shareholders have sufficient influence to affect payout and financing policies (Jacob and Michaely 2017; Bach et al. 2024). By contrast, the more dispersed ownership of public firms makes it less likely that payout policies respond to the tax preferences of any particular shareholder group, especially when shareholders differ in their tax status and dividend preferences.

all firms. Hence, our firm-level analysis does not capture cost of capital effects of the dividend tax increase (see King 1977, Auerbach 1979, Bradford, 1981, Harberger, 1962, 1966; Feldstein, 1970; Poterba and Summers, 1985). This allows us to isolate firm-level investment responses to the dividend tax hike that result from private consumption and saving decisions of shareholders.[19] We then estimate the following generalized DiD design:

$$y_{mt} = \sum_{j=2003, j\neq 2004}^{2014} \alpha_t Treated_m \times \mathbb{1}\ t = j) + \phi_{founding} \times \phi_t + \phi_{sector} \times \phi_t + \phi_{size} \times \phi_t + \phi_m + \epsilon_{mt} \quad (3)$$

where y_{mt} is the dependent variable for firm m in year t. $Treated_m$ is an indicator variable that is equal to one for treated firms, and zero for control firms. As in the individual-level analysis, the key coefficient of interest α_t estimates the treatment effect of the dividend tax hike on the dependent variable y_{mt} in year t relative to 2004.

We note that in Norway, dividend payouts in year t are decided upon and reflected in the corporate accounts in year *t-1*. Since the reform was announced in 2004, 2005 constitutes the first post-reform *accounting year* relevant for firm behavior while 2006 constitutes the first post-reform *dividend payment year* relevant for shareholder income and thus consumption. For the firm-level analysis, we thus expect effects of the reform to manifest as early as in 2005 as the firm has to determine the 2006 dividend payout in 2005.

We include an extensive set of fixed effects to ensure that treated and control firms are comparable. This includes founding year × year fixed effects ($\phi_{founding} \times \phi_t$) to ensure that we compare firms with the same age. We also include size interval × year fixed effects ($\phi_{size} \times \phi_t$) to account for differential trends among firms with different sizes. Size intervals are defined as bins of NOK 5 million in total assets in 2004 (approx. $740,000). Finally, we include sector × year fixed effects ($\phi_{sector} \times \phi_t$) to absorb sector-specific shocks. A sector is defined as all firms with the same two-digit Standard Industrial Classification code

[19] With respect to the existing dividend tax literature, this notion is hence more related to the idea of locked capital in firms due to agency issues that managers can invest in pet projects (Chetty and Saez 2010).

assigned by Statistics Norway which is based on Eurostat's NACE code. In sum, these three sets of fixed effects ensure that we estimate the treatment effect by comparing treated and control firms that are similar in terms of size and age and operate in the same industry. We also include firm fixed effects (ϕ_m) to absorb time-invariant firm-specific determinants of investment or payout. Given the rich set of fixed effects, we do not add control variables. Standard errors are adjusted for clustering at the firm level.

5.2 Effect on dividend payouts, equity and liabilities

We begin by examining the effect of the dividend tax hike on dividend payouts of private firms in Figure 4(a). Recall that firm accounting outcomes respond in 2005 because dividends paid in 2006 are determined and thus recognized in the 2005 accounts. Firms controlled by treated individuals significantly reduce their dividend distributions in the years following the reform. The effect persists throughout the sample period and closely mirrors our individual-level findings, which show a substantial decline in income driven by lower dividend payouts (see, also, Berzins, Bøhren, Stacescu 2019, or Alstadsæter, Jacob, Kopczuk, and Telle 2025).

Figure 4(b) presents results using changes in equity and liabilities as the dependent variable. We find that the dividend tax reform induced substantial adjustments in the balance sheets of private firms. The reform generated an immediate increase in retained earnings in 2005, which persists in smaller magnitude throughout the sample period. On average, retained earnings increased by 3.3 percentage points of lagged assets relative to control firms, with smaller estimates when excluding the transition year 2005 (2.4 percentage points, see Table 5). In contrast, long-term debt gradually declined in the post-treatment years by 1.2 percentage points of lagged assets (see Figure 4(c) and Table 5).

5.3 Saving and corporate investment in private firms

We present results on asset holdings within the firm in Figure 5. Contrary to the view that retained earnings stimulate investment, we find virtually no increase in productive investment. Specifically, there is little evidence of increased investment in

tangible fixed assets in Figure 5(a). Marketable securities also exhibit no systematic response (Figure 5(b)). The strongest asset-side response is instead observed for the accumulation of cash holdings, which rise steadily throughout the post-reform period as can be seen in Figure 5(c). The average change in cash and deposits rose by 2.4 percentage points of lagged assets for treated firms in the post-reform period.

Together, these findings indicate that shareholders responded to the dividend tax by leaving earnings inside the firm rather than distributing them. The additional retained earnings were primarily reflected in higher cash holdings and, to a lesser extent, lower long-term debt, rather than expanding productive investment. Hence, the evidence suggests that the reform did not primarily induce shareholders to save more through tradable financial assets. Rather, affected owners possibly shifted savings from personal accounts into their closely held corporations. The increase in corporate saving might therefore reflect a relocation of liquid wealth from outside the firm to inside the firm, predominantly in the form of cash and deposits.

In Figure 6 and Table 6, we examine this possibility by returning to the shareholder-level analysis and comparing non-operating financial assets held inside and outside the firm by each shareholder. The non-operating financial assets of an individual held inside the firm are calculated as the firm's financial assets multiplied by the individual's total ownership share (i.e., combined direct and indirect ownership) in this firm. When computing indirect ownership shares, we include only ownership chains through private firms to avoid double counting of listed shares in the financial assets.

The results support the notion of a reallocation of wealth from personal portfolios to corporate balance sheets. Total non-operating financial assets held outside the firm decline by NOK 132,400, while assets held inside the firm increase by NOK 64,400, although the latter estimate is imprecisely estimated. The composition of this shift is highly informative. Holdings of marketable securities fall both inside and outside the firm, and the corresponding estimates are economically small and statistically weak. In contrast,

cash and deposits increase by NOK 114,200 inside the firm and decrease by NOK 83,200 outside the firm. The event-study estimates in Figure 6 show that these divergences emerge immediately after the reform and persist throughout the post-reform period.

From these tests, we conclude that the dividend tax hike induces shareholders to use their firm or their holding company as a savings tool. The shift in savings from the personal to the firm level could be explained, for example, by shareholders hoping for a dividend tax cut (or at least a temporary tax holiday) in the future, although the reform was announced as a permanent tax increase and it still applies as of today in 2026. Moreover, there is also a potential behavioral explanation. Specifically, tax aversion has been shown to bias taxpayers to postpone tax payments even in the absence of any financial rationale to do so (e.g., Sussman and Olivola 2011; Kessler and Norton 2016).

5.4 Operating expenses, profitability and within-firm consumption

In the final step, we turn to firm operations that directly affect profits prior to the payout decision. Shareholders may try to change firm operations to compensate the dividend-tax-induced income reduction in two different ways (e.g., Leite 2024). First, shareholders in treated firms could pay themselves higher salaries as manager-owners following the reform to compensate for the income loss due to the reduction in dividend payments. Consumption out of such salary increases is already captured in our shareholder-level consumption measure as it directly affects observable disposable income outside the firm. Second, shareholders may try to relocate part of their consumption into the firm by consuming firm resources (e.g., cars, dinners, holidays, equipment, etc.). Such consumption *inside* the firm would compensate for a reduced consumption *outside* the firm and is not captured in our shareholder-level consumption measure.

Because higher manager-owner salaries and within-firm consumption manifest themselves in higher operating expenses without a corresponding increase in corporate revenue, there should be higher cost-to-revenue ratios and lower profitability among treated firms. In Figure 7 and Table 7, we examine this mechanism by running our firm-

level regression with the cost-to-revenue ratio as the dependent variable. Following the reform, the cost-to-revenue ratio increases by 2.7 percentage points in treated firms relative to control firms (see Figure 7(a) and Table 7, column (1)). Because the cost-to-revenue ratio equals 1 minus the profit margin, this implies a significant reduction in operating profitability.

In Figure 7(b)-(d), we split operating expenses into its main components: the wage bill, consumable expenses (e.g., cost of materials), and non-consumable expenses (e.g., depreciation) to examine whether the increase in operating expenses is related to within-firm private consumption. When including only the wage bill in the cost component, the cost-to-revenue ratio rises by 1.5 percentage points (see column (2) of Table 7). In Figure 7(b), we further split the wage bill into salary payments to employees with shareholdings in the firm (red line) and those without shareholdings (green line). The disproportionate increase in the wage bill to revenue ratio is entirely driven by salaries paid to shareholders of the same firm. This implies that shareholders pay themselves relatively higher salaries as manager-owners following the reform, as the dividend tax increase reduced the tax advantage of receiving remuneration through dividends. In contrast, salaries paid to other employees do not respond. We thus find no evidence of the dividend tax reform affecting wages of employees more generally.

Turning to non-wage expenses, we find that the increase in the cost-to-revenue ratio is concentrated in consumable expenses that are suitable for private consumption (see Figure 7(c)). For such consumable expenses, the cost-to-revenue ratio increases by 1.1 percentage points (see column (3) of Table 7). In contrast, non-consumable expenses increase only marginally, in statistical and economic terms (see column (4) of Table 7).

These findings are consistent with controlling shareholders of private firms trying to reduce the decline in consumption outside the firm by consuming more within their firms. To quantify the magnitude of such private consumption spending within the firm, we estimate a specification in which the logarithm of consumable corporate expenses is

regressed on the treatment indicator while controlling directly for operating revenue as well as the full set of fixed effects. Results are presented in column (6) of Table 7. Conditional on revenue, treated firms increase consumable expenses by 2.2 percent after the reform. This estimate captures spending that cannot be explained by higher business activity and thus likely reflects within-firm consumption. Evaluating this estimate at the average level of consumable expenses and the average number of shareholders among treated firms prior to the reform, the estimated coefficient implies additional spending of approximately NOK 74,200 (or $11,000) per shareholder per year. Since we cannot guarantee that all additional spending ends up as private consumption, this figure arguably constitutes an upper bound on within-firm consumption due to the reform. Taken at face value, this estimate implies that up to 80% of the consumption decline *outside* of the firm (see results in Section 4.3) is compensated by increased consumption *inside* the firm.

Overall, the evidence indicates that the dividend tax reform affected not only the location of savings but also the location of consumption. Shareholders accumulated liquid wealth within their firms while simultaneously increasing corporate expenditures that reduced profitability and appear unrelated to productive business activity. These patterns are consistent with a substitution from personal consumption and saving toward within-firm consumption and saving in closely held corporations.

6 Aggregate consumption effects

Sections 4 and 5 establish how higher dividend taxes affect household consumption, corporate saving, and within-firm consumption. We now ask whether these mechanisms are economically meaningful when considering aggregate consumption effects. To assess the macroeconomic implications of increasing dividend taxes, we aggregate the estimated individual consumption responses across all shareholders. For this purpose, we begin by estimating a continuous difference-in-differences design where we replace the treatment indicator with the total amount of dividends received over the pre-treatment

period 2003-2004 in NOK 10,000. The estimated coefficients from this regression are displayed in Online Appendix Table A.4 and provide us with an estimate of the consumption response per NOK 10,000 of pre-treatment dividend payments. The estimated semi-elasticity is approximately -0.20 percent per NOK 10,000 of pre-reform dividend income in the short run (2006–2008) and between -0.12 and -0.17 percent in the longer run (2009--2014), depending on the sample considered.

Next, for each individual, we multiply pre-reform dividend income (2003-2004) by the estimated consumption response per NOK 10,000 of pre-treatment dividends obtained from the individual-level regressions. We then sum these predicted consumption changes across all shareholders and separately for the first three years after the reform (2006-2008, *short-run* effect) and the subsequent five years (2009-2014, *long-run* effect). This yields an estimated reduction in consumption of approximately NOK 8.7 billion in the short-run (2006-2008) and NOK 5.6 billion in the long run (2009-2014) when considering only consumption outside the firm. Relative to aggregate household consumption in the pre-reform period, these correspond to declines of approximately 0.92 percent and 0.47 percent, respectively. Expressed relative to "mainland GDP" (which excludes oil-related GDP as is common in Norwegian official statistics), the implied reductions are 0.47 percent in the short run and 0.24 percent in the long run (see Figure 8, blue bars).

