

**Owner Illiquidity and Firm Behavior:
Financial and Real Effects of the Personal Wealth Tax on Private Firms**

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Abstract

We examine how negative liquidity shocks to households propagate to the firms they own. Our main tool for identification is a tax-driven shock to the household's personal liquidity that is independent of the firm and of the household's income and preexisting liquidity. We find that higher wealth tax payments on the personal home of a private firm's controlling shareholder are associated with lower personal and corporate liquidity and with lower sales, investment, employment, and performance in the firm. Compared to shareholders without residential real estate, homeowners pay 19 percent more wealth tax, their liquidity decreases by two percent, and the firm's revenues decrease by three percent. These findings imply that even strictly personal liquidity shocks to shareholders have causal effects on firm behavior. The negative spillover from shareholder illiquidity to firm behavior might be mitigated by increasing the wealth-tax payment threshold rather than excluding corporate assets from the tax base.

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1. Introduction

We show how a personal liquidity shock to a private firm's controlling owner changes the firm's behavior and performance. Private firms are often unknown to new investors, facing the firms with higher costs of external finance compared to public firms. This situation makes the firms unusually dependent on internal funds to finance growth (Gilchrist and Himmelberg 1995; Khwaja and Mian 2008; Hadlock and Pierce 2010). Private firms also have less diversified owners and less liquid shares (Edmans and Holderness 2017), making their owners' personal finances unusually reliant on the firms' payouts. Consequently, private firms may have to pay out more and abandon profitable projects when their owners need additional liquidity for personal reasons. If this happens, owner illiquidity has financial and real effects on firms. To the best of our knowledge, our paper is the first to investigate this role of the equity channel, where personal liquidity shocks for the owner are propagated to the company.

We find that when controlling shareholders experience a negative personal liquidity shock that is unrelated to the firm, the liquidity available to the firm is reduced and the firm's growth is slower. Thus, shocks to household finance propagate to corporate finance. The tight relationship we identify between personal wealth and corporate behavior suggests that the negative spillover to the firm might be mitigated by raising the minimum wealth tax threshold rather than excluding corporate assets from the tax base¹.

In the first step, we start with a personal liquidity shock unrelated to the firm. Using proprietary tax-return data from Norway for the population of private, family-controlled firms and their shareholders, we exploit regulatory changes in the tax value of the shareholder's personal home, i.e., residential real estate. This conventional tax value was increased annually by a fixed percentage per year across the board in four consecutive years (2006-2010), producing a cumulative increase of 67%.

The majority of controlling families in our sample own a home that is on average about one third of the family's taxable wealth. Therefore, the increased tax value of the home produces a large shock to most households' tax base that is unrelated to income. We show that the increase in the conventional tax value of housing resulted in significant increases in

¹ A tax reform in France (*Financial Times*, 2017) eliminated stocks from the tax base for the wealth tax, which has since focused on just real estate. The wealth tax was reintroduced in Spain in 2022, and there has been a debate about introducing a wealth tax in the UK (*Financial Times* 2023, 2024) and internationally (Zucman 2024).

wealth tax payments. Our difference in difference results show that the wealth tax payments of firm owners with residential real estate increase by 19 percentage points compared to owners without residential real estate.

The increased tax liability is not associated with an increase in the the firm owners' personal income or liquidity. Unlike personal or corporate income taxes, where higher earnings lead to higher tax payments, in the case of our shock that link is absent. We just have an increase in the conventional value of a preexisting asset (the tax base) and an increased tax liability that needs to be covered from other sources of liquidity. Given that private firms can find it difficult to raise outside funds, and the tight connection between private firms and their owners, there may be a reduction in the liquidity available to firms and their owners. In the second step, we document that, following the tax increase, the liquidity controlling owners have (measured as cash and tradeable securities held inside and outside the firm) is reduced by two percent if they are homeowners compared to owners without residential real estate.

Because the increased tax value is not based on changes in the market value, there is no effect on collateral value, ruling out any effect on the firm's financing capacity (Chaney, Sraer, and Thesmar 2012; Schmalz, Sraer, and Thesmar 2017). Because the tax applies exclusively to non-firm assets and is paid by the shareholder, and is unrelated to the business cycle, the way it can affect the firm is through the shareholder using cash outflows from the firm to cover the personal need for liquidity.

In the third step, we look at potential effects of the reduced liquidity on the firm's behavior and performance. When faced with a higher personal tax bill, business owners can first use their personal liquid assets to pay the tax. If the tax increase is large relative to personal liquidity, however, the owner may have to tap the firm's liquidity through dividend and salary payments. If the firm cannot raise additional capital easily, which is the case for most small private firms, the lost liquidity may hurt the firm's investment program and growth prospects. We find that the firm's revenues are almost three percent lower in firms where controlling shareholders are homeowners compared to firms where they are not. We also find evidence of negative effects on fixed assets, employment, and performance measured as return on assets.

Our baseline sample of about 33,000 firms on average per year is from the population of active, non-financial, private firms with limited liability. We consider firms controlled by a family and define control as ultimate ownership of more than 50% of the firm's equity. We focus on such firms to ensure that the household experiencing the personal liquidity shock can single-handedly make the decisions that have financial and real effects on the firm. We match firm data with personal tax-return data for the household's capital income, labor income, assets, liabilities, and wealth tax payments. The sample period is 2001–2010; the tax shocks we investigate occur annually from 2006 to 2010.

In 2005, firm owners with residential real estate paid on average 1.3% of their personal liquid assets (cash, bank deposits, and listed securities) in the wealth tax, compared to 1.1% for firm owners without residential real estate. In 2010, the proportions were 4.0% and 3.2% respectively. The top 10% homeowners had a ratio of at least 3.1% in 2005 and 9.7% in 2010, compared with 2.7% and 7.4% respectively for non-homeowners.

Compared to the personal liquid assets available to firm owners with residential real estate, the additional wealth tax payments coming directly from the increase in the valuation of housing represents slightly more than 1% for the median firm owner, but at least 20% for 10% of them and at least 50% for 5% of them. The firm owners for which the ratio is higher have relatively lower wealth.

Firm owners with residential real estate are wealthier on average than firm owners without real estate (the mean gross wealth in 2005 was NOK 4.03 million compared to NOK 2.7 million). Our difference in difference results survive when we match on gross wealth, or on gross wealth and leverage, using both coarsened exact matching and kernel-based propensity score matching. They also survive when we also match on firm characteristics such as firm size and age.

The increase in the tax value of residential real estate (a percentage applied to a conventional value) was unrelated to the evolution of market values. However, it may still be useful to control for local market real estate prices. Our results are largely unchanged when we do that.

We extend the existing literature in four ways. First, we provide direct evidence that household finance interacts with corporate finance through shareholder illiquidity and the equity channel. While the literature on corporate debt financing documents the importance of the collateral channel (Chaney et al. 2012; Kerr, Kerr, and Nanda 2015; Schmalz, Sraer, and

Thesmar 2017), we study equity financing and document the importance of the shareholders' liquidity position. Unlike new debt, retained earnings may be the most valuable funding source, particularly for smaller private firms with severe adverse selection problems (Leland and Pyle 1977; Myers and Majluf 1984). Thus, personal liquidity shocks to the controlling shareholder may hurt the firm's cheapest financing source by forcing retained earnings out of the firm.

While the entrepreneurship literature studies how the birth of firms depends on new financing (Hurst and Lusardi 2004; Andersen and Nielsen 2012; Schmalz et al. 2017; Hombert et al. 2020; Ring 2023), we study existing firms with a given financing. This approach allows us to analyze how shocks to shareholders change firm behavior when ownership and managerial talent remain unchanged. Moreover, while this entrepreneurship literature (Bernstein, McQuade, and Townsend 2021) analyses link between worker productivity and shocks to shareholder wealth, which may also involve shocks to shareholder liquidity, we zoom in on shocks to shareholder liquidity. These properties of our approach allow for a cleaner test of how shareholder illiquidity per se might influence the firm. Also, while the entrepreneurship literature studies shocks to the firm's local economy, we measure the shocks at the individual shareholder level. This approach allows for a more precise measurement of the shock and richer controls for other personal characteristics that may matter for the shareholder's response, such as personal wealth, liquid assets, and debt.²

Our second contribution is to show that even taxes that are strictly personal may matter for firm behavior. This relationship is underexplored in the literature, which has studied only how personal capital income taxes relate to the firm's capital structure, dividend, and investment decisions (Graham 1999; Chetty and Saez 2006, 2010; Desai and Jin 2011; Becker, Jacob, and Jacob 2013; Colombo and Caldeira 2018). While these taxes depend directly on the firm's decisions, we analyze taxes the firm cannot influence. Thus, we study how the firm responds to taxation that is exogenous to the firm's cash flow and value.

Correspondingly, Tsoutsoura (2015) shows that succession taxes have real effects. However, succession happens to only a few owners, at their discretion, and changes the firm's ownership. In contrast, the event we analyze affects most owners, happens at a time they cannot decide, and leaves ownership unchanged. Our approach allows us to separate ownership channel from the managerial talent channel and test the first one. Also, while

² Giroud and Rauh (2019) examine the effect of taxation on small firms, studying business taxation rather than personal taxation. Jacob (2021) looks at dividend taxation and firm productivity.

succession taxes depend on the value of the firm, the wealth tax shock we study does not. Thus, unlike the succession tax, the tax on residential real estate is strictly personal.

Third, we contribute to the recent literature on the merits of wealth taxation (Piketty 2013; Fagereng et al. 2016; Fisman et al. 2017; Guvenen et al. 2019; Zucman 2019; Saez and Zucman 2019; Jakobsen et al. 2020), and to the political debate on a possible wealth tax in the United States and elsewhere (Chassany, 2017; Greeley, 2019; Barrett, 2024; Johnston, 2025; Zucman 2024). Our results suggest that any wealth tax system should carefully consider the implicit link between the owner’s non-firm assets and the firm’s financial constraints. A recent report from the OECD (2018) shows that analyses of optimal tax policy often ignore this link. Our results also suggest that restricting the wealth tax base to just real estate, which France does (Chassany 2017), will not avoid negative side effects on the firm. Moreover, the wealth tax literature mostly studies inequality effects of the wealth tax (Saez and Zucman 2019; Zucman 2019), its efficiency relative to capital income taxes (Guvenen et al. 2019), and behavioral responses based on asset allocation (Durán-Cabré, Esteller-Moré, and Mas-Montserrat 2019; Jakobsen et al. 2020; Brühlhart et al. 2021). In contrast, we analyze liquidity effects, which have received very little attention in the literature (Bastani and Waldenström 2018). We confirm that a wealth tax can generate “liquidity problems for some moderately wealthy taxpayers with few liquid assets and limited cash incomes” (Saez and Zucman 2019). Our result suggests the negative spillover from shareholder illiquidity to firm behavior might be mitigated by increasing the wealth-tax payment threshold rather than excluding corporate assets from the tax base.

Our results apply internationally. While rare globally, the personal wealth tax is not the only tax that must be paid regardless of personal income and liquidity.³ This principle also applies to property taxes, which are widespread and an important source of tax revenue (OECD 2019).⁴ Recent policy recommendations propose an increased use of property taxes because of their moderate distortionary effects and “potential gains to inclusive growth” (OECD 2018). The Norwegian wealth tax system offers a quasi-natural experiment to assess this idea. Our results, which are likely to be valid in any country with property taxes, suggest

³ France, Iceland, Lichtenstein, Norway, Luxembourg, and Switzerland have a personal wealth tax system, while the system was recently abolished in Denmark, Finland, Germany, Netherlands, and Sweden. The Norwegian wealth tax revenue in 2017 was NOK 15 billion, which was 4.3% of total tax revenue from persons.

⁴ Property taxes were on average 1.94% of GDP in OECD countries in 2017, up from 1.75% in 2000. The proportion was higher in the United Kingdom, France, and the United States, and lower in Norway (1.27%).

that one should carefully consider the distortive effects on firm liquidity, investment, growth, and performance.