Because some shareholders are also owners of closely held firms, we additionally account for the increase in within-firm consumption documented in the firm-level analysis. For this purpose, we rerun the regression in column (5) of Table 7, distinguishing between short-term (2006-2008) and long-term (2009-2014) effect of the dividend tax hike on consumable corporate costs that are unrelated to revenues (see Online Appendix Table A.5). We then compute the amount of within-firm consumption by multiplying the estimated semi-elasticities by the average pre-reform amount of consumable corporate costs and impute these amounts to all controlling shareholders with a pre-treatment dividend share in their income of more than 20%. Our firm-level estimates indicate that treated

firms increase expenditures on consumable inputs after the dividend tax hike consistent with the substitution from individual to firm-financed consumption. Accounting for this substitution reduces the aggregate decline in household consumption to NOK 7.2 billion in the short run and to NOK 3 billion in the long run. These estimates correspond to reductions of 0.76 percent and 0.26 percent of aggregate household consumption, or 0.39 percent and 0.13 percent of GDP, respectively (see Figure 8, red bars).

Overall, the results suggest that the dividend tax hike generated economically meaningful reductions in aggregate household spending. Part of the consumption response reflects a reallocation of expenditures from the individual to the corporate sector, which offsets around one-sixth of the short-run effect and roughly one-half of the long-run effect. Consequently, even after accounting for within-firm substitution, the reform led to a sizeable contraction in measured household consumption, indicating that higher dividend taxes can have non-negligible aggregate demand effects.

7 Conclusion

This paper examines how dividend taxation affects household consumption. Using a large dividend tax increase in Norway together with uniquely linked administrative data on shareholders and firms, we show that higher dividend taxes do not simply reduce shareholder income but that they also reduce household consumption and reshape the allocation of consumption and saving between households and firms. We find that higher dividend taxes lead to a large and persistent decline in shareholder consumption. Shareholders partially smooth the resulting income shock by drawing down private savings, but these adjustments are insufficient to fully offset the reduction in dividend income. At the same time, firms cut dividends and increase retained earnings. However, rather than financing additional productive investment, these retained funds are primarily accumulated as cash holdings and used to reduce debt, implying that higher dividend taxes shift savings from households to corporate balance sheets.

Furthermore, our linked data allow us to identify a substitution effect regarding the location of consumption. Controlling shareholders offset a significant portion of their private consumption decline by increasing within-firm consumable expenditures and extracting higher managerial wages. This documents a specific behavioral response where tax policy induces a relocation of spending and remuneration to the corporate sector.

These findings have broader implications for the evaluation of capital taxation. Dividend taxes influence not only corporate financial policies but also shareholders' consumption spending, the allocation of savings between households and firms, and ultimately aggregate demand. Although shareholders possess opportunities to adjust to higher dividend taxes, these adjustments only partially offset the reduction in household consumption, resulting in lower individual and aggregate consumption in response to higher dividend taxes. Consequently, evaluating the efficiency and welfare consequences of dividend taxation requires accounting for the full range of behavioral responses on both sides of the household-firm boundary.

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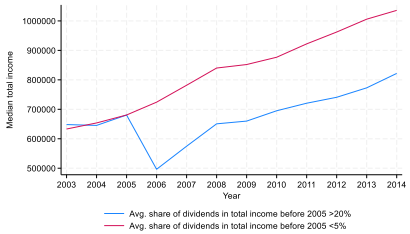
Figure 1: Average dividend income for treated and control groups



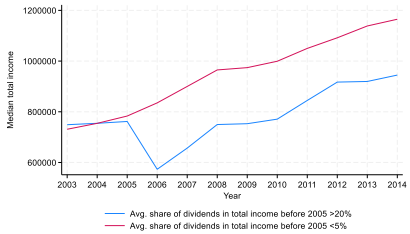
Notes: This figure displays the evolution of average dividend income for individuals in the treatment and control group of all individuals. The treatment group (blue line) consists of individuals whose share of dividend income earned between 2003 and 2004 is larger than 20% of their gross income earned during the same period. The control group (red line) consists of individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and 20% of gross income in 2003-2004 are excluded.

Figure 2: Consumption and income around the reform by income groups

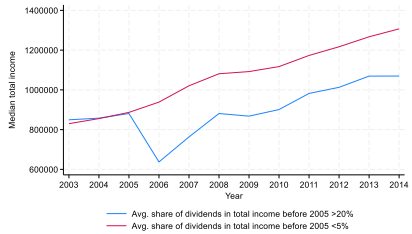
(a) Gross income (Income NOK 600-700k)



(b) Gross income (Income NOK 700-800k)



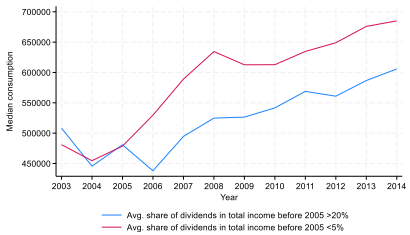
(c) Gross income (Income NOK 800-900k)



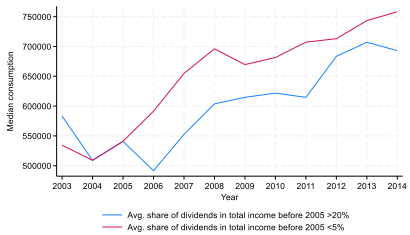
(d) Gross income (Income NOK 900-1,000k)



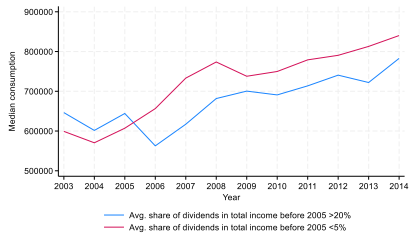
(e) Consumption (Income NOK 600-700k)



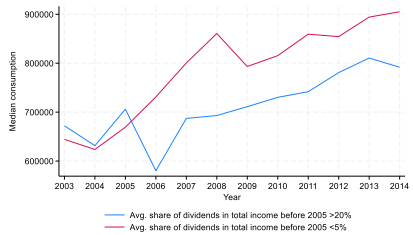
(f) Consumption (Income NOK 700-800k)



(g) Consumption (Income NOK 800-900k)

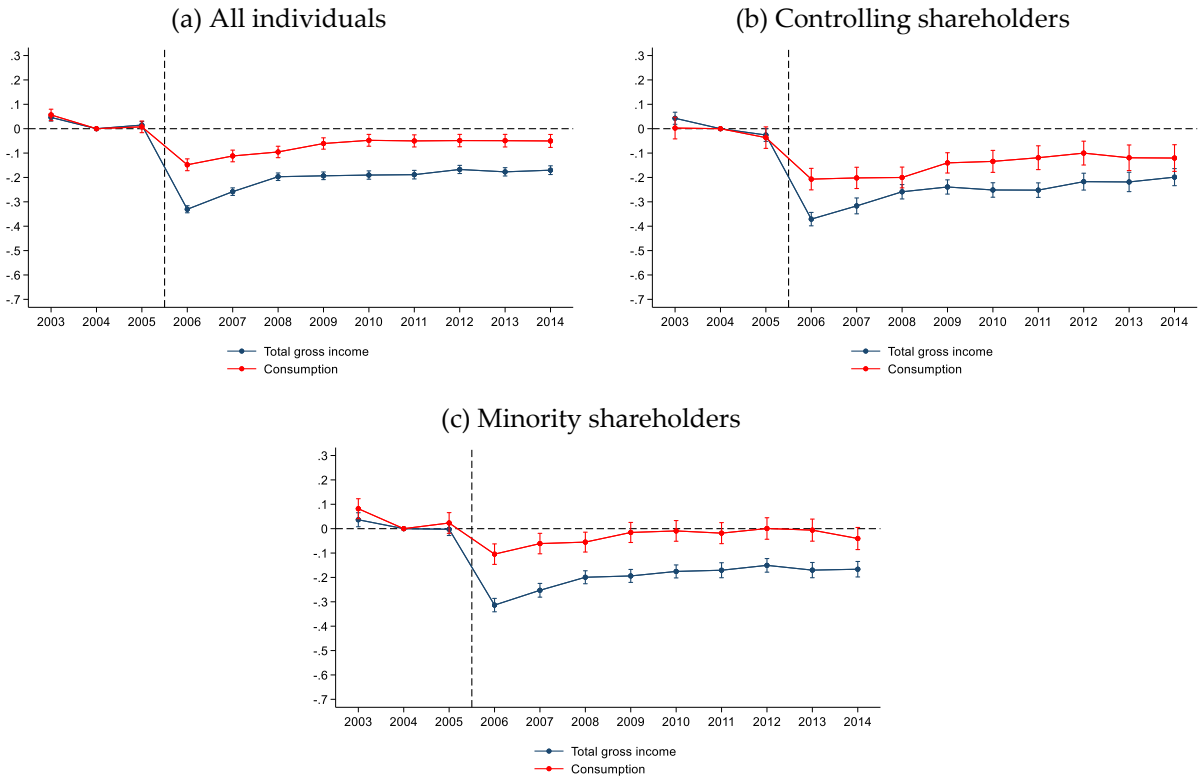


(h) Consumption (Income NOK 900-1,000k)



Notes: This figure displays the evolution of median gross income (a-d) and median consumption (e-h) for the treatment and control group of all individuals. Each subfigure displays the evolution for individuals with average total gross income in the specified interval in 2003-2004. The treatment group (blue line) consists of individuals whose share of dividend income earned between 2003 and 2004 is larger than 20% of their gross income earned during the same period. The control group (red line) consists of individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and 20% of gross income in 2003-2004 are excluded.

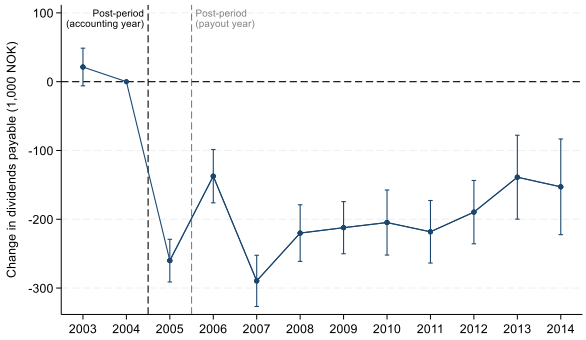
Figure 3: The effect of dividend taxes on income and consumption



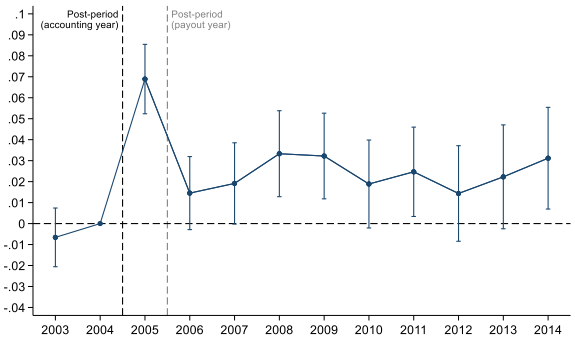
Notes: This figure displays the estimation results of a weighted generalized difference-in-differences regression. Weights are computed based on average gross income in 2003-2004 following the entropy-balancing methodology by Hainmueller (2012). We present the coefficients for the year dummies as well as their 95% confidence intervals. Standard errors are adjusted for clustering at the shareholder level. 2004 serves as the baseline year. The sample includes all individuals in subfigure (a), controlling shareholders in subfigure (b) and minority shareholders in subfigure (c). The treatment group comprises individuals whose share of dividend income earned between 2003 and 2004 is larger than 20% of their gross income earned during the same period. The control group contains individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and 20% of gross income in 2003-2004 are excluded. The blue lines display estimations with the logarithm of total net income of the individual as the dependent variable. The red lines display estimations with the logarithm of the consumption of the individual as defined in Section 3.2 as the dependent variable. All estimations control for marriage status and include individual, birth year × year fixed effects, wealth interval (NOK 2.5 million) × year fixed effects, and tax bracket × year fixed effects based onthe four tax brackets in 2004 (NOK 394,000, NOK 750,000, NOK 936,800). Standard errors presented in parentheses are adjusted for clustering at the individual level.

Figure 4: Effect on dividend payouts, liabilities, equity

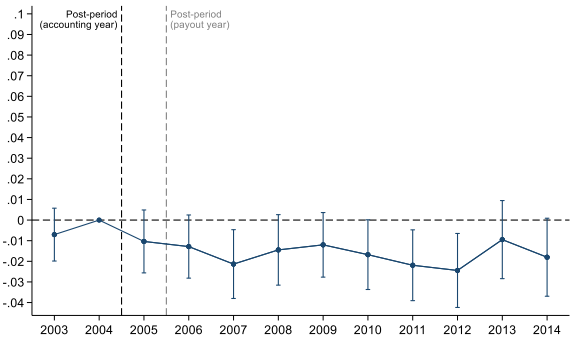
(a) Dividends payable



(b) Δ Retained earnings



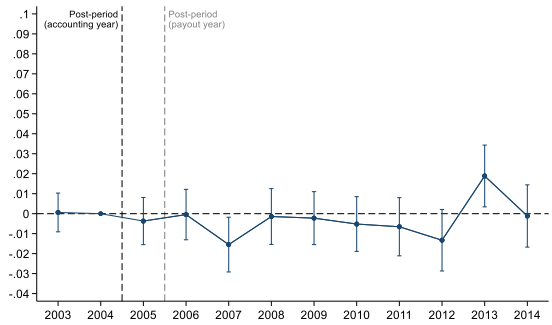
(c) Δ Long-term debt



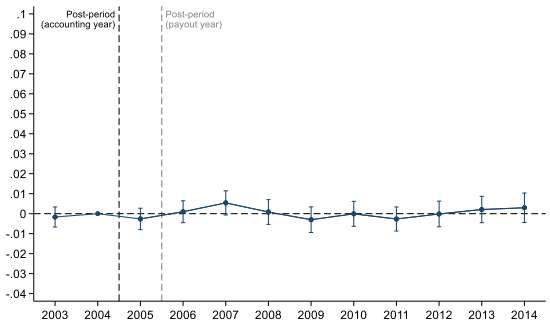
Notes: This figure displays the estimation results of the generalized difference-in-differences regression (3) on the firm level. The sample includes private firms owned by individuals of the treatment and control group in the individual-level estimation presented in Table 4. The figure presents the coefficients for the year dummies as well as their 95% confidence intervals. 2004 serves as the baseline year. Standard errors are adjusted for clustering at the firm level. The treatment group comprises firms with at least 50% of their shares held by individuals that we define as treated in the individual level analysis (i.e., individuals with dividend income of more than 20% of their total gross income in the pre-reform years). The control group contains firms with at least 50% of their shares are owned by individuals that we define as controls in the individual-level analysis (i.e., individuals with dividend income below 5% of their total gross income in the pre-reform years). In subfigure (a), the dependent variable is the absolute amount in dividends payable. In subfigures (b) and (c), the dependent variable is the change in retained earnings and long-term debt, respectively, each scaled by lagged total assets. All estimations include firm fixed effects as well as founding year × year fixed effects, size interval (NOK 5 million in total assets) × year fixed effects and industry (2-digit NACE code) × year fixed effects. Standard errors presented in parentheses are adjusted for clustering at the firm level.

Figure 5: Effect on assets in private firms

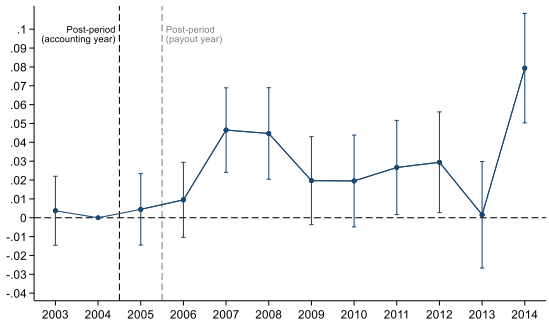
(a) Δ Tangible fixed assets



(b) Δ Marketable securities



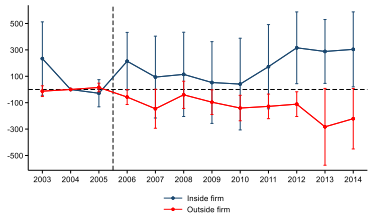
(c) Δ Cash & deposits



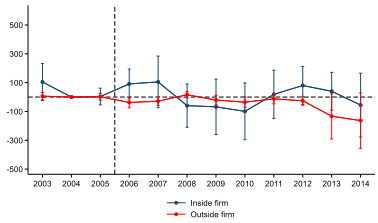
Notes: This figure displays the estimation results of the generalized difference-in-differences regression (3) on the firm level. The sample includes private firms owned by individuals of the treatment and control group in the individual-level estimation presented in Table 4. The figure presents the coefficients for the year dummies as well as their 95% confidence intervals. 2004 serves as the baseline year. Standard errors are adjusted for clustering at the firm level. The treatment group comprises firms with at least 50% of their shares held by individuals that we define as treated in the individual level analysis (i.e., individuals with dividend income of more than 20% of their total gross income in the pre-reform years). The control group contains firms with at least 50% of their shares are owned by individuals that we define as controls in the individual-level analysis (i.e., individuals with dividend income below 5% of their total gross income in the pre-reform years). In subfigures (a)-(c), the dependent variable is the change in tangible assets, marketable securities, and cash & deposits, respectively, each scaled by lagged total assets. All estimations include firm fixed effects as well as founding year × year fixed effects, size interval (NOK 5 million in total assets) × year fixed effects and industry (2-digit NACE code) × year fixed effects. Standard errors presented in parentheses are adjusted for clustering at the firm level. Stars behind coefficients indicate significance: * 10%, ** 5%, *** 1%.

Figure 6: Non-operating financial assets inside and outside of the firm

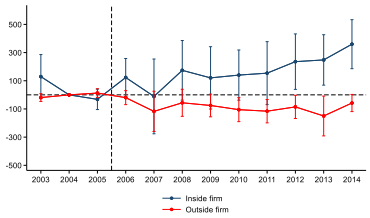
(a) All non-operating financial assets



(b) Marketable securities



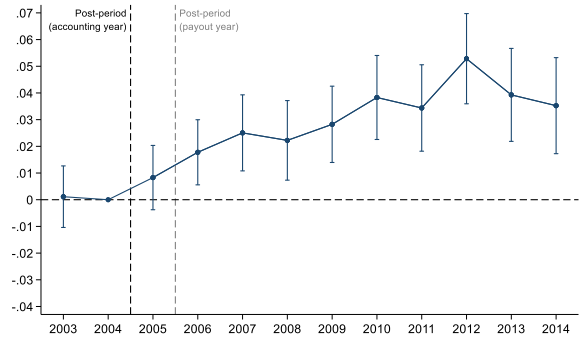
(c) Cash & deposits



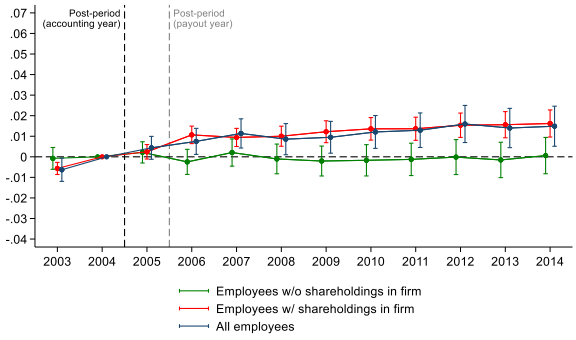
Notes: This figure displays the estimation results of a weighted generalized difference-in-differences regression. Weights are computed based on average gross income in 2003-2004 following the entropy-balancing methodology by Hainmueller (2012). We present the coefficients for the year dummies as well as their 95% confidence intervals. Standard errors are adjusted for clustering at the shareholder level. 2004 serves as the baseline year. The sample includes shareholders. The treatment group comprises individuals whose share of dividend income earned between 2003 and 2004 is larger than 20% of their gross income earned during the same period. The control group contains individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and 20% of gross income in 2003-2004 are excluded. In subfigures (a), (b), and (c), the blue and red lines display estimations with the amount of all non-operating financial assets (cash, deposits, fixed income assets, tradeable stocks), the amount of marketable securities (fixed income assets and tradeable stocks) and the amount of cash and deposits held inside and outside a firm, respectively. All estimations control for marriage status and include individual, birth year × year fixed effects, wealth interval (NOK 2.5 million) × year fixed effects, and tax bracket × year fixed effects based on the four tax brackets in 2004 (NOK 394,000, NOK 750,000, NOK 936,800).

Figure 7: Effect on cost-to-revenue ratio in private firms

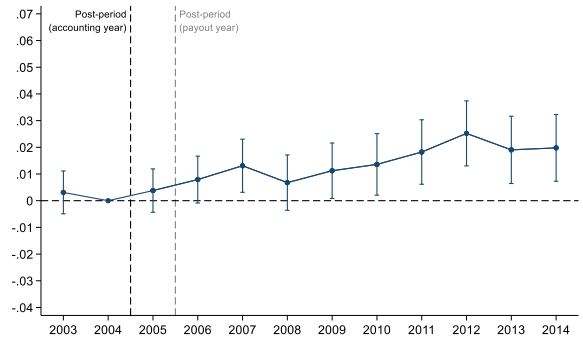
(a) Cost-to-revenue ratio: All operating expenses



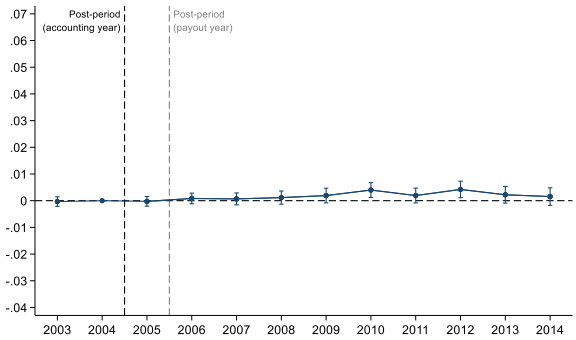
(b) Cost-to-revenue ratio: Wage bill



(c) Cost-to-revenue ratio: Consumable expenses



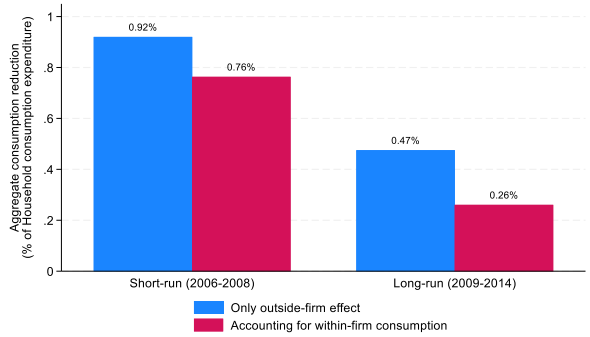
(d) Cost-to-revenue ratio: Non-consumable expenses



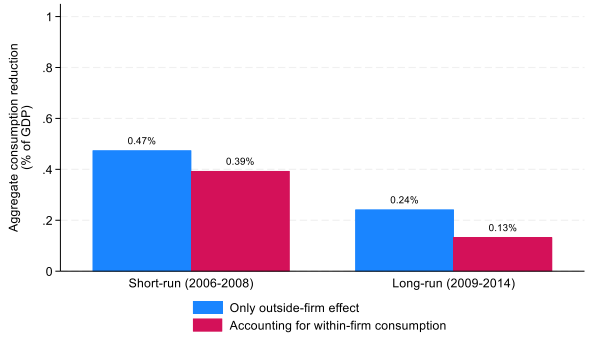
Notes: This figure displays the estimation results of the generalized difference-in-differences regression (3) on the firm level. The sample includes private firms owned by individuals of the treatment and control group in the individual-level estimation presented in Table 4. The figure presents the coefficients for the year dummies as well as their 95% confidence intervals. 2004 serves as the baseline year. Standard errors are adjusted for clustering at the firm level. The treatment group comprises firms with at least 50% of their shares held by individuals that we define as treated in the individual level analysis (i.e., individuals with dividend income of more than 20% of their total gross income in the pre-reform years). The control group contains firms with at least 50% of their shares are owned by individuals that we define as controls in the individual-level analysis (i.e., individuals with dividend income below 5% of their total gross income in the pre-reform years). In subfigures (a)-(d), the dependent variable is the cost-to-revenue ratio computed by dividing all operating expenses, the wage bill, consumable expenses (cost of materials and other operating expenses) and non-consumable expenses (depreciation, amortization and loss on receivables), respectively, by total operating revenue. All estimations include firm fixed effects as well as founding year × year fixed effects, size interval (NOK 5 million in total assets) × year fixed effects and industry (2-digit NACE code) × year fixed effects. Standard errors presented in parentheses are adjusted for clustering at the firm level.