Finally, we uncover a novel determinant of cash holdings in private firms, where the lack of a liquid equity market may make cash particularly important (Gao, Harford, and Li 2013). We show that the controlling shareholder's personal liquidity needs spill over to the firm's cash holdings. Because most private firms are majority owned (Berzins, Böhren, and Stacescu 2018), the new cash determinant we find may apply to most firms in the economy.

Although the liquidity shock is small for the average household in our sample, the shock is quite large for many households. For instance, the increased wealth tax payments over the five years of tax hikes are up to 5% of the initial liquid assets for 25% of the controlling families, up 20% for 10% of them, and at least 450% for 1% of them. Therefore, the increased wealth tax is economically significant for a notable part of our sample, providing us with sufficient variation for the empirical tests.

We describe the Norwegian wealth tax system in Section 2, present the data in Section 3, and show summary statistics in Section 4. We present difference-in-difference results, including extensions and robustness tests, in Section 5. We conclude in Section 6.

2. The Norwegian Wealth Tax System

The tax base for the wealth tax is the person's net assets (i.e., personal assets less personal debt) above a standard exemption threshold. The assets include shares, bonds, bank savings, and residential real estate. Bank savings, listed shares, and other traded securities are valued at their year-end market value. The tax base for nonlisted shares in year t is based on the book value of the firm's assets and liabilities at the end of accounting year $t - 1$.⁵

Until 2009, residential real estate had a conventional value set by local authorities based on the historic construction cost. The system was changed in 2010 to one where the tax base depends on local transaction prices. Because the tax rate was 1.1% during the entire sample period, the tax shocks in our sample work exclusively through the changes in tax-value rules.

⁵ Because we study private firms where a family owns more than 50% of the equity, the firm's net assets are included in the family's tax base at their book value (except for real estate, where the valuation follows the same rules as for personal real estate owners). The controlling owner may also own shares in listed firms, which we count at market value and include in the family's liquid wealth.

While the tax value of a personal home has historically been far below the market value, two changes in tax-value rules in our sample period reduced the gap. First, starting in 2006, successive upward adjustments were applied to existing tax values across the board. Specifically, the tax value was increased by 25% in 2006 and by 10% annually in 2007, 2008, and 2009, producing a cumulative increase of 67%. Second, in 2010 the tax value based on historic cost was replaced by a value based on local transaction prices of similar homes. As we show below, this switch to market-based valuation produced, once again, a large increase in tax value. We also show that the tax value grew faster than the market value from 2006 on, and that the increased tax value was unrelated to economic growth. Thus, the wealth tax shock was independent not just of wealth shocks coming from the person's ownership in the firm, but also of the market value of the home and the overall economy.

The third significant change in the wealth tax system was a gradual increase in the standard deduction from NOK 120,000 in 2001 to NOK 700,000 in 2010.⁶ As a result, many households that used to pay very small amounts of wealth tax paid nothing by the end of the sample period. The change mattered more for the number of households paying than for the payment per household. Therefore, the overall effect of the three tax-code changes was that middle-class households, which are more likely to own firms and more likely to own valuable homes, paid increasing amounts of wealth tax. The increased tax value of residential real estate had a relatively small effect at the top of the wealth distribution. This is because the home of the wealthiest individuals represents a small proportion of their assets, which are mostly listed and nonlisted equity (Fagereng et al. 2020). Indeed, we show below that there is a negative correlation between the relative importance of the shock coming from the changes in real estate values and the firm owners' overall wealth. Therefore, our findings are not driven by wealth tax shocks to the wealthiest shareholders in the economy.

The increases in tax value were announced in advance. For instance, the increase for 2006 was announced in September 2005, while the increase for 2009 was announced in October 2008. Despite the resulting opportunity to respond to the tax shock before it became effective, the incentives and the ability to do so were weak. First, because the home is among the most tax-advantaged assets even after the increase in its tax value, selling the home and replacing it by another asset type will likely increase the tax base. Second, because the shareholder needs a place to live, selling the home and instead renting may generate large transaction costs.

⁶ The average exchange rates in 2010 were 1 USD = 6.04 NOK and 1 EUR = 8.01 NOK (Source: Norges Bank).

Tax evasion through underreporting may be a concern for wealth taxes (Saez and Zucman 2019; Durán-Cabré, Esteller-Moré, and Mas-Montserrat 2019), but should not be important in our study. First, the Norwegian wealth tax system relies mostly on third-party reporting (Fagereng et al. 2020). Residential real estate values are assessed by local tax authorities, while financial intermediaries report the liquid assets. Also, all limited-liability firms had to submit audited accounts during our sample period, making the reported equity holdings in private firms unusually reliable. Second, tax evasion primarily happens at the top of the wealth distribution (Alstadsæter, Johannesen, and Zucman 2019). Unlike wealth taxes in other wealth tax systems, however, such as in Denmark (Jakobsen et al. 2020), the Norwegian wealth tax affects not only the very rich, but also a large proportion of moderately wealthy households. Our sample covers every controlling owner of private firms, including owners with low wealth and small firms. We show that almost half the owners paid wealth tax even after the exemption threshold was increased to NOK 700,000 in 2010.

A new system for capital income taxation implemented in 2006 increased the tax rate on dividends received by personal shareholders from 0% to 28%. Dividends decreased strongly, the average payout ratio in our sample firms dropping from 49% before 2006 to 13% after. The dividend tax reform was announced in 2004, triggering quite volatile payout levels (Alstadsæter, Kopczuk, and Telle 2014). There were very large dividend payments prior to the introduction of the increased tax rate, based not just on current earnings, but also accumulated cash reserves. Some of the dividends were returned into the firm as paid-in capital, which can be withdrawn tax-free even under the new tax regime. Following the introduction of the tax, dividend payments were extremely low in the first year and stabilized at a low level following that. Cash savings switched from the personal level to within the firm. We illustrate this short-term volatility in Figure A1 in the Appendix, which also shows cash being accumulated mostly at the personal level before the tax reform and mostly at the corporate level afterwards. To address the noise introduced by the tax reform in the cash flows and cash holdings at the personal and corporate levels, we use the total liquidity available to the firm owner as our main variable. It is calculated as the sum between the personal holdings of liquid assets (cash, bank savings, listed securities) and the cash holdings of the firm multiplied by the ownership share of the controlling family.⁷

⁷ Dividends and capital gains are taxed at the same rate for all investors and years under both the old and the new dividend tax system. Because we find evidence of repurchases in less than 1% of the firm years, capital gains taxes are largely irrelevant for our study.

Overall, tax regulations in our sample period imply that the wealth tax shocks we study are unrelated to the firm, unrelated to the shareholder's personal liquidity, and difficult to avoid. Because the tax changes have not been reversed, the increased tax values are also persistent, generating higher wealth tax payments every year once installed.

3. Data

The data set covers the period 2001–2010.⁸ Our dating system uses the accounting year rather than the payment year, which is the year after the accounting year. Thus, the wealth tax for year t is paid in year $t + 1$ based on assets and debt at the end of year t .⁹ Moreover, the dividends we report for year t are paid out in year $t + 1$. We apply several filters to build the sample of economically active firms from the population of all firm with limited liability:

1. We exclude financial firms to avoid the impact of special accounting rules, capital requirements, and caps on ownership concentration.
2. We require positive sales, assets, and employment to avoid inactive firms. We ignore the smallest 5% of firms by assets, sales, and employment to avoid passive firms.
3. We exclude subsidiaries in deep business groups to avoid dividends distorted by special tax rules for cash transfers between group members. The exception is subsidiaries owned through a single holding company with no significant economic activity.
4. We include only firms where a wide family (persons related up to the fourth degree of kinship) owns more than 50% of the shares measured by ultimate (i.e., direct plus indirect) ownership. We restrict our attention to firms with a controlling family to ensure that one household can single-handedly make the financing and investment decisions. The family's gross assets must be at least NOK 10,000.

We match firm data with data on the firm's largest nuclear family (parents and underage children) by ownership and the family's tax return data, which contains details about the family's capital and labor income, assets, liabilities, and wealth tax payments. We measure the annual change in the tax value of the family's home over the period 2006–2010.

⁸ Accounting, ownership, and board data are delivered by Experian (www.experian.com). The data on family relationships are from Skattedirektoratet (www.skatteetaten.no), and the personal tax return data are from Statistics Norway (<https://www.ssb.no/>), both of which are state agencies. All data items were received electronically and stored by the Centre for Corporate Governance Research (www.bi.edu/ccgr).

⁹ If the asset is shares in a private firm, the tax value is based on the net asset value at the end of year $t - 1$.

We estimate difference-in-difference regressions using the period 2001–2010. We define the treatment group as the firms where the controlling family owns a home in 2005, which means the personal liquidity is likely to be affected by the tax changes in 2006–2010. The control group includes the remaining firms, which are majority-owned by a family that does not own a home. We compare the period when the treatment group is affected by the tax changes (2006–2010) with the prior period (2001–2005).

The sample period overlaps with the global financial crisis, but the effect on the Norwegian economy was small because of high oil prices. The dip in GDP was just -1.0% in the last quarter of 2008, -0.8% in the first quarter of 2009, and payout ratios remained quite stable. Nevertheless, we use year fixed effects to account for economic cycles.

4. Summary Statistics

Our first step in documenting the importance of the personal wealth tax for the firm's controlling shareholder is to measure the wealth tax amount due and relate it to the ability to pay. Along these lines, Table 1 shows annual descriptive statistics for all controlling families selected by the sampling criteria from Section 3. Panel A shows that these families are the majority shareholder in 22,907 firms on average per year.

Table 1

The average wealth tax paid per family increases from NOK 18,991 in year 2001 to NOK 34,551 in 2006 and to NOK 47,839 in 2010, representing an 152% nominal growth over a decade (125% real growth). The amounts and the growth are much larger for wealth-tax-paying families owning their home than for families not owning a home: The average amounts are NOK 51,321 and 36,948, respectively, while the growth rates are 214% and -22%, respectively.¹⁰ The proportion of controlling shareholders owning a home remains high and stable, being 86.4% on average.¹¹

The threshold triggering wealth tax payments was gradually increased over the sample period. Panel B shows that, as expected, the increasing threshold is accompanied by a

¹⁰ The atypically low mean wealth tax payment for families with residential real estate in 2005 may be due to missing observations for a few families with unusually high wealth.

¹¹ Norway has a high proportion of homeownership. For instance, the homeownership rate was 83% in 2010, while it was 71% in the EU (Source: Eurostat).

decreasing proportion of families paying wealth tax. For instance, while 66.4% of those owning their home pay wealth tax in 2001, only 57.2% do so in 2010.

Panel C measures the wealth tax burden by relating the wealth tax payment to the controlling family's liquid assets (cash, bank accounts, and listed securities). The change in this wealth-tax-to-liquidity ratio is our main proxy of the shareholder's wealth tax shock. The ratio in 2010 is on average 2.7% for families owning a home, 2.3% for families not owning a home, and 3.8% for home-owning families who also pay wealth tax. 10% of wealth tax payers that own a home have a ratio of at least 13.1% compared to 10.9% for the top 10% wealth tax payers without residential real estate.

Figure 1 illustrates the evolution of wealth tax payments for controlling families that were homeowners in 2005 compared to those who were not. It shows a downward parallel trajectory of wealth tax payments relative to the owner's liquid assets prior to 2006, and a gradual upward trend afterwards which is more pronounced for homeowners. There is therefore an increasing tax pressure on personal liquidity, stronger in the case of homeowners, starting from 2006. The pattern is confirmed when we restrict our attention to just wealth tax payers, excluding owners that fall below the tax threshold.

Figure 1

Table 2 presents an overview of residential real estate as part of firm owners' wealth. It shows that the tax value of residential real estate increases every year after 2005 to a median of NOK 787,586 in 2010. The nominal (real) growth rate in 2001–2010 is 126% (89%). The median annual growth in any year during 2001–2009 is exactly equal to the standard change in tax value given by the tax rules: An increase of 15% in 2001, a decrease of 5% in 2003, and increases of 25%, 10%, 10%, and 10% in 2006, 2007, 2008, and 2009, respectively. In fact, a change in tax value exactly equal to the standard change represents about three quarters of the cases. This pattern reflects that most families own just one home and remain there rather than move to another.