Figure 8: Aggregate consumption effect of dividend tax hike

(a) As a percentage of national household consumption expenditure



(b) As a percentage of mainland GDP



Notes: This figure shows the aggregate effect of the 2006 Norwegian dividend tax hike on consumption. Subfigure (a) reports the effect as a percentage of national household consumption expenditure, while subfigure (b) reports the effect as a percentage of mainland GDP. Blue bars represent the estimated effect on consumption outside closely held firms. Red bars represent the total effect, including estimated within-firm consumption by controlling shareholders.

Table 1: Tax rates on labor and dividend income before and after the 2006 reform

	Until 2005	After Jan 1, 2006
Top marginal tax rate on labor income	**64.7%**	**54.3%**
Corporate income tax rate	28%	28%
Dividend tax	0%	28%
Combined marginal tax rate on dividends	**28%**	**48.2%**

Notes: This table displays the statutory tax rates for labor and capital income in Norway before and after the 2006 dividend tax hike.

Table 2: Descriptive Statistics

Panel A: All individuals

	No. of obs.	Mean	SD	25th percentile	Median	75th percentile
Gross income	3,249,657	542,171.207	380,473.040	362,021.000	457,202.000	607,973.000
Net income	3,249,657	418,426.255	246,882.325	297,362.406	368,534.219	470,907.312
Labor income	3,249,657	519,993.416	323,556.516	355,939.000	448,680.000	590,616.000
Dividend income	3,249,657	12,430.966	155,454.739	0.000	0.000	264.000
Consumption	3,249,657	484,513.707	455,202.516	279,838.062	373,649.438	535,500.938
Age	3,249,657	45.927	7.464	41.000	46.000	51.000
Male	3,249,657	0.582	0.493	0.000	1.000	1.000
Married	3,249,657	0.716	0.451	0.000	1.000	1.000

Notes: This table displays descriptive statistics for the sample of all individuals.

Panel B: Controlling shareholders

		No. of obs.	Mean	SD	25th percentile	Median	75th percentile
Gross income		152,215	768,121.141	774,031.224	427,328.000	585,755.000	867,626.000
Net income		152,215	568,596.999	518,949.500	340,596.000	451,947.281	637,626.375
Labor income		152,215	590,830.954	444,267.150	384,828.000	504,524.000	689,582.000
Dividend income		152,215	152,148.823	537,064.041	0.000	169.000	87,023.000
Consumption		139,437	720,693.436	871,101.961	327,653.250	495,966.781	801,070.625
Age		152,215	47.183	7.436	42.000	47.000	53.000
Male		152,215	0.811	0.392	1.000	1.000	1.000
Married		152,215	0.727	0.445	0.000	1.000	1.000
All non-operating financial assets (1,000 NOK)	Inside firm	152,215	950.172	2845.224	24.000	227.281	845.500
	Outside firm	152,215	282.332	732.916	29.987	97.653	281.632
Cash & deposits (1,000 NOK)	Inside firm	152,215	775.749	2104.114	19.000	193.547	729.667
	Outside firm	152,215	209.831	525.339	20.405	66.192	199.715
Marketable securities (1,000 NOK)	Inside firm	152,215	775.749	2104.114	19.000	193.547	729.667
	Outside firm	152,215	174.422	1312.879	0.000	0.000	6.700

Notes: This table displays descriptive statistics for the sample of controlling shareholders (i.e., individuals who were the beneficial owner of at least one firm in 2004).

Table 2: (continued)

Panel C: Private firms

		Number of obs.	Mean	SD	P25	Median	P75
Total assets (1,000 NOK)		70,880	5,655.884	10,948.671	1,263.000	2,772.000	6,026.500
Number of employees		70,090	7.910	12.271	2.000	5.000	9.000
Sales (1,000 NOK)		70,880	11,689.573	23,021.933	2,020.000	5,022.000	12,170.000
Retained earnings (1,000 NOK)		70,880	1,143.421	3,646.306	35.000	353.000	1,210.000
Long-term debt (1,000 NOK)		70,880	1,171.615	3,852.757	0.000	102.000	909.000
Tangible assets (1,000 NOK)		70,880	1,310.183	3,990.974	53.000	259.000	1,000.000
Cash & deposits (1,000 NOK)		70,880	1,155.334	2,192.639	152.000	490.000	1,290.000
Marketable securities (1,000 NOK)		70,880	12.507	776.902	-1.060	0.000	0.000
Δ scaled by total assets in *t-1*	Retained earnings	70,880	0.048	0.321	-0.036	0.020	0.117
	Long-term debt	70,880	0.014	0.252	-0.045	0.000	0.000
	Tangible assets	70,880	0.016	0.210	-0.042	-0.009	0.015
	Cash & deposits	70,880	0.037	0.361	-0.073	0.005	0.123
	Marketable securities	70,880	0.004	0.088	-0.000	0.000	0.000
Cost-to-revenue ratio	All operating expenses	70,522	0.939	0.252	0.873	0.946	0.991
	Wage bill	70,522	0.344	0.204	0.193	0.318	0.463
	Consumable expenses	68,242	0.561	0.254	0.381	0.566	0.728
	Non-consumable expenses	70,458	0.030	0.054	0.004	0.012	0.031
Consumable expenses (1,000 NOK)		68,594	8,008.856	18,704.045	889.000	2,641.500	7,368.000
Consumable expenses (logarithm)		68,572	7.840	1.577	6.792	7.880	8.905
Total operating revenue (1,000 NOK)		70,880	11,998.971	23,136.135	2,280.000	5,265.000	12,402.500
Total operating revenue (logarithm)		70,514	8.571	1.326	7.746	8.577	9.431

Notes: This table displays descriptive statistics for the sample of private firms.

Table 3: Treatment versus control group (weighted means)

	Weighted means, pre-treatment (2003-2005)					
	All individuals		Controlling shareholders		Minority shareholders	
	Treatment	Control	Treatment	Control	Treatment	Control
Gross income	807,567.8	806,735.3	825,142.2	828,500.1	749,529.9	748,705.5
Consumption	662,408.3	689,442.7	796,995.0	718,484.4	617,538.8	612,011.2
Gross wealth	1,086,626.4	1,415,694.7	1,345,643.1	1,481,952.3	1,025,309.9	1,239,037.1
Age	42.9	42.4	43.2	43.3	42.8	40.3

Notes: This table displays the weighted means for shareholders in the indicated subsamples in the treatment and control group of pre-treatment period (2003-2005).

Table 4: Dividend taxes and income and consumption

Dependent Variable	All individuals		Controlling shareholders		Minority shareholders	
	Income	Consump-tion	Income	Consump-tion	Income	Consump-tion
	(1)	(2)	(3)	(4)	(5)	(6)
Post × *Treated*	-0.230***	-0.097***	-0.267***	-0.140***	-0.212***	-0.071***
	(0.005)	(0.007)	(0.010)	(0.014)	(0.010)	(0.012)
Implied MPC (short-run)	0.620		0.754		0.492	
Implied MPC (long-run)	0.445		0.590		0.318	
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Birth year × year FE	Yes	Yes	Yes	Yes	Yes	Yes
Wealth interval × year FE	Yes	Yes	Yes	Yes	Yes	Yes
Tax bracket × year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	3,249,657	3,249,657	152,215	152,215	3,097,442	3,097,442
No. of individuals	285,960	285,960	13,623	13,623	272,337	272,337
Adj. R^2	0.691	0.441	0.641	0.437	0.714	0.448

Notes: This table displays the estimation results of a weighted difference-in-differences regression. Weights are computed based on average gross income in 2003-2004 following the entropy-balancing methodology by Hainmueller (2012). The sample includes all individuals in columns (1)-(2), controlling shareholders in columns (3)-(4) and minority shareholders in columns (5)-(6). *Post* is equal to 1 for observation years 2006 or later. *Treated* is equal to 1 for individuals whose share of dividend income earned between 2003 and 2004 is larger than 20% of their gross income earned during the same period. *Treated* is equal to zero for individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and 20% of gross income in 2003-2004 are excluded. In columns (1), (3) and (5), the dependent variable is the logarithm of total net income of the individual. In columns (2), (4) and (6), the dependent variable is the logarithm of the consumption of the individual as defined in Section 3.2. All estimations control for marriage status and include individual, birth year × year fixed effects, wealth interval (NOK 2.5 million) × year fixed effects, and tax bracket × year fixed effects based on the four tax bracketsin 2004 (NOK 394,000, NOK 750,000, NOK 936,800). Standard errors presented in parentheses are adjusted for clustering at the individual level. Stars behind coefficients indicate significance: * 10%, ** 5%, *** 1%.

Table 5: Effect on assets in private firms

Dependent variable	*Change in*					
	Retained Earnings		*Long-term*	*Tangible*	*Cash &*	*Marketable*
	All years	*w/o 2005*	*debt*	*Assets*	*deposits*	*securities*
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Treated	0.033***	0.024***	-0.012***	-0.004	0.024***	0.001
	(0.005)	(0.005)	(0.004)	(0.003)	(0.005)	(0.001)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Founding year × year FE	Yes	Yes	Yes	Yes	Yes	Yes
Size interval × year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	70,880	63,946	70,880	70,880	70,880	70,880
No. of firms	7,815	7,702	7,815	7,815	7,815	7,815
Adj. R^2	0.131	0.131	0.006	0.011	-0.011	-0.025

Notes: This table displays the estimation results of a difference-in-differences regression on the firm level. The sample includes private firms owned by individuals of the treatment and control group in the individual-level estimation presented in Table 4. *Post* is equal to 1 for observation years 2005 or later (i.e., the first post-reform accounting year). *Treated* is equal to 1 for a firm if at least 50% of its shares are held by individuals that we define as treated in the individual level analysis (i.e., individuals with dividend income of more than 20% of their total gross income in the pre-reform years). *Treated* is equal to 0 for a firm if at least 50% of its shares are owned by individuals that we define as controls in the individual-level analysis (i.e., individuals with dividend income below 5% of their total gross income in the pre-reform years). In columns (1)-(6), the dependent variable is the change in retained earnings, long-term debt, tangible assets, cash & deposits and marketable securities, respectively, each scaled by lagged total assets. All estimations include firm fixed effects as well as founding year × year fixed effects, size interval (NOK 5 million in total assets) × year fixed effects and industry (2-digit NACE code) × year fixed effects. Standard errors presented in parentheses are adjusted for clustering at the firm level. Stars behind coefficients indicate significance: * 10%, ** 5%, *** 1%.