Table 2

Figure 2 compares the indexes for the tax value, the market value, and the standard change in tax value of residential real estate, finding that the paths of tax values and market values are quite different.¹² While market values grow steadily, tax values grow much more

¹² We measure market value as market price per m² for residential real estate (Source: Statistics Norway).

from 2005 on, when the regulator started increasing the tax value every year. This pattern suggests that changes in tax values and market values are largely unrelated.

Figure 2

The impact of the personal tax shock at the personal and corporate levels may depend on family and firm characteristics. In the following table, we compare mean characteristics for controlling shareholders with and without residential real estate in 2005.

Table 3

Controlling families with residential real estate own more assets (gross wealth) than do those without (mean of NOK 4.03 mill. vs. 2.70 mill.). Their net wealth is also larger (NOK 2.39 mill. vs. 1.50 mill.), their assets are less liquid (liquid assets to gross assets is 0.36 vs. 0.48).¹³

The firm's financing and investment behaviors may depend not just on the controlling owner's liquidity, but also on characteristics of the firm. Table 3 shows that firms controlled by families who own vs. do not own their home are slightly larger (mean sales of 7.66 mill. vs. 6.39 mill. NOK), older (13.2 years vs. 11.8 years), less leveraged (total-liabilities-to-assets ratio of 0.76 vs. 0.8), and more profitable (return on assets of 11% vs. 8%), while the assets are less tangible (tangible assets to gross assets of 0.22 vs. 0.26).

Although the median firm pays no dividends regardless of whether the controlling family owns its home, the mean dividends-to-earnings ratio is higher for homeowners (0.03 vs. 0.02¹⁴). This tendency is also reflected in the sum of dividends and salary paid to the family: Measured as a fraction of earnings plus salary, the mean of this ratio is higher when the family owns its home (0.55 vs. 0.5), even though the difference is not economically large.

In the difference-in-difference regressions described in Section 5 we will use dependent variables in logs to estimate semielasticities. We present the mean values of those variables for 2005 in the final section of the table. As expected, we find higher values for the log of wealth tax payments, total liquidity (calculated as the sum between the owner's personal liquid assets – cash, bank savings, listed securities – and the owner's proportional share of the

¹³ Mean family leverage exceeds 100% because some assets, such as real estate and shares in private firms, have a tax value below the market value, while debt is normally closer to market value.

¹⁴ Note that 2005 was a year with particularly low dividend payments, as illustrated by Figure A1 in the Appendix.

firm's cash holdings), firm revenues, fixed assets, and employment, as well as for the return on assets. However, the differences are not very large from an economic point of view.

In Table 4 we take a closer look at the link between the wealth tax increases coming from the change in tax valuations, the owner's personal liquidity and overall wealth, and cash payments from the firm to the owner. In order to illustrate the magnitude of the tax shock, we compare the cumulative amount of additional wealth tax coming directly from the increase in the tax value of residential real estate during 2006-2010 on the one hand to the firm owners' personal liquid assets at the end of 2005 on the other hand. This measure shows us how much of the owners' liquidity reserves would be consumed by the higher tax liability. We take the increase in the conventional tax value and apply the 1.1% rate to it to get the tax payment. Note that the effect is cumulative: since the tax increase is persistent, it triggers higher wealth tax payments in all subsequent years. To get a clean measure in our exercise and avoid noise coming from real estate transactions and renovations, we carve a subsample where the tax value of residential real estate increases exactly by the standard percentage (25% in 2006 and 10% in each of the three subsequent years), and for 2010 we restrict our attention to cases where the change was between NOK -100,000 and NOK +500,000.

Table 4

Panel A shows that the cumulative-wealth-tax-to-initial-liquidity ratio is up to roughly 5% for 25% of the families, up to 20% for 10% of them, and above 450% for 1% of them. This shows that, while there is a large amount of variation, the increased wealth tax payments coming directly from the automatic increase in real estate tax values take up an economically significant share of the owners' preexisting liquidity for a notable part of our sample. Panel B shows mean and median family wealth in different percentiles of the cumulative-wealth-tax-to-initial-liquidity distribution. The numbers reflect that the owners affected the most are not the richest. Rather, exposed owners tend to have moderate wealth. For instance, while average wealth is 3.4 mill. NOK for families in the 25th–50th percentiles of the distribution, average wealth is only 1.8 mill. in the 50th–75th percentiles.

Panel C takes examines the relationship between the shareholder's tax shock and the cash flow from the firm to the shareholder. We look at the years starting from 2006, with successive increases in tax valuations, and also with a stable and high tax rate for dividend payments. We compare two groups: one of them highly exposed to the tax shock, and the

other largely unexposed. Shareholders in the first group are homeowners, pay wealth tax in 2005, and are in the top 10% of the distribution of the cumulative-wealth-tax-to-initial-liquidity ratio. Shareholders in the second group either do not own their home or are not wealth-tax payers in 2005, and are not in the top 10% of the cumulative-wealth-tax-to-initial-liquidity distribution. The table shows the mean and median for the dividends-to-earnings ratio, the proportion of dividend payers, and the dividends-and-salary-to-earnings-before-salary ratio. The latter ratio is calculated by dividing the dividends and salaries received by controlling owners by the firm's earnings gross of salary payments. The numbers show that shareholders in the first group, where the tax-driven liquidity drain is the larger, receive more cash from the firm. For instance, the average shareholder's dividend and salary is 70.1% of earnings before salary in the first group and 65.8% in the second group. Thus, it seems personal tax shocks are propagated as shocks to the firm's liquidity, and more so the larger the tax drain on personal liquidity.

Summarizing this section, we find that fewer controlling owners of family firms pay wealth tax over time, that those who do pay, pay increasingly more relative to their liquid wealth, and that this effect is strongest for families owning their home. The tax value of the home usually increases by exactly the standard rate. The tax increase is often large relative to personal liquidity for shareholders with moderate wealth, and we also find that a high relative shock is associated with larger cash payments to the owners in the post-2006 period. Compared to controlling families that do not own their home, those that do own have on average more assets and also have a larger net wealth. That is why in our difference-in-difference tests we also match the two groups on wealth and personal leverage. .

5. Difference-in-Difference results on Wealth Tax Payments, Liquidity, and Real Effects on the Firm

5.1. Main Variables

The increased tax valuations are likely to have led to higher wealth tax payments. In the presence of financial frictions, that can reduce the liquidity available to the firms and have a negative real effects on the firm, such as lower profitability and growth. We test this chain of effects using a difference-in-difference specification:

$$Lnwealthtax_{it} = \alpha + \beta_1 Homeowner \times After\ 2005 + Year_t + f_i + \varepsilon_{it} \quad (1)$$

$$Lnliquidity_{it} = \alpha + \beta_1 Homeowner \times After\ 2005 + Year_t + f_i + \varepsilon_{it} \quad (2)$$

$$Lnsales_{it} = \alpha + \beta_1 Homeowner \times After\ 2005 + Year_t + f_i + \varepsilon_{it}, \quad (3)$$

where i is the firm, t is time, $Year_t$ is year fixed effects, f_i is firm fixed effects, ε_{it} is the residual. *Homeowner* is a dummy variable equal to 1 if the controlling shareholders owned residential real estate in 2005 (our treatment group) and 0 if they did not (our control group). *After 2005* is a dummy variable equal to 1 for the years between 2006 and 2010 and 0 for the years between 2001 and 2005.

Our first dependent variable is *Lnwealthtax*, the log of the controlling shareholder's wealth tax payment, inflation adjusted in 2005 kroner. It compares the evolution of wealth tax payments for the treatment and control groups after relative to before the introduction of successive revaluations of residential real estate.

The second dependent variable is *Lnliquidity*, our measure of the liquidity available to the controlling shareholders and their firm. It is calculated as the log of the sum between the controlling shareholder's personal liquid assets (cash, bank deposits, and listed securities) and the controlling shareholder's share of the firm's cash holdings, in 2005 kroner. The measure reflects the total liquidity available internally to the firms and their owners. We pool the liquidity available at the personal and the corporate level because the changes in the taxation of dividends prior to 2006 generated a high volatility of the cash flows between the firm and the owners. Given a zero tax rate on dividends prior to the steep increase to 28%, firm owners in our sample – most of them single owners – could easily switch the cash between the firm and their own personal accounts. There were very high payments before the dividend tax increase, very low payments immediately afterwards, and roundtrips where the dividends were reinvested as paid-in capital to ensure tax-free withdrawals following the tax increase. This pattern is illustrated in Figure A1 in the Appendix; it is the reason why our preferred pooled measure is more stable and avoids the noise coming from temporary tax optimization. If wealth tax payments increased more for owners with residential real estate compared to the control group, we expect their liquidity to decline in relative terms.

The third dependent variable is *Lnsales*, the log of the firm's revenues in 2005 kroner. In the presence of financial frictions, the drain on liquidity coming from higher wealth tax payments may reduce the firm's ability to invest in its growth. We use the firm's revenues as the most

broadly comparable measure of real effects across firms of different sizes and coming from different industries.

We include firm fixed effects to control for time-invariant differences between firms. As a robustness exercise, we also use industry-year fixed effects to control for different industry-specific shocks at different points in our time interval.

Table 5

Table 5 presents the results of our estimation. It finds that when the controlling shareholder is a homeowner wealth tax payments increase by 19% more in the period starting from 2006 compared to the case where the controlling shareholder is not a homeowner. The increase in the tax valuation of residential real estate therefore seems to create a significant wedge between the tax outflows from the two groups. The result is confirmed when we include industry-year effects.

The increased wealth tax payments seem to have a significant and persistent negative effect on the liquidity reserves of firms and their owners. On average, the level of liquidity decreases by 2% for homeowners compared to non-homeowners.

The lower liquidity coming from high wealth tax payments is also associated with lower firm growth. Compared to non-homeowning controlling shareholders, the sales of firms with controlling shareholders who are homeowners are 2% lower in the years with increasing tax valuations.

Figures 3, 4 and 5 plot the dependent variables over time. They show that the pre-2006 trends were quite similar for homeowning and non-homeowning shareholders, and that the trends begin to diverge following that. Thus the figures confirm the existence of parallel trends prior to the tax shock, as well as the importance of 2006 as a change point in the evolution of the treatment and control groups. As it may be expected from a gradual series of tax increases, the gap between the two groups is getting larger over time.

Taken together, these results show that firm owners with residential real estate did indeed pay more in wealth tax starting from 2006, that the liquidity available to them and their firms was lower, and that the growth of their firms was slower. This emphasizes the close link between personal and corporate liquidity in private firms, as well as the importance of financial constraints for those firms.

As shown in Tables 1 and 4, there is significant variation in the importance of wealth tax payments for various firm owners. Around four out of ten are under the net wealth threshold required to pay the tax – but 10% of them paid at least 3% of their personal liquidity in wealth tax even in 2005. We expect the increase in residential real estate valuations to be less of a concern for the former group – while at the same time it can be an important shock for firm owners above the wealth tax threshold.

Table 6

Table 6 presents the results of our difference-in-difference tests for two subgroups: firm owners that were wealth tax payers in 2005, prior to the increase in tax values (Panel A) and firm owners that were not wealth tax payers at the same point in time (Panel B).

Panel A shows that, as may be expected, firm owners that were already above the threshold are significantly affected by the tax changes. Compared to tax-paying controlling shareholders without residential real estate, tax-paying owners with residential real estate paid 27% more in wealth tax in the 2006-2010 period. The liquidity available to them at the personal and corporate level was 2.7% lower, and the revenues of their firms were 3.3% lower. The effects go in the same direction and are larger than the baseline results using the entire sample in Table 5.

Panel B presents the results for the difference-in-difference estimation comparing owners with and without residential real estate that did not pay wealth tax in 2005. While the signs of the coefficients go in the same direction, the size of the coefficients is small and they are almost always insignificant. For shareholders below the threshold, the tax valuation increases were not large enough to bring them above the line or to induce large enough tax payments to significantly affect the firms and their owners.