Table 6: Non-operating financial assets held by firm owners inside and outside the firm

Dependent Variable	*Non-operating financial assets (1,000 NOK)*					
	All		*Marketable securities*		*Cash & Deposits*	
	Inside	*Outside*	*Inside*	*Outside*	*Inside*	*Outside*
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Treated	64.40	-132.4**	-49.85	-49.18**	114.2	-83.19**
	(138.5)	(56.52)	(67.44)	(20.01)	(81.79)	(39.66)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Birth year × year FE	Yes	Yes	Yes	Yes	Yes	Yes
Wealth interval × year FE	Yes	Yes	Yes	Yes	Yes	Yes
Tax bracket × year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	152,215	152,215	152,215	152,215	152,215	152,215
No. of individuals	13,623	13,623	13,623	13,623	13,623	13,623
Adj. R^2	0.716	0.688	0.644	0.620	0.619	0.652

Notes: This table displays the estimation results of a weighted difference-in-differences regression. Weights are computed based on average gross income in 2003-2004 following the entropy-balancing methodology by Hainmueller (2012). The sample includes all individuals in columns (1)-(2), controlling shareholders in columns (3)-(4) and minority shareholders in columns (5)-(6). *Post* is equal to 1 for observation years 2006 or later. *Treated* is equal to 1 for individuals whose share of dividend income earned between 2003 and 2004 is larger than 20% of their gross income earned during the same period. *Treated* is equal to zero for individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and 20% of gross income in 2003-2004 are excluded. In columns (1)-(2), the dependent variable is the amount of all non-operating financial assets (cash, deposits, fixed income assets, tradeable stocks) held inside and outside a firm, respectively. In columns (3)-(4), the dependent variable is the amount of marketable securities (fixed income assets and tradeable stocks) held inside and outside a firm, respectively. In columns (5)-(6), the dependent variable is the amount of cash and deposits held inside and outside a firm, respectively. All estimations control for marriage status and include individual, birth year × year fixed effects, wealth interval (NOK 2.5 million) × year fixed effects, and tax bracket × year fixed effects based on the four tax brackets in 2004 (NOK 394,000, NOK 750,000, NOK 936,800). Standard errors presented in parentheses are adjusted for clustering at the individual level. Stars behind coefficients indicate significance: * 10%, ** 5%, *** 1%.

Table 7: Effect on cost-to-revenue ratio in private firms

Dependent variable	Cost-to-revenue ratio				Log Consumable expenses
	All operating expenses	Wage bill	Expenses		
			Consumable	Non-consumable	
	(1)	(2)	(3)	(4)	(5)
Post × *Treated*	0.027***	0.015***	0.011***	0.002*	0.022***
	(0.005)	(0.003)	(0.004)	(0.001)	(0.008)
Log total operating revenue					0.812***
					(0.011)
Firm FE	Yes	Yes	Yes	Yes	Yes
Founding year × year FE	Yes	Yes	Yes	Yes	Yes
Size interval × year FE	Yes	Yes	Yes	Yes	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes
No. of observations	71,692	71,692	69,323	71,627	69,306
No. of firms	7,840	7,840	7,799	7,839	7,798
Adj. R^2	0.381	0.747	0.714	0.647	0.970

Notes: This table displays the estimation results of a difference-in-differences regression on the firm level. The sample includes private firms owned by individuals of the treatment and control group in the individual-level estimation presented in Table 4. *Post* is equal to 1 for observation years 2005 or later (i.e., the first post-reform accounting year). *Treated* is equal to 1 for a firm if at least 50% of its shares are held by individuals that we define as treated in the individual level analysis (i.e., individuals with dividend income of more than 20% of their total gross income in the pre-reform years). *Treated* is equal to 0 for a firm if at least 50% of its shares are owned by individuals that we define as controls in the individual-level analysis (i.e., individuals with dividend income below 5% of their total gross income in the pre-reform years). In columns (1)-(4), the dependent variable is the cost-to-revenue ratio computed by dividing all operating expenses, the wage bill, consumable expenses (cost of materials and other operating expenses) and non-consumable expenses (depreciation, amortization and loss on receivables), respectively, by total operating revenue. In column (5) the dependent variable is the logarithm of consumable expenses. All estimations include firm fixed effects as well as founding year × year fixed effects, size interval (NOK 5 million in total assets) × year fixed effects and industry (2-digit NACE code) × year fixed effects. Standard errors presented in parentheses are adjusted for clustering at the firm level. Stars behind coefficients indicate significance: * 10%, ** 5%, *** 1%.

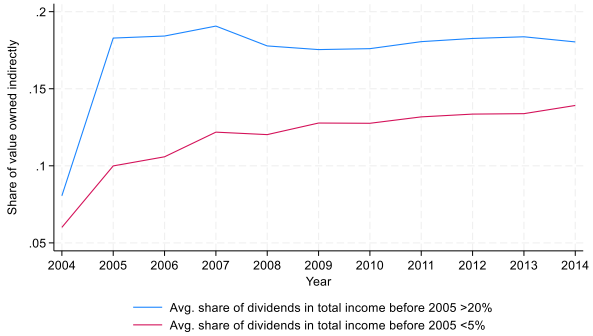
Online Appendix

for "Dividend taxes and consumption"
by Martin Jacob, Roni Michaely and Maximilian Todtenhaupt

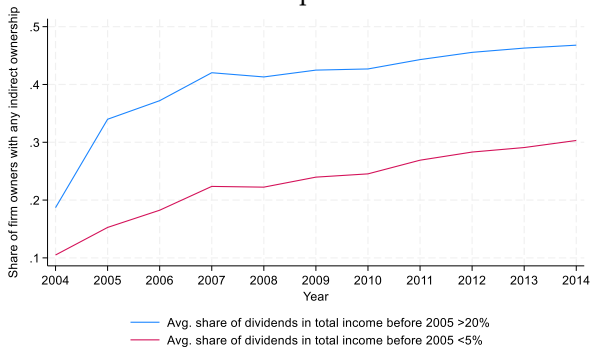
A Additional results

Figure A.1: Indirect holdings of firm owners

(a) Share of value held indirectly

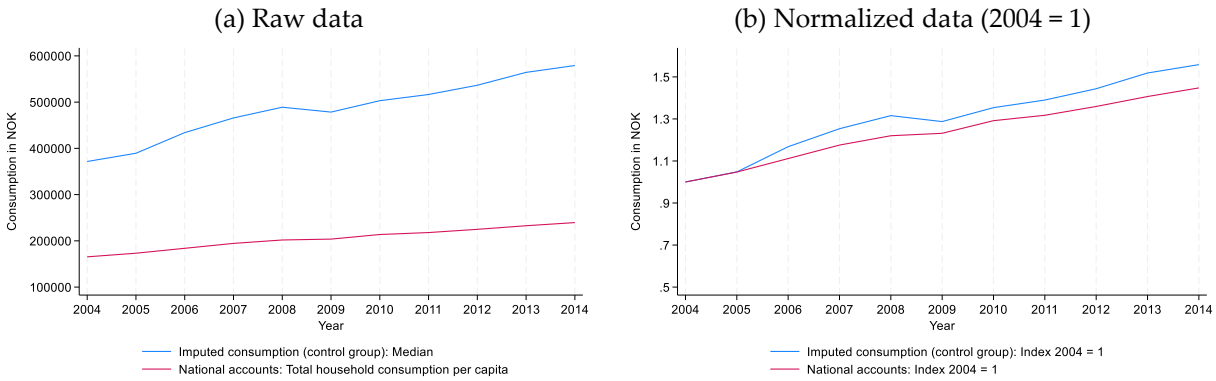


(b) Share of firm owners with any indirect ownership



Notes: This figure displays descriptive statistics on indirect holdings of controlling shareholders (i.e., individuals owning at least 25% of that firm in 2004) in the treatment (blue lines) and control group (red lines). Subfigure (a) presents the share of total firm value held indirectly (i.e., through another firm). Subfigure (b) presents the share of firm owners with any indirect holding.

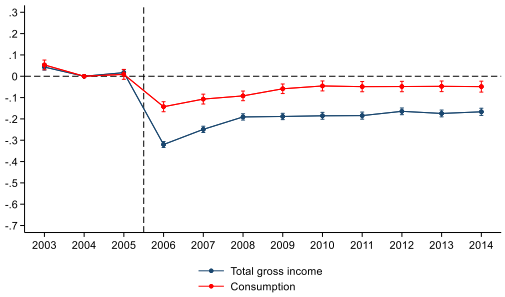
Figure A.2: Benchmarking imputed consumption against national accounts



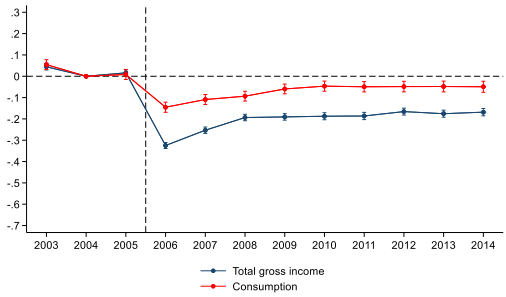
Notes: This figure plots the evolution of average imputed consumption of the control group (i.e., individuals receiving less than 5% of their gross income between 2003 and 2004 in the form of dividends) in the estimation sample of all individuals (blue line) and the per capita final consumption expenditure of Norwegian households (red line) as reported by Statistics Norway (Statbank table 09172). Subfigure (a) reports the raw values while subfigure (b) reports values for an index set to 1 in 2004 for each time series.

Figure A.3: Alternative thresholds to determine treatment (all individuals)

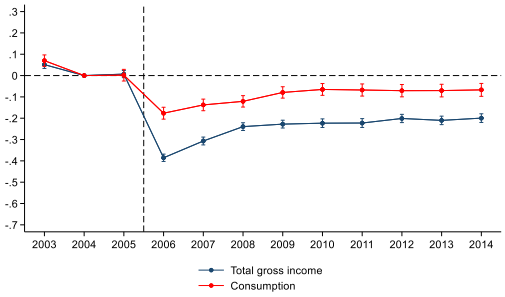
(a) Threshold 10%



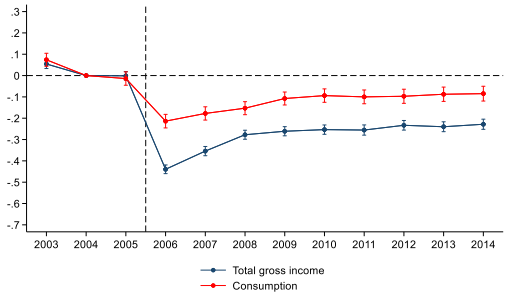
(b) Threshold 15%



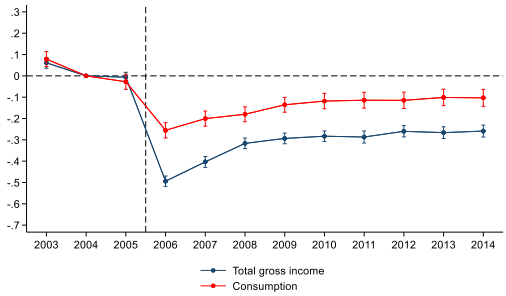
(c) Threshold 25%



(d) Threshold 30%



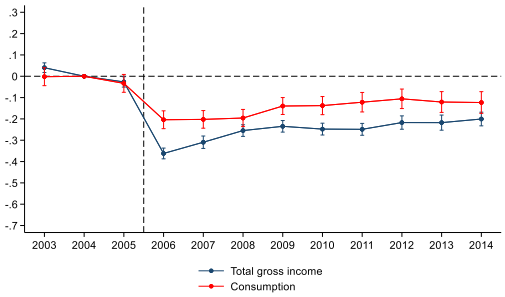
(e) Threshold 35%



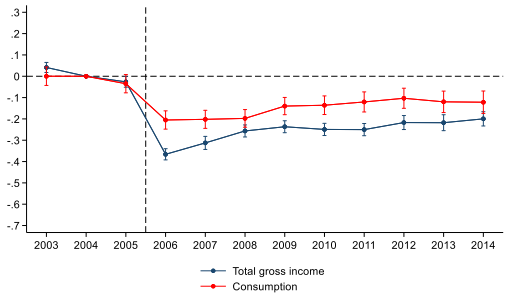
Notes: This figure displays the estimation results of a weighted generalized difference-in-differences regression. Weights are computed based on average gross income in 2003-2004 following the entropy-balancing methodology by Hainmueller (2012). We present the coefficients for the year dummies as well as their 95% confidence intervals. Standard errors are adjusted for clustering at the shareholder level. 2004 serves as the baseline year. The sample includes all individuals. In subfigures (a)-(e), the treatment group comprises individuals whose share of dividend income earned between 2003 and 2004 is larger than 10%, 15%, 25%, 30% and 35%, respectively, of their gross income earned during the same period. The control group contains individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and the relevant threshold of gross income in 2003-2004 are excluded. The blue lines display estimations with the logarithm of total net income of the individual as the dependent variable. The red lines display estimations with the logarithm of the consumption of the individual as defined in Section 3.2 as the dependent variable. All estimations control for marriage status and include individual, birth year × year fixed effects, wealth interval (NOK 2.5 million) × year fixed effects, and tax bracket × year fixed effects based on the four tax bracketsin 2004 (NOK 394,000, NOK 750,000, NOK 936,800). Standard errors presented in parentheses are adjusted for clustering at the individual level.

Figure A.4: Alternative thresholds to determine treatment (controlling shareholders)

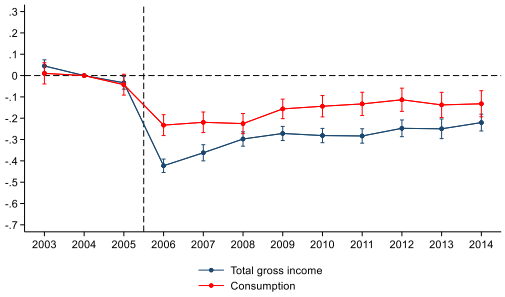
(a) Threshold 10%



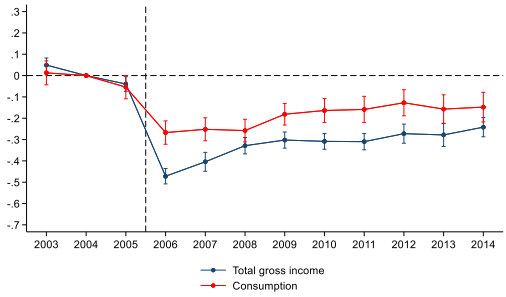
(b) Threshold 15%



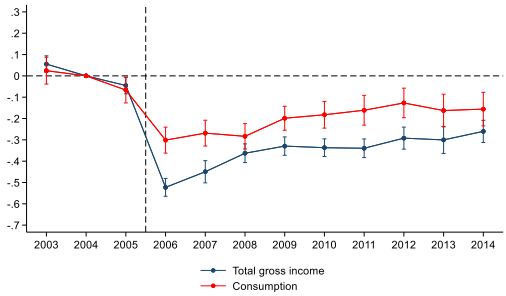
(c) Threshold 25%



(d) Threshold 30%



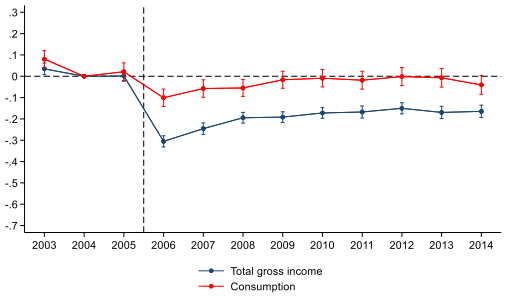
(e) Threshold 35%



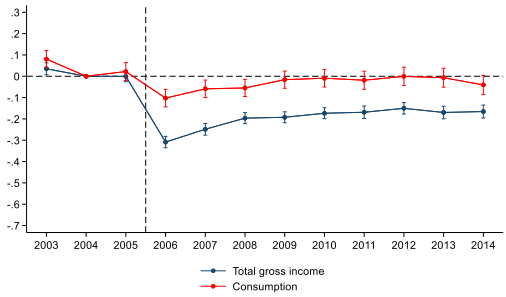
Notes: This figure displays the estimation results of a weighted generalized difference-in-differences regression. Weights are computed based on average gross income in 2003-2004 following the entropy-balancing methodology by Hainmueller (2012). We present the coefficients for the year dummies as well as their 95% confidence intervals. Standard errors are adjusted for clustering at the shareholder level. 2004 serves as the baseline year. The sample includes only controlling shareholders. In subfigures (a)-(e), the treatment group comprises individuals whose share of dividend income earned between 2003 and 2004 is larger than 10%, 15%, 25%, 30% and 35%, respectively, of their gross income earned during the same period. The control group contains individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and the relevant threshold of gross income in 2003-2004 are excluded. The blue lines display estimations with the logarithm of total net income of the individual as the dependent variable. The red lines display estimations with the logarithm of the consumption of the individual as defined in Section 3.2 as the dependent variable. All estimations control for marriage status and include individual, birth year × year fixed effects, wealth interval (NOK 2.5 million) × year fixed effects, and tax bracket × year fixed effects based on the four tax brackets in 2004 (NOK 394,000, NOK 750,000, NOK 936,800). Standard errors presented in parentheses are adjusted for clustering at the individual level.

Figure A.5: Alternative thresholds to determine treatment (minority shareholders)

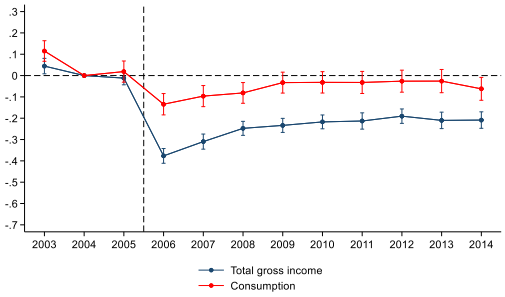
(a) Threshold 10%



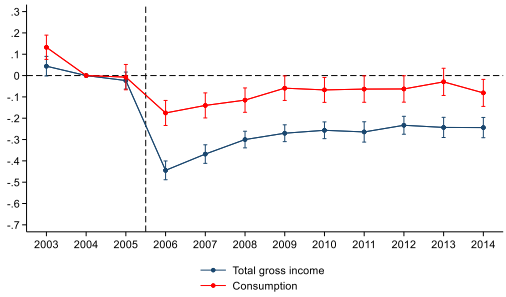
(b) Threshold 15%



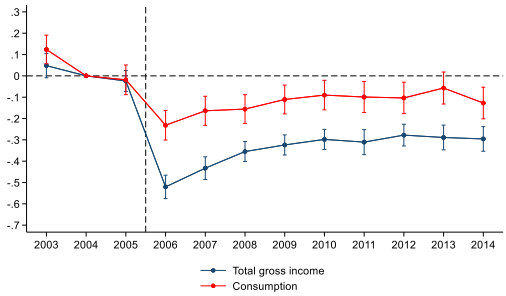
(c) Threshold 25%



(d) Threshold 30%

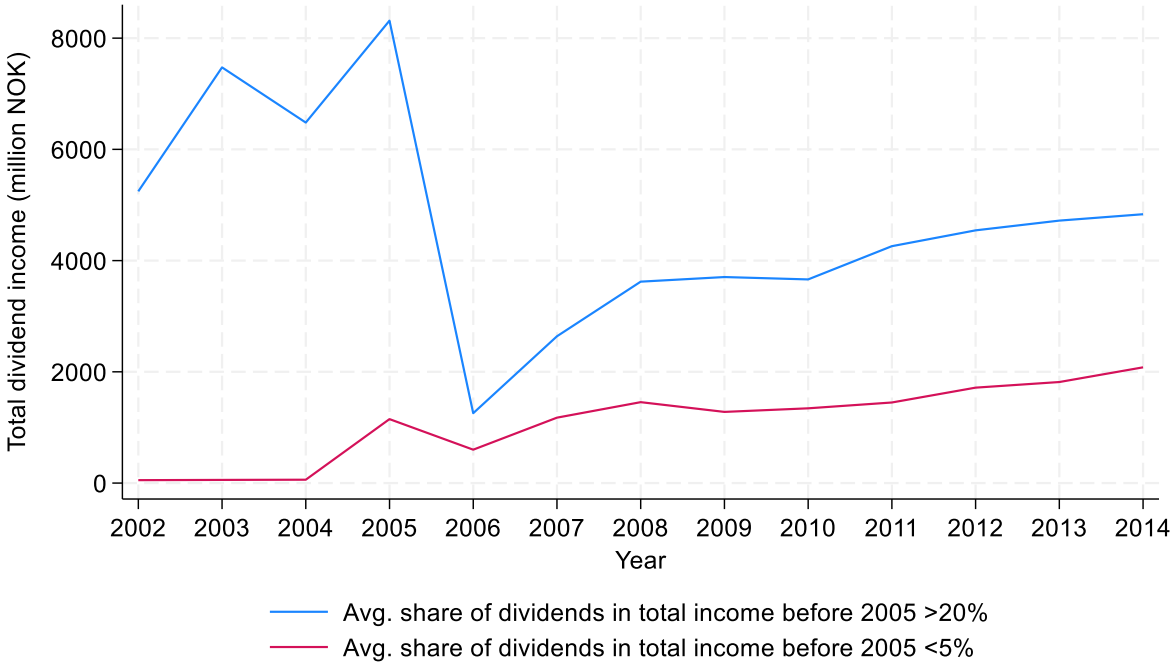


(e) Threshold 35%



Notes: This figure displays the estimation results of a weighted generalized difference-in-differences regression. Weights are computed based on average gross income in 2003-2004 following the entropy-balancing methodology by Hainmueller (2012). We present the coefficients for the year dummies as well as their 95% confidence intervals. Standard errors are adjusted for clustering at the shareholder level. 2004 serves as the baseline year. The sample includes only minority shareholders. In subfigures (a)-(e), the treatment group comprises individuals whose share of dividend income earned between 2003 and 2004 is larger than 10%, 15%, 25%, 30% and 35%, respectively, of their gross income earned during the same period. The control group contains individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and the relevant threshold of gross income in 2003-2004 are excluded. The blue lines display estimations with the logarithm of total net income of the individual as the dependent variable. The red lines display estimations with the logarithm of the consumption of the individual as defined in Section 3.2 as the dependent variable. All estimations control for marriage status and include individual, birth year × year fixed effects, wealth interval (NOK 2.5 million) × year fixed effects, and tax bracket × year fixed effects based on the four tax brackets in 2004 (NOK 394,000, NOK 750,000, NOK 936,800). Standard errors presented in parentheses are adjusted for clustering at the individual level.

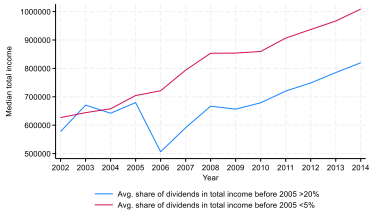
Figure A.6: Average dividend income of controlling shareholders



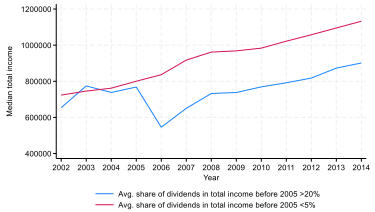
Notes: This figure displays the evolution of average dividend income for controlling shareholders in the treatment and control group of all individuals. The treatment group (blue line) consists of individuals whose share of dividend income earned between 2003 and 2004 is larger than 20% of their gross income earned during the same period. The control group (red line) consists of individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and 20% of gross income in 2003-2004 are excluded.