5.2. Additional Measures of Real Effects

We chose sales as the main measure for potential real effects on the firm because they are the most easily comparable measure across firms of different sizes and from different industries. However, the real effects on the firm may have also been noticeable in terms of other items, such as the investment in fixed assets, employment in the firm, or profitability.

In a further round of tests, we use similar specifications to equations (1)-(3) above, but we use the log of the firm's fixed assets in 2005 kroner, the log of the firm's total number of employees, as the firm's return on assets as dependent variables. We run the difference-in-difference regressions with those additional variables and present the results in Table 7.

Table 7

We find some evidence that the fixed assets of firms with homeownership owners were relatively lower in the 2006-2010 period compared to non-homeownership owners. There is also evidence of significantly lower employment (by around 2 percent), as well as a slight, but statistically significant relative reduction in profitability measured as the return on assets.

Table A1 in the appendix presents the results for the two subgroups: firms where the controlling owners were wealth tax payers at the end of 2005 and firms where they were not. We find significant negative effects on fixed assets, employment, and profitability in the subsample of tax payers, where the effects should be stronger. In contrast, all coefficients are statistically insignificant in the subsample of nonpayers, where the increase in tax valuations may be insufficient to bring the owners above the threshold for the wealth tax, or may just induce relatively low tax payments.

5.3. Matching Results

Beside capturing the likelihood of larger or smaller impacts from the increase in tax valuations, the split into wealth tax payers and nonpayers also reduces the small gap between homeowners and non-homeowners in terms of wealth outlined in Table 3. We can go further and increase the comparability of the treatment and control groups by running the difference-in-difference analysis on matched samples.

Table 8 presents results using coarsened exact matching. Panel A matches firms with homeownership and non-homeownership controlling shareholders that are in the same percentile of gross wealth. Since there is a wide dispersion of the wealth levels in both groups, there are matches for the vast majority of observations.

Table 8

The results largely confirm our base-case findings in Table 5. The coefficient in the first regression, where the log of the wealth tax payment is the dependent variable, is slightly lower than in Table 5 and indicates an increase between 13% and 16% depending on the fixed effects which are included. This is not very surprising given that business owners with residential real estate are slightly wealthier on average, more likely to pay the wealth tax, and that may result in increasing taxable wealth and wealth tax payments over time. However, the matched results indicate that when the differences in wealth are taken into account we still have a large and economically and statistically significant effect. The coefficient in the second regression, with liquidity as the dependent variable, is quite similar to the baseline in Table 5, while the estimated effect on sales in the third regression is if anything slightly larger.

In Panel B the treatment and control firms are matched on both the percentile of gross wealth and the percentile of personal leverage of the controlling shareholder. This reflects the idea that the wealth tax payments of the shareholders depend both on their total, gross wealth and their leverage given that the tax base deducts personal liabilities. Results are again similar to the baseline, with slightly lower coefficients for the wealth tax payments.

Panel C uses coarsened exact matching on percentiles of gross wealth to check the robustness of the findings in Table 7 that look at the impact on fixed assets, employment, and profitability. The results for fixed assets and employment are quite similar to those in the previous table. However, the small negative impact on profitability becomes insignificant.

Panel D uses matching on both gross wealth and personal leverage. Results are quite similar using this alternative matching, with fairly large and negative effects on fixed assets, negative and significant effects on employment, and insignificant effects on profitability.

Propensity score matching is an alternative matching strategy, and makes it easier to include several matching characteristics – with the caveat of potentially less precise matches.

Table A4 in the Appendix presents the results of difference-in-difference estimation with kernel-based propensity score matching.

Table A4

Panel A shows the results when we match just on the owners' gross wealth. While the coefficient in the wealth tax regression is again smaller, the overall picture is quite similar to our base case.

Panel B matches both on gross wealth and on personal leverage, since both are important for wealth tax payments. The results are again confirmed, with a slightly increased coefficient for wealth tax payments.

Finally, Panel C matches both on owners characteristics (gross wealth, personal leverage, and personal liquid assets) and on firm characteristics (firm size measured by revenues and firm age¹⁵). Using this broader set of matching variables, results are again largely unchanged.

5.4. Controlling for Market Real Estate Prices

As shown in Figure 1, the evolution of market residential real estate prices was quite different from that of tax values. The levels were also different, and they only started to converge starting from 2010. Therefore the effects that we capture are unlikely to be related to the evolution of market residential prices and capture for instance collateral effects (Schmalz, Sraer, and Thesmar 2017). However, to address the possibility of residual correlations between market and tax values, it may still be useful to include market prices as a control variable in our regressions.

Table A2

Table A2 in the Appendix includes market real estate prices measured using the index of contemporary prices per square meter for residential real estate transactions in the local area. Panel A includes the change in local market prices compared to the previous year. The coefficients on the additional measure are always insignificant, and the difference-in-difference coefficients are almost identical to our base case. Panel B presents results when we include market real estate prices in levels rather than percentage changes. As it can be expected from the literature on the collateral channel, higher levels of local real estate prices are associated with higher wealth tax payments, higher liquidity, and higher revenues. This link seems however to be orthogonal to the tax mechanism we examine. The difference-in-difference coefficients remain largely unchanged for all three dependent variables.

¹⁵ Firm size and firm age have been identified in the literature as important proxies for financial constraints (Hadlock and Pierce 2010).

Table A3 in the Appendix presents results including market real estate prices in the regressions looking at the other real effects proxies. Panel A includes the percentage changes in real estate prices, while Panel B includes the annual levels of local prices. The former is usually insignificant, while the latter only has a positive and significant link to profitability. The difference-in-difference coefficients confirm the negative impact on fixed assets and employment. For profitability, the coefficient is negative, economically small, but statistically significant in the regressions controlling for changes or levels of real estate prices.

6. Conclusions

We examine the causal effect of household finance on corporate finance, which is just starting to get attention in the economics and finance literature. We make this investigation by studying how the private firm behaves when the wealth of its controlling family becomes more illiquid after a wealth tax shock. This spillover effect on firm behavior is relevant for any tax that must be paid independently of the taxpayer's liquidity, income, and consumption, such as the property tax.

Importantly for identification, the wealth tax shock we analyze is independent of the shareholder's income and liquidity and also of the firm's situation. Although the shock is small for most households in our sample, the shock is large for quite a few with moderate wealth, which provides us with sufficient variability.

We find that the higher personal wealth tax payments are associated with a 2% lower liquidity available to the affected group compared to the control group. This propagates into real effects on the firm. We find that the sales of firms with affected owners are 3% lower, and also find evidence of lower investment in fixed assets, employment, as well as some evidence of lower firm profitability.

Both findings suggest that household finance matters for corporate finance. Because the liquidity shock to the shareholder is normally modest, the relationships we find reflect that corporate finance may be sensitive to even small changes in household finance.

This evidence suggests that personal liquidity effects for the shareholder and financial and real effects for the firm should be analyzed jointly. This perspective is particularly important in private firms with concentrated ownership and moderate size, where both the owners' liquidity constraints and the firm's financial constraints are likely to be strong.

Our findings suggest that even moderate changes in personal taxes can have significant effects on the corporate sphere through the equity channel. This happens because the personal tax is draining liquidity away from the firm's shareholders, who use their control rights to partially fill the gap with a higher payout from the firm, which in turn reduces its investment, growth, and performance. These effects of shareholder illiquidity on the firm should be carefully considered when evaluating the merits of the wealth tax, which is receiving increasing global attention from policymakers. The tight relationship we identify between personal and corporate liquidity suggests that the negative spillover of personal illiquidity on

firm behavior could be made less severe by increasing the threshold for taxable wealth rather than excluding corporate assets from the tax base.

References

- Alstadsæter, Annette, Wojciech Kopczuk, and Kjetil Telle, 2014, Are closely held firms tax shelters? *Tax Policy and the Economy* 28, 1–32.
- Alstadsæter, Annette, Niels Johannesen, and Gabriel Zucman, 2019, Tax evasion and inequality, *American Economic Review* 109, 2073–2103.
- Andersen, Steffen, and Kasper Meisner Nielsen, 2012, Ability or finances as constraints on entrepreneurship? Evidence from survival rates in a natural experiment, *Review of Financial Studies*, 3684–3710.
- Banerjee, Suman, Vladimir A. Gatchev, and Paul A. Spindt, 2007, Stock market liquidity and firm dividend policy, *Journal of Financial and Quantitative Analysis* 42, 369–397.
- Barrett, Claer, Dan Neidle: ‘A UK wealth tax wouldn’t work’, *Financial Times*, September 3, 2024, <https://www.ft.com/content/1ed71bcb-e350-45ba-b1e1-fe9f8c3e370b>.
- Bastani, Spencer, and Daniel Waldenström, 2018, How should capital be taxed? Theory and evidence from Sweden, IZA DP 11475.
- Becker, Bo, Marcus Jacob, and Martin Jacob, 2013, Payout taxes and the allocation of investment, *Journal of Financial Economics* 107, 1–24.
- Shai Bernstein, Timothy McQuade, and Rick Townsend, 2021, Do household wealth shocks affect productivity? Evidence from innovative workers during the Great Recession, *Journal of Finance* 76, 57–111.
- Berzins, Janis, Øyvind Bøhren, and Bogdan Stacescu, 2018, Shareholder conflicts and dividends, *Review of Finance* 22, 1807–1840.
- Bjørneby, Marie, Simen Markussen, and Knut Røed, 2020, Does the wealth tax kill jobs? IZA Discussion Paper No. 13766.
- Brülhart, Marius, Jonathan Gruber, Matthias Krapf, and Kurt Schmidheiny, 2021, Behavioral responses to wealth taxes: Evidence from Switzerland, *American Economic Journal: Economic Policy*, forthcoming.
- Chaney, Tomas, David Sraer, and David Thesmar, 2012, The collateral channel: How real estate shocks affect corporate investment, *American Economic Review* 102, 2381–2409.
- Chassany, Anne-Sylvaine, Macron slashes France’s wealth tax in pro-business budget, *Financial Times*, October 24, 2017, <https://www.ft.com/content/3d907582-b893-11e7-9bfb-4a9c83ffa852>.
- Chetty, Raj, and Emmanuel Saez, 2006, The effects of the 2003 tax cut on corporate behavior: Interpreting the evidence, *American Economic Review* 96, 124–129.

- Chetty, Raj, and Emmanuel Saez, 2010, Dividend and corporate taxation in an agency model of the firm, *American Economic Journal: Economic Policy*, 1–31.
- Colombo, Jéfferson A., and João F. Caldeira, 2018, The role of taxes and the interdependence among corporate financial policies: Evidence from a natural experiment, *Journal of Corporate Finance* 50, 402–423.
- DeAngelo, Harry, Linda DeAngelo, and Rene M. Stulz, 2006, Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory, *Journal of Financial Economics* 81, 227–254.
- DeAngelo, Harry, Linda DeAngelo, and Douglas J. Skinner, 1992, Dividends and losses, *Journal of Finance* 47, 1837–1863.
- Desai, Mihir A., and Li Jin, 2011, Institutional tax clienteles and payout policy, *Journal of Financial Economics* 100, 68–84.
- Durán-Cabrè, José María, Alejandro Esteller-Moré, and Mariona Mas-Montserrat, 2019, Behavioral responses to the (re)introduction of wealth taxes. Evidence from Spain, IEB Working Paper 2019/04.
- Edmans, Alex, and Clifford G. Holderness, 2017, Blockholders: A survey of theory and evidence. In Hermalin, Benjamin E., and Michael S. Weisbach, *The Handbook of the Economics of Corporate Governance*, Volume 1. Amsterdam: Elsevier.
- Fagereng, Andreas, Luigi Guiso, Davide Malacrino, and Luigi Pistaferri, 2016, Heterogeneity in returns to wealth and the measurement of wealth inequality, *American Economic Review* 106, 651–655.
- Fagereng, Andreas, Luigi Guiso, Davide Malacrino, Luigi Pistaferri, 2020, Heterogeneity and persistence in returns to wealth, *Econometrica* 88, 115–170.
- Fama, Eugene F., and Kenneth R. French, 2001, Disappearing dividends: Changing firm characteristics or lower propensity to pay? *Journal of Financial Economics* 60, 1–43.
- Fisman, Raymond, Keith Gladstone, Ilyana Kuziemko, and Suresh Naidu, 2017, Do Americans want to tax capital? Evidence from online surveys, NBER Working Paper 23907.
- Frank, Murray Z., and Vidhan K. Goyal, 2009, Capital structure decisions: Which factors are reliably important? *Financial Management* 38, 1–37.
- Gao, Huasheng, Jarrad Harford, and Kai Li, 2013, Determinants of corporate cash policy: Insights from private firms, *Journal of Financial Economics* 109, 623–639.
- Gilchrist, Simon, and Charles Himmelberg, 1995, Evidence on the role of cash flow for investment, *Journal of Monetary Economics* 36, 541–572.

- Giroud, Xavier, and Joshua Rauh, 2019, State taxation and the reallocation of business activity: Evidence from establishment-level data, *Journal of Political Economy* 127, 1262–1316.
- Griffin, Carroll Howard, 2010, Liquidity and dividend policy: International evidence, *International Business Research* 3, 3–9.
- Graham, John R., 1999, Do personal taxes affect corporate financing decisions? *Journal of Public Economics* 73, 147–185.
- Greeley, Brendan, The wealth tax plan worrying US billionaires, , *Financial Times*, November 11, 2019, <https://www.ft.com/content/0bab153a-026b-11ea-b7bc-f3fa4e77dd47>.
- Grullon, Gustavo, Roni Michaely, and Bhaskaran Swaminathan, 2002, Are dividend changes a sign of firm maturity? *Journal of Business* 75, 387–424.
- Guvenen, Fatih, Gueorgui Kambourov, Burhanettin Kuruscu, Sergio Ocampo-Diaz, and Daphne Chen, 2019, Use it or lose it: Efficiency gains from wealth taxation, NBER Working Paper 26284.
- Hadlock, Charles J., and Joshua R. Pierce, 2010, New evidence on measuring financial constraints: moving beyond the KZ index, *Review of Financial Studies* 23, 1909–1940.
- Hombert, Johan, Antoinette Schoar, David Sraer, David Thesmar, 2020, Can unemployment insurance spur entrepreneurial activity? Evidence from France, *Journal of Finance* 75, 1247–1285.
- Hurst, Erik, and Annamaria Lusardi, 2004, Liquidity constraints, household wealth, and entrepreneurship, *Journal of Political Economy* 112, 319–347.
- Jacob, Martin, 2021, Dividend taxes, employment, and firm productivity, *Journal of Corporate Finance* 69, 1020–1040.
- Jakobsen, Katrine, Kristian Jakobsen, Henrik Kleven, and Gabriel Zucman, 2020, Wealth taxation and wealth accumulation: Theory and evidence from Denmark, *The Quarterly Journal of Economics* 135, 329–388.
- Jensen, Michael C., 1988, Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76, 323–329.
- Johnston, Ian, French Socialists threaten to topple government over wealth tax, *Financial Times*, October 24, 2025, <https://www.ft.com/content/1c8994b6-c538-46aa-aed4-072fb91e5dbb>.
- Miller, Merton H., and Franco Modigliani, 1961, Dividend policy, growth, and the valuation of shares, *Journal of Business* 34, 411–433.
- Mundy, Simon, Why wealth taxes are back in the spotlight, *Financial Times*, December 3, 2025, <https://www.ft.com/content/0c963768-cdb7-4f33-baaa-26900f791d9d>.

- Myers, Stewart C., and Nicholas S. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187–221.
- Piketty, Thomas, 2013, *Capital in the twenty-first century*, Cambridge, MA: Harvard University Press.
- Leland, Hayne E., and David H. Pyle, 1977, Informational asymmetries, financial structure, and financial intermediation, *Journal of Finance* 32, 371–387.
- Kerr, Sari, William R. Kerr, and Ramana Nanda, 2015, House money and entrepreneurship, NBER Working Paper 21458.
- Khwaja, Asim Ijaz, and Atif Mian, 2008, Tracing the impact of bank liquidity shocks: Evidence from an emerging market, *American Economic Review* 98, 1413–1442.
- OECD, 2018, Tax policies for inclusive growth: Prescription versus practice, OECD Economic Policy Paper No 24, December 2018.
- OECD, 2019, Tax on property (indicator), <https://doi.org/10.1787/213673fa-en> (accessed on 17 January 2019).
- Ring, Marius A., 2023, Entrepreneurial wealth and employment: Tracing out the effects of a stock market crash, *Journal of Finance* 78, 3343–3386.
- Saez, Emmanuel, and Gabriel Zucman, 2019, Progressive wealth taxation, BPEA Conference Draft, Fall.
- Schmalz, Martin C., David Sraer, and David Thesmar, 2017, Housing collateral and entrepreneurship, *Journal of Finance* 72, 99–132.
- Sraer, David, and David Thesmar, 2007, Performance and behavior of family firms: Evidence from the French stock market, *Journal of the European Economic Association* 5, 709–751.
- Tsoutsoura, Margarita, 2015, The effect of succession taxes on family firm investment: Evidence from a natural experiment, *Journal of Finance* 70, 649–688.
- Zucman, Gabriel, 2019, [Global Wealth Inequality](#), *Annual Review of Economics*, 11, 109–138.
- Zucman, Gabriel, 2024, [A Blueprint for a Coordinated Minimum Effective Taxation Standard for Ultra-High-Net-Worth Individuals](#), report commissioned by the Brazilian G20 Presidency, at <https://gabriel-zucman.eu/files/report-g20.pdf>

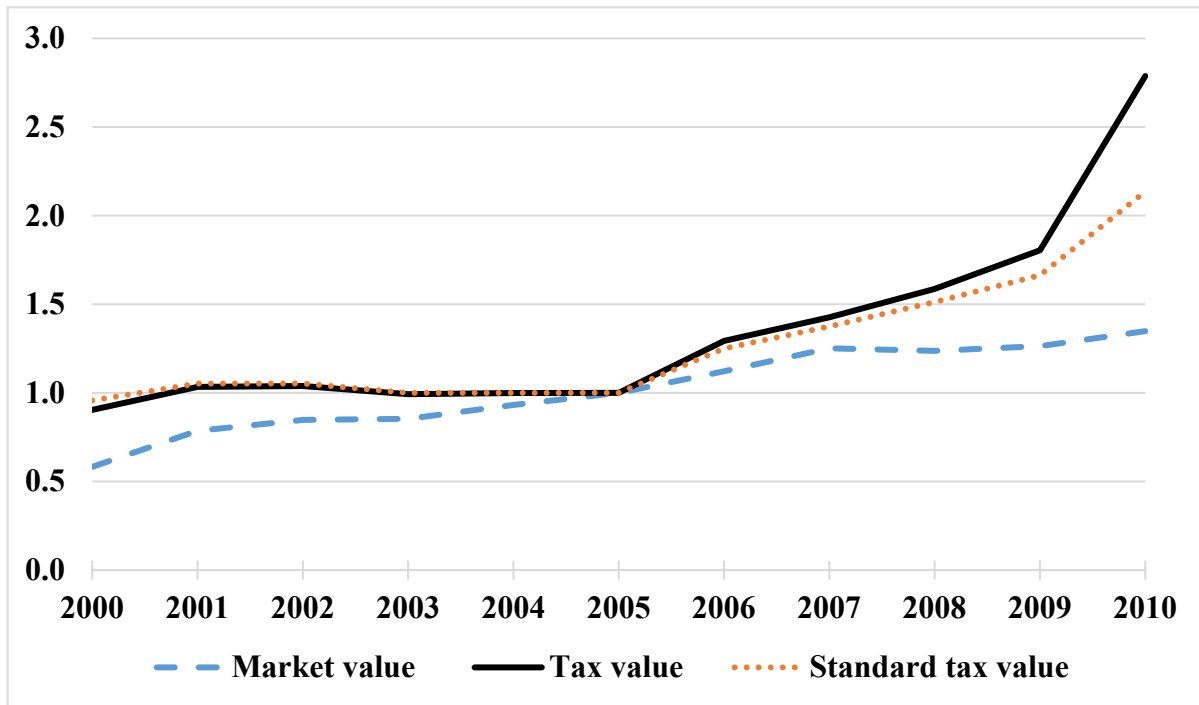


Figure 1: The change in the market value and tax value of residential real estate

This figure shows indexes of the market value and tax value of residential real estate (i.e., personal homes) owned by controlling families. The figure also shows the standard change in the tax value according to the tax rule change that year. The base year is 2005 (index value = 1). The year 2010 does not have a standard change and reflects the median change in tax value in our sample. The sample includes all active limited-liability firms in Norway where a controlling family holds more than 50% of the equity. The controlling family we study is the nuclear family (parents and their underage children). We exclude financials, business groups, holding companies, families with zero gross wealth, and the smallest 5% of firms by assets, sales, and employment. The source of the market values is Statistics Norway.

Table 1: The controlling family's wealth tax payments*Panel A. Mean wealth tax paid by the controlling family*

Year	All	Homeowner	Not homeowner	Homeowner; wealth tax payer	Not homeowner; wealth tax payer	Proportion homeowners	Number of firms
2000	35,284	38,418	19,361	60,571	39,166	83.6%	29,528
2001	33,769	36,728	18,813	57,559	37,524	83.5%	30,987
2002	39,123	43,175	17,437	69,044	35,714	84.3%	31,341
2003	40,708	45,416	14,477	74,979	30,001	84.8%	32,400
2004	53,111	59,372	16,875	101,364	35,701	85.3%	33,031
2005	30,308	32,428	18,533	56,746	38,563	84.7%	32,929
2006	57,004	62,131	24,074	111,296	50,465	86.5%	33,630
2007	54,904	60,435	21,319	111,828	45,987	85.9%	33,014
2008	55,693	60,792	24,121	111,505	51,373	86.1%	33,510
2009	57,100	62,660	18,946	116,863	44,152	87.3%	33,437
2010	66,245	71,099	27,571	144,061	76,898	88.8%	34,386
Average	47,568	52,059	20,139	92,347	44,140	85.5%	32,563

Panel B. Proportion of controlling families paying wealth tax

Year	All	Homeowner	Not homeowner
2000	61.1%	63.4%	49.3%
2001	61.6%	63.8%	50.1%
2002	60.4%	62.5%	48.8%
2003	58.7%	60.6%	48.3%
2004	56.9%	58.6%	47.3%
2005	55.8%	57.1%	48.1%
2006	54.7%	55.8%	47.7%
2007	53.0%	54.0%	46.4%
2008	53.5%	54.5%	47.0%
2009	52.3%	53.6%	42.9%
2010	47.8%	49.4%	35.9%
Average	56.0%	57.6%	46.5%

Panel C. The controlling family's wealth-tax-to-liquidity ratio

Year	All	Homeowner	Not homeowner	Homeowner; wealth tax payer	Not homeowner; wealth tax payer
2000	3.6%	3.7%	2.7%	5.9%	5.4%
2001	3.7%	3.8%	2.7%	6.0%	5.4%
2002	2.6%	2.7%	2.1%	4.3%	4.3%
2003	1.9%	2.0%	1.5%	3.3%	3.2%
2004	1.6%	1.6%	1.3%	2.8%	2.8%
2005	1.3%	1.3%	1.1%	2.3%	2.2%
2006	1.5%	1.5%	1.3%	2.7%	2.6%
2007	1.9%	2.0%	1.6%	3.7%	3.4%
2008	3.4%	3.5%	2.8%	6.4%	6.0%
2009	3.8%	4.0%	3.1%	7.4%	7.2%
2010	3.6%	3.6%	2.9%	7.4%	8.1%
Average	2.6%	2.7%	2.1%	4.7%	4.6%

This table shows summary statistics for wealth tax payments made by families who control our sample firms. The sample includes all active limited-liability firms in Norway where a controlling family holds more than 50% of the equity. The controlling family we study is the nuclear family (i.e., parents and their underage children). We exclude financials, business groups, holding companies, families with zero gross wealth, and the smallest 5% of firms by assets, sales, and employment. Panel A shows the mean wealth tax payments measured in NOK as of 2010 for all controlling families, controlling families that own and do not own their home, controlling families that own and do not own their home and also pay a wealth tax, and the proportion of controlling families that are homeowners. Panel B shows the proportion paying wealth tax among all controlling families, among controlling families that own their home, and among controlling families that do not own their home. Panel C shows the mean ratio of wealth tax payments to liquid assets (cash, bank deposits, and listed securities) for all controlling families, controlling families that own their home, do not own their home, and for controlling families owning and not owning their home and also paying wealth tax.