Figure A.7: Consumption and income of controlling shareholders around the reform by income groups

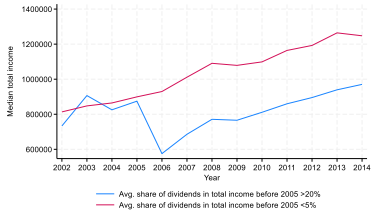
(a) Gross income (Interval NOK 600-700k)



(b) Gross income (Interval NOK 700-800k



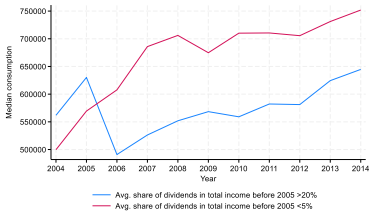
(c) Gross income (Interval NOK 800-900k)



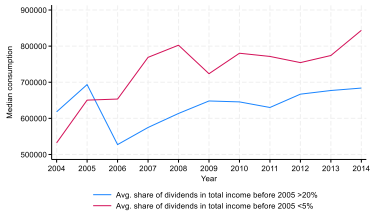
(d) Gross income (Interval NOK 900-1,000k)



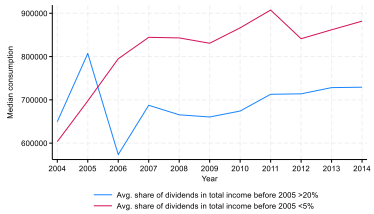
(e) Consumption (Interval NOK 600-700k)



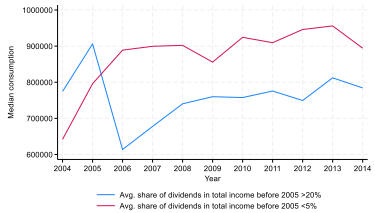
(f) Consumption (Interval NOK 700-800k)



(g) Consumption (Interval NOK 800-900k)

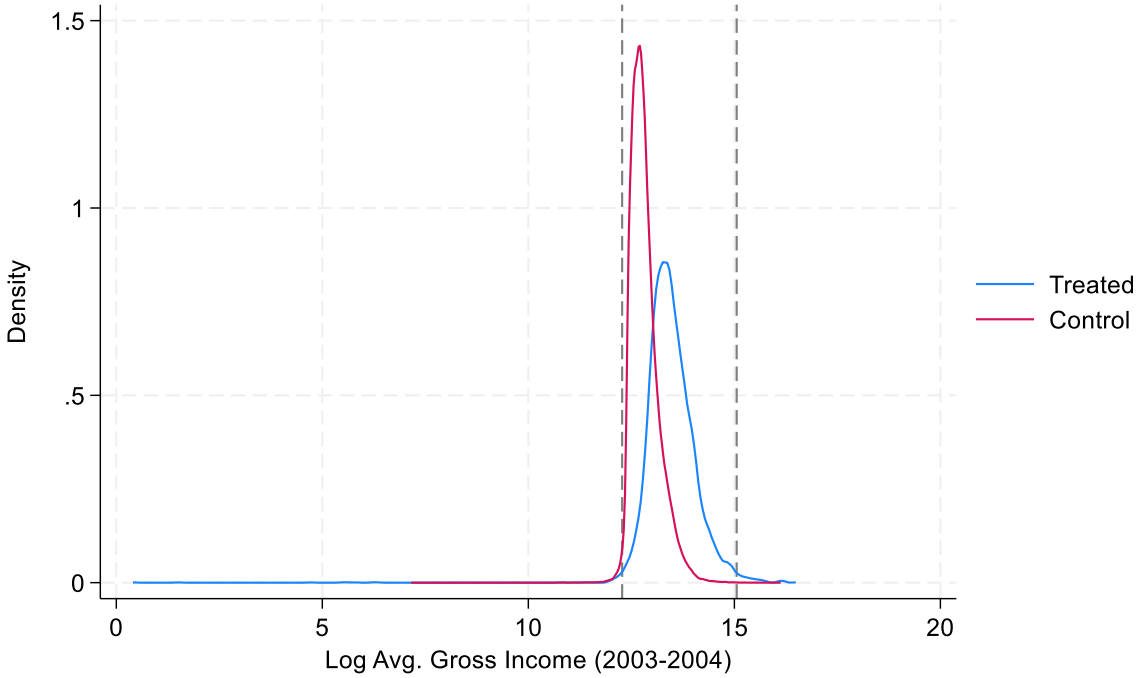


(h) Consumption (Interval NOK 900-1,000k)



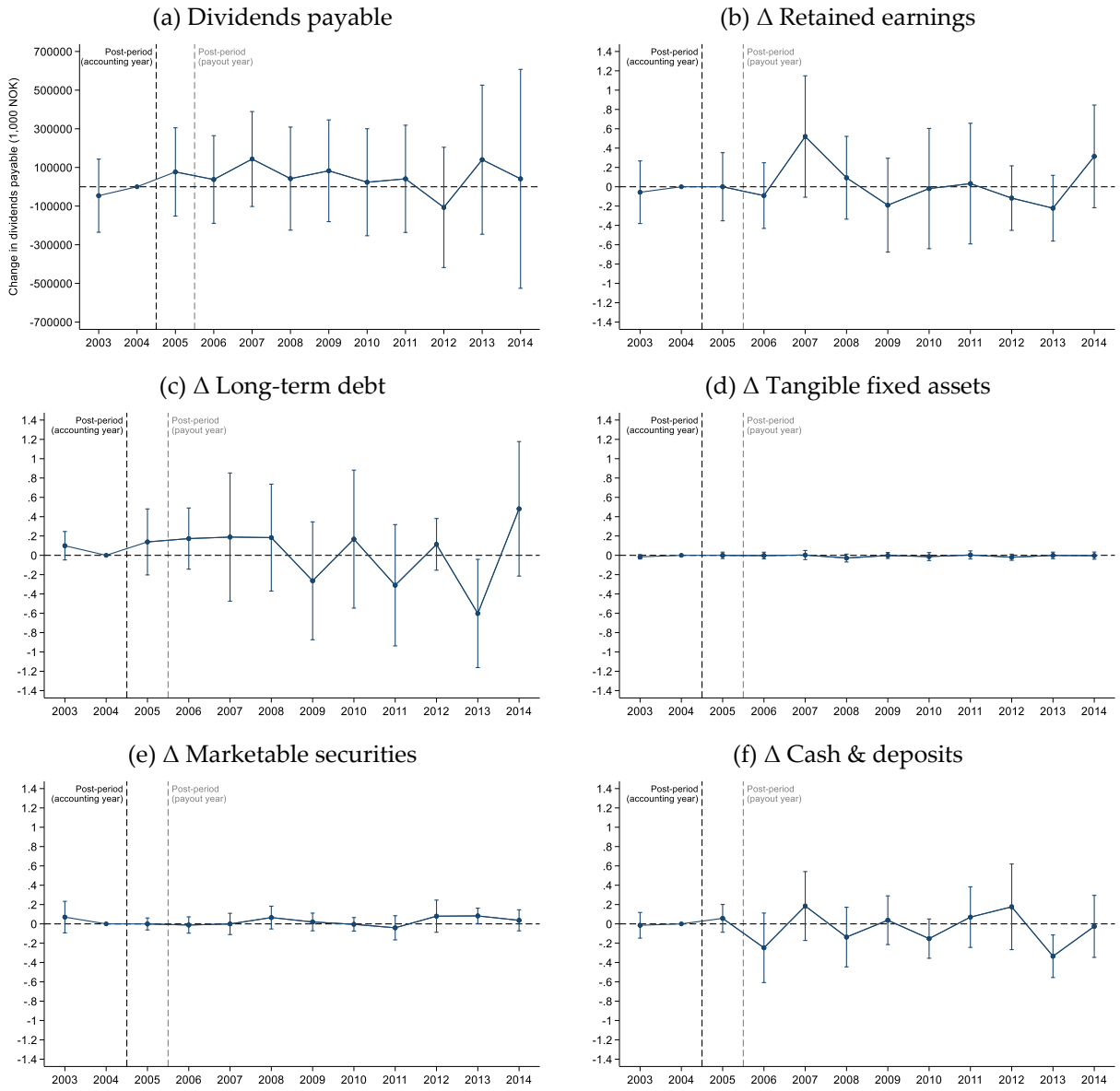
Notes: This figure displays the evolution of median gross income (a-d) and median consumption (e-h) for the treatment and control group of controlling shareholders. Each subfigure displays the evolution for individuals with average total gross income in the specified interval in 2003-2004. The treatment group (blue line) consists of individuals whose share of dividend income earned between 2003 and 2004 is larger than 20% of their gross income earned during the same period. The control group (red line) consists of individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and 20% of gross income in 2003-2004 are excluded.

Figure A.8: Common support across pre-treatment gross income



Notes: This figure displays the Kernel density of the logarithm of average gross income between 2003 and 2004 across all shareholders in the estimation sample. The dashed vertical lines indicate the cut-offs at the 1st percentile of the control group and the 99th percentile of the treatment group.

Figure A.9: Effect on dividend payouts, liabilities, equity, and assets in listed firms



Notes: This figure displays the estimation results of the generalized difference-in-differences regression (3) on the firm level. The sample includes listed firms. The figure presents the coefficients for the year dummies as well as their 95% confidence intervals. 2004 serves as the baseline year. Standard errors are adjusted for clustering at the firm level. The treatment group comprises firms with at least 50% of their shares held directly or indirectly by Norwegian residents. In subfigure (a), the dependent variable is the absolute amount in dividends payable. In subfigures (b) and (c), the dependent variable is the change in retained earnings and long-term debt, respectively, each scaled by lagged total assets. In subfigures (d)-(f), the dependent variable is the change in tangible assets, marketable securities, and cash & deposits, respectively, each scaled by lagged total assets. All estimations include firm fixed effects as well as founding year × year fixed effects, size interval (NOK 5 million in total assets) × year fixed effects and industry (2-digit NACE code) × year fixed effects. Standard errors presented in parentheses are adjusted for clustering at the firm level. Stars behind coefficients indicate significance: * 10%, ** 5%, *** 1%.

Table A.1: Sample selection

	Number of individuals	Number of obs.
Adult individuals between 18 and 62 years of age observed in 2004 and 2006, with above median gross income and non-negative values for labor and capital income in 2004	1,454,637	15,718,572
Excl. observations w/ zero gross income	1,449,454	15,596,366
Excl. individuals w/ less than 8 years of observed consumption	765,259	8,986,000
Excl. individuals w/ extreme changes in consumption (log growth rate > 99th percentile)	665,513	7,812,936
Excl. individuals w/ non-positive after-tax income	622,384	7,359,898
Excl. individuals w/o dividend income in 2003-2004	296,261	3,514,233
Estimation sample of individuals w/ non-missing consumption	296,261	3,365,158
Imposing common support restriction	293,243	3,331,244
Treatment group	7,543	83,794
Control group	278,417	3,165,863
Neither in treatment nor control group (not included in estimation sample)	7,283	81,587
Total baseline estimation sample	285,960	3,249,657
Of which controlling shareholders	13,623	152,215
Of which minority shareholders	272,337	3,097,442

Notes: This table displays the sample selection steps for the sample of shareholders used in the baseline estimations.

Table A.2: Dividend taxes and income and consumption with alternative treatment thresholds

Panel A: 10% threshold (11,501 treated individuals in the full sample)

	All individuals		Controlling shareholders		Minority shareholders	
Dependent Variable	Income	Consump-tion	Income	Consump-tion	Income	Consump-tion
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Treated	-0.164***	-0.0556***	-0.211***	-0.106***	-0.135***	-0.0338***
	(0.004)	(0.005)	(0.008)	(0.011)	(0.006)	(0.008)
Implied MPC (short-run)	0.557		0.724		0.466	
Implied MPC (long-run)	0.322		0.564		0.174	
No. of observations	3,294,026	3,294,026	176,840	176,840	3,117,186	3,117,186
No. of individuals	289,918	289,918	15,826	15,826	274,092	274,092
Adj. R^2	0.707	0.439	0.648	0.429	0.734	0.437

Panel B: 15% threshold (9,291 treated individuals in the full sample)

	All individuals		Controlling shareholders		Minority shareholders	
Dependent Variable	Income	Consump-tion	Income	Consump-tion	Income	Consump-tion
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Treated	-0.198***	-0.0747***	-0.240***	-0.122***	-0.173***	-0.0492***
	(0.005)	(0.006)	(0.009)	(0.012)	(0.008)	(0.010)
Implied MPC (short-run)	0.590		0.735		0.486	
Implied MPC (long-run)	0.379		0.571		0.225	
No. of observations	3,269,230	3,269,230	163,437	163,437	3,105,793	3,105,793
No. of individuals	287,708	287,708	14,629	14,629	273,079	273,079
Adj. R^2	0.699	0.439	0.645	0.433	0.723	0.439

Panel C: 25% threshold (6,156 treated individuals in the full sample)

	All individuals		Controlling shareholders		Minority shareholders	
Dependent Variable	Income	Consump-tion	Income	Consump-tion	Income	Consump-tion
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Treated	-0.268***	-0.121***	-0.300***	-0.158***	-0.258***	-0.104***
	(0.006)	(0.008)	(0.012)	(0.016)	(0.012)	(0.014)
Implied MPC (short-run)	0.642		0.745		0.559	
Implied MPC (long-run)	0.496		0.593		0.422	
No. of observations	3,234,128	3,234,128	142,121	142,121	3,092,004	3,092,004
No. of individuals	284,573	284,573	12,717	12,717	271,856	271,856
Adj. R^2	0.684	0.445	0.636	0.442	0.709	0.458