Table 2: The tax value of residential real estate

Year	Tax value (NOK)				Median change in tax value	Proportion homeowners with standard tax value change	Number of firms
	5 th percentile	Mean	Median	95 th percentile			
2000	74,800	352,145	305,700	770,308	9.8%	76.3%	24,673
2001	86,242	402,679	348,508	885,500	15.0%	76.6%	25,869
2002	85,388	404,612	349,970	890,970	0.0%	77.0%	26,407
2003	81,719	386,632	331,683	856,322	-5.0%	86.2%	27,470
2004	82,920	389,151	330,480	878,478	0.0%	73.7%	28,165
2005	82,920	389,590	328,695	878,846	0.0%	77.5%	27,904
2006	98,356	503,749	422,114	1,177,737	25.0%	72.8%	29,100
2007	109,058	555,664	461,065	1,298,825	10.0%	74.3%	28,346
2008	121,783	618,012	505,540	1,465,315	10.0%	75.5%	28,850
2009	134,505	702,955	575,830	1,674,352	10.0%	68.5%	29,184
2010	208,926	1,085,960	787,586	2,801,992	31.6%	56.8%	30,551

This table shows the evolution of the tax value of the home owned by families that control our sample firms and also own their homes. "Tax value" is the tax value of homes owned by the controlling family. "Median change in tax value" is the median percentage increase/decrease over the year in the tax value of homes owned by the controlling family. "Proportion homeowners with standard tax value change" is the fraction of controlling families whose tax value of their home changes by the percentage specified by the tax rule plus/minus 1% (2000–2009), or where the change in tax value is between NOK -100,000 and NOK +500,000 (year 2010). "Number of firms" is the number of firms in the sample. The sample consists of active limited-liability firms in Norway where a controlling family holds more than 50% of the equity. The controlling family we study is the nuclear family (i.e., parents and their underage children). We exclude financials, business groups, holding companies, families with zero gross wealth, and the smallest 5% of firms by assets, sales, and employment.

Table 3: Characteristics of the controlling family and the controlled firm

Summary statistics (2005)

	Homeowner		Not homeowner		Difference	P-value
	Mean	Std. Dev.	Mean	Std. Dev.		
<i>Family characteristics</i>						
Family gross wealth	4.03	29.13	2.7	23.34	1.33***	0.002
Family net wealth	2.39	23.78	1.5	21.03	0.89**	0.020
Family wealth tax	0.03	0.26	0.02	0.23	0.01**	0.016
Family leverage	1.16	1.46	1.46	1.98	-0.31***	0.000
Family residential real estate	0.39	0.29	0	0	0.39***	0.000
Family residential real estate to gross wealt	0.29	0.24	0	0	0.29***	0.000
Family liquid assets to gross wealth	0.36	0.25	0.48	0.32	-0.12***	0.000
Family wealth tax to liquid assets	0.01	0.02	0.01	0.02	0.00***	0.000
Total liquidity	2.52	14.17	1.63	4.45	0.89***	0.000
<i>Firm characteristics</i>						
Revenues	7.66	22.69	6.39	12.74	1.26***	0.000
Firm age	13.19	11.18	11.77	10.77	1.42***	0.000
Employment	5.64	10.92	5.05	7.23	0.58***	0.000
Fixed assets	1.24	6.49	1.38	5.66	-0.14	0.182
Cash to assets	0.28	0.24	0.24	0.22	0.03***	0.000
Firm leverage	0.76	0.25	0.8	0.26	-0.03***	0.000
Dividend payer	0.07	0.26	0.05	0.21	0.02***	0.000
Dividends to earnings	0.03	0.13	0.02	0.1	0.01***	0.000
Dividends and salary to gross earnings	0.55	0.32	0.5	0.34	0.04***	0.000
<i>Dependent variables</i>						
Wealth tax (logs)	5.64	4.87	4.86	4.71	0.78***	0.000
Total liquidity (logs)	13.64	1.5	13.23	1.55	0.41***	0.000
Revenues (logs)	1.56	0.94	1.47	0.9	0.09***	0.000
Fixed assets (logs)	10.26	5.13	10.51	5.05	-0.25***	0.005
Employment (logs)	1.54	0.75	1.48	0.72	0.05***	0.000
Return on assets	0.11	0.16	0.08	0.16	0.03***	0.000
Number of observations	22778		3644		26422	

This table shows summary statistics on controlling families and the firms they control in 2005. The sample includes all active limited-liability firms in Norway where a nuclear family (i.e, parents and their underage children) holds more than 50% of the equity. We exclude financials, business groups, holding companies, the families with zero gross wealth, and the smallest 5% of firms by assets, sales, and employment. the treatment group (Homeowner) consists of firm owners with residential real estate at the end of 2005 and the control group consists of owners without residential real estate at the same point. "Family gross wealth" is the family's total assets, "Family net wealth" is the family's total assets less its debt, "Family wealth tax" is the wealth tax payment for the family, "Family leverage" is the family's personal debt to gross wealth, "Family residential real estate" is the tax value of the family's home, "Family residential real estate to gross wealth" is the tax value of the family's home divided by the family's total assets, "Family liquid assets to gross wealth" is the family's cash, bank savings, and listed securities divided by gross assets, "Family wealth tax to liquid assets" is the family's wealth tax payments divided by its liquid assets. "Total liquidity" is the family's liquid assets plus the family's share of the firm's cash holdings. "Revenues" is the firm's sales. "Firm age" is the number of years since the firm was founded. "Employment" is the number of employees in the firm. "Fixed assets" is the book value of the firm's fixed assets. "Cash to assets" is the firm's cash holdings over the year divided by the firm's assets. "Firm leverage" is the ratio of the firm's liabilities to its total assets. "Asset tangibility" is the ratio of the firm's fixed assets to total assets. "Sales to assets" is the ratio of the firm's sales to assets. "Volatility of revenues" is the coefficient of variation of sales over the past three years. "Dividend payer" is 1 if the firm paid a dividend in 2005 and 0 otherwise. "Dividends to earnings" is the ratio of the firm's dividends to operating earnings. "Dividends and salary to gross earnings" is the sum of dividends and salary paid to the controlling family divided by the family's part of the firm's operating earnings plus salary. "Return on assets" is the firm's operating earnings divided by its assets. The absolute values are in million 2005 NOK. The ratios are winsorized at 97.5%, except for the return on assets, which is winsorized at 2.5% and 97.5%.

Table 4: The cumulative wealth tax shock and personal liquidity*Panel A. Percentiles of the cumulative-wealth-tax-to-initial-liquidity ratio*

	Percentile						
	10 th	25 th	50 th	75 th	90 th	95 th	99 th
The cumulative-wealth-tax-to-initial-liquidity ratio	0.00 %	0.27 %	1.16 %	4.86 %	19.81 %	49.32 %	455.96 %

Panel B. Average family wealth across the distribution of the cumulative-wealth-tax-to-initial-liquidity ratio

Percentile of the cumulative-wealth-tax-to-initial-liquidity ratio	Family gross assets (NOK)	
	Mean	Median
Below 25 th	6,581,654	2,712,037
25 th –50 th	3,385,088	2,309,856
50 th –75 th	1,796,310	1,244,298
75 th –90 th	1,206,891	804,778
90 th –95 th	1,001,106	648,792
95 th –99 th	855,753	577,097
Above 99 th	791,709	573,974

Panel C. Firm payout to shareholders with high vs. low liquidity shock

Payout measure	Homeowner, wealth tax taxpayer, above 90 th percentile of the cumulative-wealth-tax-to-initial-liquidity ratio		Not home owner or not wealth tax taxpayer, and below 90 th percentile of the cumulative-wealth-tax-to-initial-liquidity ratio		p-value for difference tests	
	Mean	Median	Mean	Median	Means	Medians
Dividends to earnings	14.67 %	0.00 %	12.53 %	0.00 %	0.009	0.001
Dividend payer	21.26 %	0.00 %	17.84 %	0.00 %	0.001	0.001
Dividends and salary to earnings before salary	65.79 %	73.92 %	61.70 %	70.05 %	0.004	0.052

This table shows summary statistics for the relationship between the cumulative wealth tax shock and the initial personal liquid assets across shareholders with different wealth. The sample period is 2006–2010. The sample includes all active limited-liability firms in Norway where a nuclear family (i.e. parents and their underage children) holds more than 50% of the equity and either does not own its home, experiences a standard change in the home's tax value plus/minus 1% (2006–2009), or where the change in tax value is between NOK -100,000 and NOK +500,000 (year 2010). We exclude financials, business groups, holding companies, the families with zero gross wealth, and the smallest 5% of firms by assets, sales, and employment. The tax shock is calculated by applying the 1.1% wealth tax rate to the increase in the tax value of the home and collecting the total for 2006–2010. The personal liquidity is calculated as the family liquid assets at the end of 2005. We call the ratio between the two the cumulative-wealth-tax-to-initial-liquidity ratio. Panel A shows percentiles of this ratio, while Panel B shows the mean and median family gross assets (as of the end of 2005) for various quantiles of the cumulative-wealth-tax-to-initial-liquidity ratio. Panel C shows the mean and median dividend payout measures for 2006–2010 for two groups. The first is homeowners who are wealth tax taxpayers and are above the 90th percentile of the cumulative-wealth-tax-to-initial-liquidity ratio. The second group consists of shareholders who are either not home owners or are not wealth tax taxpayers by the end of 2005, and who are below the 90th percentile in terms of the cumulative-wealth-tax-to-initial-liquidity ratio. "Dividends to earnings" is the firm's dividends to operating earnings. "Dividend payer" equals 1 if the firm pays dividends, and 0 otherwise. "Dividends and salary to earnings before salary" is the sum of dividends and salary paid to the controlling family divided by the family's part of the firm's operating earnings plus salary.

Table 5: Base case difference-in-difference results

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Wealth tax	Liquidity	Revenues	Wealth tax	Liquidity	Revenues
Homeowner* After 2005	0.178*** (0.0359)	-0.0200** (0.00998)	-0.0290*** (0.00404)	0.171*** (0.0360)	-0.0213** (0.0100)	-0.0270*** (0.00401)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	204,614	204,253	221,015	204,614	204,253	221,015
R-squared	0.002	0.061	0.035	0.004	0.065	0.056
Number of firms	26,422	26,422	26,422	26,422	26,422	26,422

This table presents difference in difference results where the treatment group (Homeowner) consists of firm owners with residential real estate at the end of 2005 and the control group consists of owners without residential real estate at the same point. The sample includes all active limited-liability firms in Norway where a nuclear family (i.e, parents and their underage children) holds more than 50% of the equity. The post-treatment period starts from 2006, the beginning of the tax increases for residential real estate. The dependent variables are: wealth tax (the log of wealth tax payments, inflation adjusted), liquidity (the log of the sum between the owner's personal liquid assets and the share of the cash in the firm, inflation adjusted), and revenues (the log of the firm's revenues, inflation adjusted). All regressions use firm fixed effects, and standard errors are clustered at the firm level. Regressions (1) to (3) also include year fixed effects, while regressions (4) to (6) use year times industry fixed effects. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively. Standard errors are in brackets.

Graphical diagnostics for parallel trends

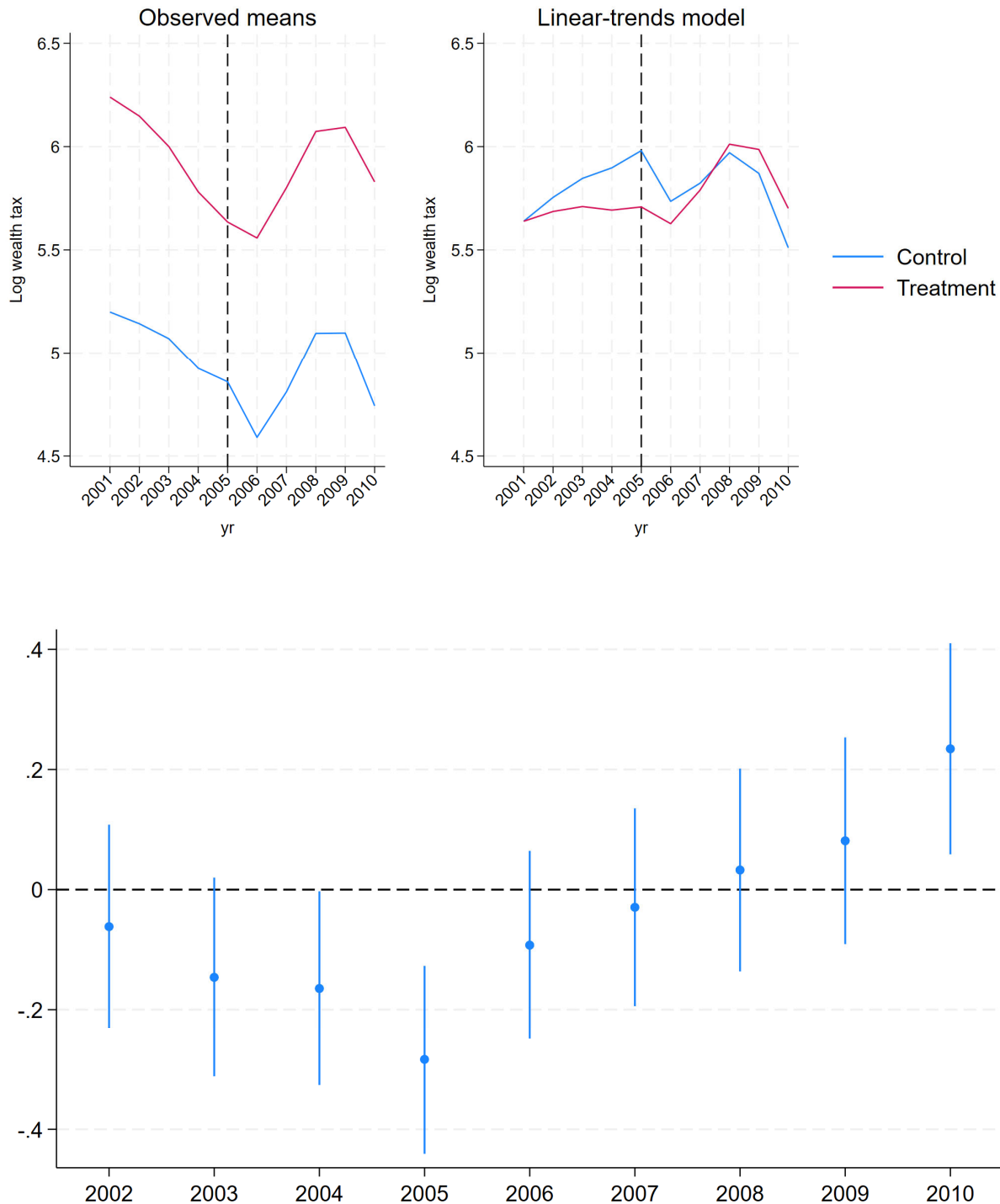


Figure 2: Difference-in-difference tests for wealth tax payments

The upper panel presents the trends for the treatment and control groups (observed means on the left and results from a linear trends model on the right) in the case of wealth tax payments (measured as the log of the owner's tax payments, in logs, inflation-adjusted). The lower panel presents the annual coefficients with confidence intervals.

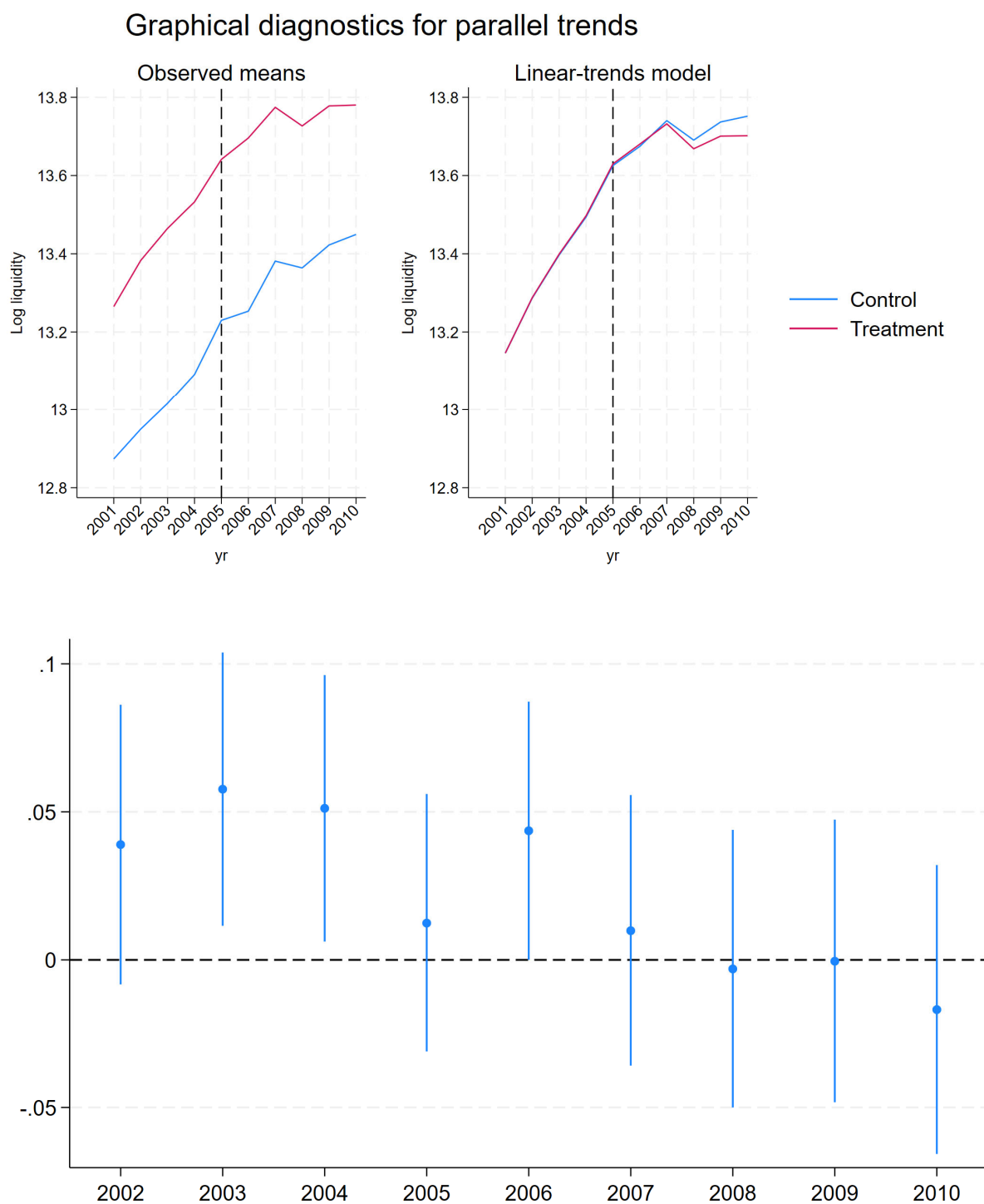


Figure 3: Difference-in-difference tests for liquidity

The upper panel presents the trends for the treatment and control groups (observed means on the left and results from a linear trends model on the right) in the case of total liquidity (measured as the log of the sum between the owners' personal liquid assets and their share of the firm's cash holdings, in logs, inflation-adjusted). The lower panel presents the annual coefficients with confidence intervals.

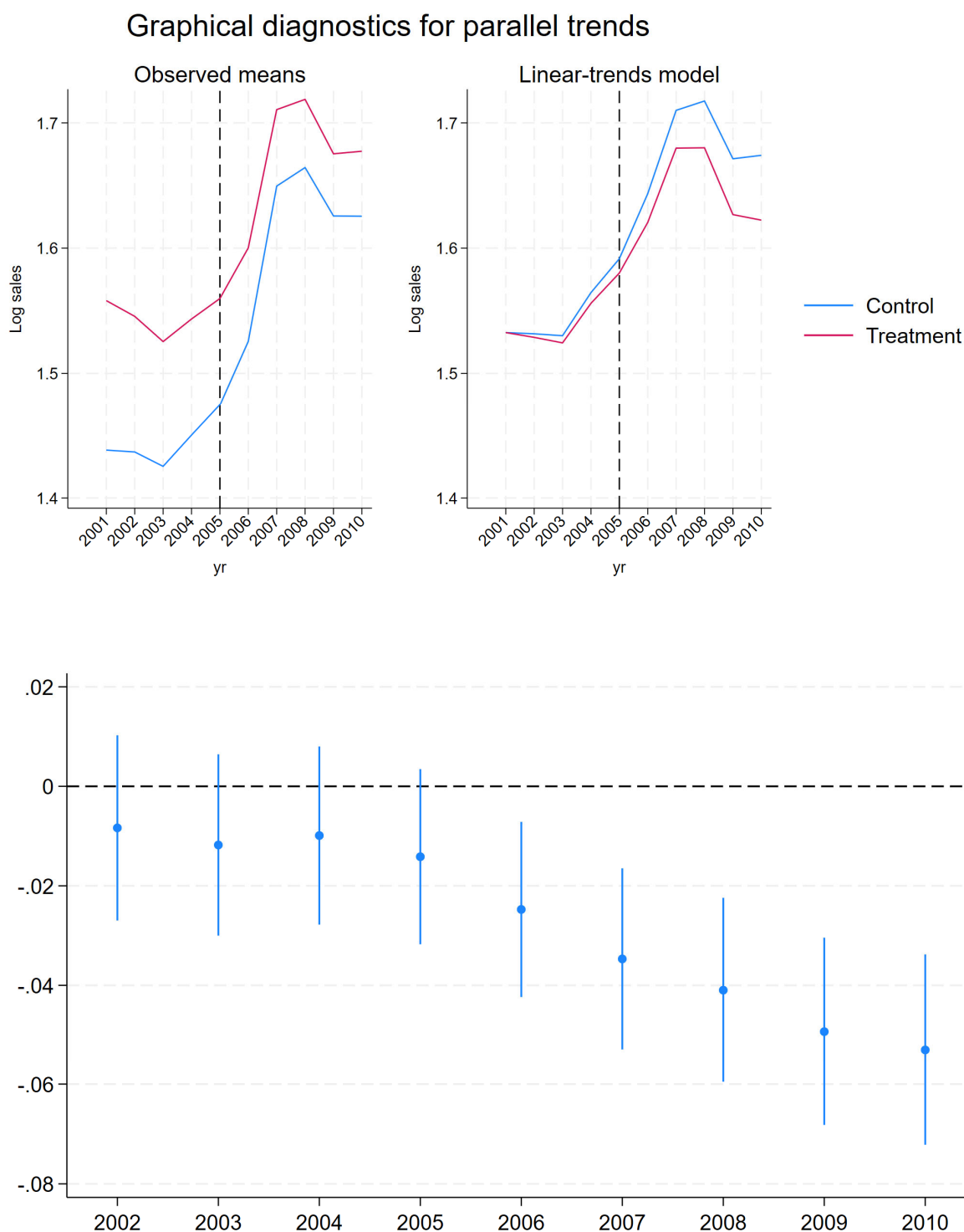


Figure 3: Difference-in-difference tests for revenues

The upper panel presents the trends for the treatment and control groups (observed means on the left and results from a linear trends model on the right) in the case of firm revenues (measured as the log of the firm's revenues, in logs, inflation-adjusted). The lower panel presents the annual coefficients with confidence intervals.