Table A.2: Dividend taxes and income and consumption with alternative treatment thresholds (continued)

Panel D: 30% threshold (5,024 treated individuals in the full sample)

	All individuals		Controlling shareholders		Minority shareholders	
Dependent Variable	Income	Consumption	Income	Consumption	Income	Consumption
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Treated	-0.303***	-0.146***	-0.331***	-0.180***	-0.301***	-0.132***
	(0.007)	(0.009)	(0.013)	(0.018)	(0.015)	(0.017)
Implied MPC (short-run)	0.676		0.768		0.594	
Implied MPC (long-run)	0.542		0.614		0.472	
No. of observations	3,221,556	3,221,556	133,699	133,699	3,087,854	3,087,854
No. of individuals	283,441	283,441	11,956	11,956	271,485	271,485
Adj. R^2	0.681	0.447	0.635	0.448	0.707	0.462

Panel E: 35% threshold (4,075 treated individuals in the full sample)

	All individuals		Controlling shareholders		Minority shareholders	
Dependent Variable	Income	Consumption	Income	Consumption	Income	Consumption
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Treated	-0.339***	-0.167***	-0.363***	-0.194***	-0.355***	-0.163***
	(0.009)	(0.010)	(0.015)	(0.020)	(0.018)	(0.020)
Implied MPC (short-run)	0.681		0.768		0.589	
Implied MPC (long-run)	0.557		0.605		0.511	
No. of observations	3,210,948	3,210,948	126,205	126,205	3,084,740	3,084,740
No. of individuals	282,492	282,492	11,285	11,285	271,207	271,207
Adj. R^2	0.675	0.451	0.634	0.457	0.700	0.464

Notes: This table displays the estimation results of a difference-in-differences regression. The sample includes all individuals with positive dividend income in 2003-2004 in columns (1)-(2), controlling shareholders (i.e., individuals with positive dividend income in 2003-2004 owning at least 25% of a firm in 2004) in columns (3)-(4) and minority shareholders (i.e., individuals with positive dividend income in 2003-2004 not owning controlling shares in any firm in 2004) in columns (5)-(6). *Post* is equal to 1 for observation years 2006 or later. *Treated* is equal to 1 for individuals whose share of dividend income earned between 2003 and 2004 is larger than the percentage of their gross income earned during the same period that is indicated in the respective panel heading. *Treated* is equal to zero for individuals that generate less than 5% of their gross income between 2003 and 2004 in the form of dividends. Individuals with dividend income between 5% and the indicated percentage of gross income in 2003-2004 are excluded. In columns (1), (3) and (5), the dependent variable is the logarithm of total net income of the individual. In columns (2), (4) and (6), the dependent variable is the logarithm of the consumption of the individual as defined in Section 3.2. All estimations include individual, birth year × year fixed effects, wealth interval (NOK 2.5 million) × year fixed effects, and tax bracket × year fixed effects based on the four tax brackets in 2004 (NOK 394,000, NOK 750,000, NOK 936,800). All regressions control for marriage status. Standard errors presented in parentheses are adjusted for clustering at the individual level. Stars behind coefficients indicate significance: * 10%, ** 5%, *** 1%.

Table A.3: Additional descriptive statistics

Panel A: Minority shareholders

	Obs.	Mean	SD	25th percentile	Median	75th percentile
Gross income	3,097,442	531,067.538	346,120.348	360,002.000	453,136.000	597,859.000
Net income	3,097,442	411,046.540	222,596.361	295,952.312	365,846.625	464,569.750
Labor income	3,097,442	516,512.307	316,030.780	354,869.000	446,427.000	585,716.000
Dividend income	3,097,442	5,564.928	100,860.971	0.000	0.000	228.000
Consumption	3,097,442	473,417.748	423,213.617	278,571.500	370,148.750	525,623.625
Age	3,097,442	45.865	7.460	41.000	46.000	51.000
Male	3,097,442	0.571	0.495	0.000	1.000	1.000
Married	3,097,442	0.715	0.451	0.000	1.000	1.000

Notes: This table displays descriptive statistics for the sample of minority shareholders (i.e., those receiving dividend payments in 2002-2004 and not owning controlling shares in any firm).

Panel B: Listed firms

		Number of obs.	Mean	SD	P25	Median	P75
Total assets (1,000 NOK)		843	6,114,221.790	20,197,442.160	237,846.000	678,682	3,407,413
Number of employees		835	91.528	552.015	4	17	66
Sales (1,000 NOK)		843	800,745.581	12,052,266.078	0.000	11,976	131,643
Retained earnings (1,000 NOK)		843	1,197,931.518	4,974,706.597	3.000	70,476	440,743
Long-term debt (1,000 NOK)		843	1,260,882.624	4,641,938.767	0.000	31,134	331,608
Tangible assets (1,000 NOK)		843	306,259.420	4,575,670.029	206.000	4,851	21,122
Cash & deposits (1,000 NOK)		843	354,914.350	1,418,362.361	4,324	28,543	147,578
Marketable securities (1,000 NOK)		843	3,814.656	1,018,101.401	-1,430.377	0.000	1,237.389
Δ scaled by total assets in *t-1*	Retained earnings	843	0.018	0.591	-0.055	0.002	0.080
	Long-term debt	843	0.038	0.765	-0.024	0.000	0.043
	Tangible assets	843	-0.001	0.051	-0.003	0.000	0.002
	Cash & deposits	843	0.018	0.345	-0.047	0.000	0.042
	Marketable securities	843	-0.000	0.145	-0.002	0.000	0.002

Notes: This table displays descriptive statistics for the sample of listed firms.

Table A.4: Exploiting variation in the intensity of treatment

Panel A: 10% threshold (11,501 treated individuals in the full sample)

	Controlling shareholders		Minority shareholders	
	Consumption			
	Short-run effect	Long-run effect	Short-run effect	Long-run effect
	(1)	(2)	(3)	(4)
Post (2006-2008) × Dividend Income 2003-2004	-0.002***		-0.002***	
	(0.000)		(0.000)	
Post (2009-2014) × Dividend Income 2003-2004		-0.001***		-0.002***
		(0.000)		(0.000)
No. of observations	77,305	111,523	1,563,516	2,280,901
No. of individuals	13,522	13,522	270,812	270,812
Adj. R^2	0.437	0.428	0.433	0.448

Notes: This table displays the estimation results of a difference-in-differences regression with a continuous treatment *Dividend Income 2003-2004* which is equal to the total amount of dividend income over 2003-2004. The sample includes controlling shareholders (i.e., individuals with positive dividend income in 2003-2004 owning at least 25% of a firm in 2004) in columns (1)-(2) and minority shareholders (i.e., individuals with positive dividend income in 2003-2004 not owning controlling shares in any firm in 2004) in columns (3)-(4). Estimations in columns (1) and (3) exclude observations in years 2009-2014. Estimations in columns (2) and (4) exclude observations in years 2006-2008. *Post (2006-2008)* is equal to 1 for observation years 2006 or later. *Post (2009-2014)* is equal to 1 for observation years 2009 or later. *Treated* is equal to 1 for individuals whose share of dividend income earned between 2003 and 2004 is larger than 20% of their gross income earned during the same period. The dependent variable is the logarithm of consumption of the individual as defined in Section 3.2. All estimations include individual, birth year × year fixed effects, wealth interval (NOK 2.5 million) × year fixed effects, and tax bracket × year fixed effects based on the four tax brackets in 2004 (NOK 394,000, NOK 750,000, NOK 936,800). All regressions control for marriage status. Standard errors presented in parentheses are adjusted for clustering at the individual level. Stars behind coefficients indicate significance: * 10%, ** 5%, *** 1%.

Table A.5: Effect on cost-to-revenue ratio in private firms

	Log Consumable expenses	
	Short-run effect	Long-run effect
	(1)	(2)
Post × Treated	0.014*	0.026***
	(0.007)	(0.009)
Log total operating revenue	0.796***	0.828***
	(0.017)	(0.012)
Firm FE	Yes	Yes
Founding year × year FE	Yes	Yes
Size interval × year FE	Yes	Yes
Industry × year FE	Yes	Yes
No. of observations	37,620	50,807
No. of firms	7,476	7,632
Adj. R^2	0.975	0.970

Notes: This table displays the estimation results of a difference-in-differences regression on the firm level. The dependent variable is the logarithm of consumable expenses. The sample includes private firms owned by individuals of the treatment and control group in the individual-level estimation presented in Table 4. *Post* is equal to 1 for observation years 2005 or later (i.e., the first post-reform accounting year). *Treated* is equal to 1 for a firm if at least 50% of its shares are held by individuals that we define as treated in the individual level analysis (i.e., individuals with dividend income of more than 20% of their total gross income in the pre-reform years). *Treated* is equal to 0 for a firm if at least 50% of its shares are owned by individuals that we define as controls in the individual-level analysis (i.e., individuals with dividend income below 5% of their total gross income in the pre-reform years). All estimations include firm fixed effects as well as founding year × year fixed effects, size interval (NOK 5 million in total assets) × year fixed effects and industry (2-digit NACE code) × year fixed effects. Standard errors presented in parentheses are adjusted for clustering at the firm level. Stars behind coefficients indicate significance: * 10%, ** 5%, *** 1%.

Details for data preparation

A.1 Imputing changes in real estate

During our sample period, the Norwegian Tax Authorities applied two different methods to assess the value of real estate. In the years up to and including 2009, the initial value was set to 30% of the construction cost. The government then announced in each year by how much it would increase or decrease this value. These official adjustments usually ranged between 0% and 10% and included both increases and decreases. Because construction costs included both new buildings as well as construction in existing buildings, a valuation based on these costs allows us to capture investments in real estate beyond the actual acquisition of a house (i.e., renovations etc.) which is important for our consumption imputation. Beginning in 2010, the authorities used a hedonic real estate pricing model based on transactions in previous years to assess the value of real estate.

To obtain changes in real estate value that reflect investments, we proceed in the following steps:

(1) For pre-reform (i.e., prior to 2010) years, use first observed year with positive real estate wealth as baseline.

(2) Revert official year-to-year changes in valuation announced by the government for all pre-reform years.

(3) Divide by 0.3 to obtain the original construction value for all pre-reform years.

(4) For first observed post-reform year use observed real estate value and divide by one plus the growth rate between the first post-reform real estate wealth and the adjusted real estate wealth (see steps (1)-(3)) of last pre-reform year.

(5) For the years following the first post-reform year, compute the annual growth rate in the unadjusted values. Subtract the growth rate in housing prices in the municipality the individual resides in. Use the resulting adjusted growth rates to extrapolate adjusted values starting with the first adjusted post-reform year.

(6) Set adjusted real estate value to zero whenever the unadjusted reported value is zero or the adjusted value is negative.

Steps (1) to (6) are completed separately for primary houses and leisure homes as different value adjustments for tax purposes apply in each case. Note that by construction, the procedure above does not yield real estate values in market prices. However, the changes in the adjusted real estate values capture nominal investments into real estate capital which is relevant for imputing consumption.

A.2 Computing effective ownership shares in private firms including indirect holdings

In order to compute effective ownership shares, we start with all direct holdings of private firms by individuals registered in the shareholder register. For each of these directly held firms, we then match the identifiers and number of shares held by this firm in any other private firm. For each individual, we repeat this procedure until we arrive at a firm without any holdings in other private firms. For each private firm we then multiply the ownership shares in each level of the chain up to the beneficial individual to obtain the indirect share held in a private firm. To this, we add the direct share held in the firm to obtain the effective ownership share. *Example*: An individual owns 40% of shares in firm A and 20% of shares in firm B. Firm A owns 30% of shares in firm C. Firm C owns 50% of shares in firm B. The individual then owns 40% × 30% × 50% = 6% of shares in firm B indirectly and 20% of shares directly leading to an effective ownership share of 26%.