Table 6: Difference-in-difference results by taxpayer status**Panel A. Firms with tax paying owners**

Dependent variable	(1) Wealth tax	(2) Liquidity	(3) Revenues	(4) Wealth tax	(5) Liquidity	(6) Revenues
Homeowner* After 2005	0.236*** (0.0435)	-0.0266** (0.0111)	-0.0330*** (0.00503)	0.227*** (0.0734)	-0.0270** (0.0111)	-0.0314*** (0.00934)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	132,934	132,747	142,747	132,934	132,747	142,747
R-squared	0.021	0.087	0.023	0.024	0.092	0.051
Number of firms	16,595	16,595	16,595	16,595	16,595	16,595

Panel B. Firms with non-tax paying owners

Dependent variable	(1) Wealth tax	(2) Liquidity	(3) Revenues	(4) Wealth tax	(5) Liquidity	(6) Revenues
Homeowner* After 2005	0.0519 (0.0603)	-0.00900 (0.0197)	-0.0203*** (0.00671)	0.0600 (0.0847)	-0.00657 (0.0296)	-0.0175 (0.0124)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	71,680	71,506	78,268	71,680	71,506	78,268
R-squared	0.435	0.663	0.889	0.438	0.665	0.891
Number of firms	9,827	9,827	9,827	9,827	9,827	9,827

This table presents difference in difference results where the treatment group consists of firm owners with residential real estate at the end of 2005 and the control group consists of owners without residential real estate at the same point. The sample includes all active limited-liability firms in Norway where a nuclear family (i.e, parents and their underage children) holds more than 50% of the equity. The post-treatment period starts from 2006, the beginning of the tax increases for residential real estate. The dependent variables are: wealth tax (the log of wealth tax payments, inflation adjusted), liquidity (the log of the sum between the owner's personal liquid assets and the share of the cash in the firm, inflation adjusted), and revenues (the log of the firm's revenues, inflation adjusted). All regressions use firm fixed effects, and standard errors are clustered at the firm level. Regressions (1) to (3) also include year fixed effects, while regressions (4) to (6) use year times industry fixed effects. Panel A presents the results for the subsample where the firm owners paid a positive amount of wealth tax for 2005, while Panel B presents the results for the subsample where they did not. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively. Standard errors are in brackets.

Table 7. Other real effects on the firm

Dependent variable	All firms			All firms		
	(1)	(2)	(3)	(4)	(5)	(6)
	Fixed assets	Employment	ROA	Fixed assets	Employment	ROA
Homeowner*After 2005	-0.0819** (0.0344)	-0.0206*** (0.00309)	-0.00348** (0.00163)	-0.0579 (0.0370)	-0.0197*** (0.00327)	-0.00587*** (0.00174)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	249,204	249,218	249,042	221,011	221,018	220,953
R-squared	0.005	0.011	0.012	0.008	0.025	0.018
Number of firms	29,954	29,955	29,941	26,422	26,422	26,422

This table presents difference in difference results where the treatment group (Homeowner) consists of firm owners with residential real estate at the end of 2005 and the control group is owners without residential real estate at the same point. The sample includes all active limited-liability firms in Norway where a nuclear family (i.e, parents and their underage children) holds more than 50% of the equity. The post-treatment period starts from 2006, the beginning of the tax increases for residential real estate. The dependent variables are: fixed assets (the log of the firm's fixed assets, inflation adjusted), employment (the log of the number of employees in the firm), and the return on assets (the ratio between after tax operating income and total assets). All regressions use firm fixed effects, and standard errors are clustered at the firm level. Regressions (1) to (3) also include year fixed effects, while regressions (4) to (6) use year times industry fixed effects. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***,

Table 8. Difference-in-difference results with matching

Panel A. Matching on gross wealth, percentiles

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Wealth tax	Liquidity	Revenues	Wealth tax	Liquidity	Revenues
Homeowner* After 2005	0.1487***	-0.02774**	-0.0377***	0.125***	-0.0188**	-0.0479***
Standard error	(0.0631)	(0.0128)	(0.0119)	(0.0581)	(0.0099)	(0.0133)
Homeowner	-0.371***	-0.00875	0.00799	-0.342***	-0.00937	0.0224***
Standard error	(0.0445)	(0.0133)	(0.00836)	(0.0444)	(0.0133)	(0.00774)
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	204,690	204,343	221,015	204,690	204,343	221,015
R-squared	0.002	0.013	0.006	0.019	0.027	0.157

Panel B. Matching on gross wealth and personal leverage, percentiles

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Wealth tax	Liquidity	Revenues	Wealth tax	Liquidity	Revenues
Homeowner* After 2005	0.135**	-0.0188**	-0.0477***	0.134**	-0.0191**	-0.0492***
Standard error	(0.0614)	(0.0094)	(0.0154)	(0.0616)	(0.0092)	(0.0142)
Homeowner	0.195***	0.0412***	0.00146	0.216***	0.0383***	0.00442
Standard error	(0.0447)	(0.0133)	(0.00838)	(0.0446)	(0.0133)	(0.00775)
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	203,498	203,152	219,769	203,498	203,152	219,769
R-squared	0.002	0.013	0.006	0.020	0.027	0.158

The table presents difference-in-difference results using coarsened exact matching. The treatment group (Homeowner) consists of firm owners with residential real estate at the end of 2005 and the control group consists of owners without residential real estate at the same point. The sample includes all active limited-liability firms in Norway where a nuclear family (i.e, parents and their underage children) holds more than 50% of the equity. The post-treatment period starts from 2006, the beginning of the tax increases for residential real estate. The dependent variables are: wealth tax (the log of wealth tax payments, inflation adjusted), liquidity (the log of the sum between the owner's personal liquid assets and the share of the cash in the firm, inflation adjusted), and revenues (the log of the firm's revenues, inflation adjusted). In Panel A, observations from the treatment and control groups are matched on percentiles of gross wealth. In Panel B, observations from the treatment and control groups are matched on percentiles of gross wealth as well as percentiles of personal leverage. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively. Standard errors are in brackets.

Table 8. Difference-in-difference results with matching *(continued)*

Panel C. Matching on gross wealth, percentiles

Dependent variable	(1) Fixed assets	(2) Employment	(3) ROA	(4) Fixed assets	(5) Employment	(6) ROA
Homeowner* After 2005	-0.119* (0.0628)	-0.0289*** (0.00938)	-0.00001 (0.00194)	-0.1076* (0.0602)	-0.0281*** (0.00894)	-0.00007 (0.00192)
Homeowner	-0.563*** (0.0442)	0.0269*** (0.00661)	0.0134*** (0.00137)	-0.359*** (0.0424)	0.0454*** (0.00630)	0.00976*** (0.00136)
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	221,010	221,018	220,956	221,010	221,018	220,956
R-squared	0.003	0.003	0.007	0.092	0.104	0.037

Panel D. Matching on gross wealth and leverage, percentiles

Dependent variable	(1) Fixed assets	(2) Employment	(3) ROA	(4) Fixed assets	(5) Employment	(6) ROA
Homeowner* After 2005	-0.166*** (0.0627)	-0.0388*** (0.00939)	-0.00250 (0.00195)	-0.118* (0.0602)	-0.0349*** (0.00895)	-0.00264 (0.00193)
Homeowner	-0.596*** (0.0442)	0.0209*** (0.00662)	0.0158*** (0.00137)	-0.415*** (0.0424)	0.0327*** (0.00630)	0.0127*** (0.00136)
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	219,765	219,772	219,709	219,765	219,772	219,709
R-squared	0.004	0.003	0.007	0.092	0.104	0.037

The table presents difference-in-difference results using coarsened exact matching. The treatment group (Homeowner) consists of firm owners with residential real estate at the end of 2005 and the control group consists of owners without residential real estate at the same point. The sample includes all active limited-liability firms in Norway where a nuclear family (i.e, parents and their underage children) holds more than 50% of the equity. The post-treatment period starts from 2006, the beginning of the tax increases for residential real estate. The dependent variables are: fixed assets (the log of the firm's fixed assets, inflation adjusted), employment (the log of the number of employees in the firm), and the return on assets (the ratio between after tax operating income and total assets). In Panel C, observations from the treatment and control groups are matched on percentiles of gross wealth. In Panel D, observations from the treatment and control groups are matched on percentiles of gross wealth as well as percentiles

Table A1: Difference-in-difference results by taxpayer status**Panel A. Firms with tax paying owners**

Dependent variable	(1) Fixed assets	(2) Employment	(3) ROA	(4) Fixed assets	(5) Employment	(6) ROA
Homeowner* After 2005	-0.0925** (0.0415)	-0.0267*** (0.00372)	-0.00370** (0.00183)	-0.0503 (0.0444)	-0.0256*** (0.00751)	-0.00592** (0.00253)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	158,983	158,987	158,931	142,746	142,750	142,728
R-squared	0.006	0.006	0.018	0.011	0.025	0.025
Number of firms	18,574	18,574	18,570	16,595	16,595	16,595

Panel B. Firms with non-tax paying owners

Dependent variable	(1) Fixed assets	(2) Employment	(3) ROA	(4) Fixed assets	(5) Employment	(6) ROA
Homeowner* After 2005	-0.0618 (0.0609)	-0.00892 (0.00546)	-0.00293 (0.00313)	-0.0647 (0.0664)	-0.00907 (0.0108)	-0.00556 (0.00413)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	90,221	90,231	90,111	78,265	78,268	78,225
R-squared	0.003	0.025	0.008	0.008	0.037	0.014
Number of firms	11,380	11,381	11,371	9,827	9,827	9,827

This table presents difference in difference results where the treatment group consists of firm owners with residential real estate at the end of 2005 and the control group consists of owners without residential real estate at the same point. The sample includes all active limited-liability firms in Norway where a nuclear family (i.e, parents and their underage children) holds more than 50% of the equity. The post-treatment period starts from 2006, the beginning of the tax increases for residential real estate. The dependent variables are: fixed assets (the log of the firm's fixed assets, inflation adjusted), employment (the log of the number of employees in the firm), and the return on assets (the ratio between after tax operating income and total assets). All regressions use firm fixed effects, and standard errors are clustered at the firm level. Regressions (1) to (3) also include year fixed effects, while regressions (4) to (6) use year times industry fixed effects. Panel A presents the results for the subsample where the firm owners paid a positive amount of wealth tax for 2005, while Panel B presents the results for the subsample where they did not. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively. Standard errors are in brackets.

Table A2: Controlling for market real estate prices

Dependent variable	All firms			All firms		
	(1)	(2)	(3)	(1)	(2)	(3)
	Wealth tax	Liquidity	Revenues	Wealth tax	Liquidity	Revenues
Homeowner*After 2005	0.178*** (0.0565)	-0.0199** (0.00998)	-0.0291*** (0.00760)	0.171*** (0.0566)	-0.0212** (0.0100)	-0.0270*** (0.00747)
Percentage change in local real estate prices	-0.0165 (0.158)	0.0115 (0.0444)	0.0223 (0.0179)	-0.0247 (0.159)	0.0286 (0.0445)	0.0284 (0.0176)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	204,493	204,132	220,885	204,493	204,132	220,885
R-squared	0.002	0.061	0.035	0.004	0.065	0.056
Number of firms	26,409	26,409	26,409	26,409	26,409	26,409

Dependent variable	All firms			All firms		
	(1)	(2)	(3)	(1)	(2)	(3)
	Wealth tax	Liquidity	Revenues	Wealth tax	Liquidity	Revenues
Homeowner*After 2005	0.177*** (0.0565)	-0.0203** (0.00998)	-0.0293*** (0.00760)	0.170*** (0.0566)	-0.0216** (0.0100)	-0.0272*** (0.00747)
Local real estate prices	0.304** (0.150)	0.169*** (0.0275)	0.102*** (0.0252)	0.321** (0.150)	0.179*** (0.0275)	0.105*** (0.0246)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	204,493	204,132	220,885	204,493	204,132	220,885
R-squared	0.002	0.061	0.035	0.004	0.065	0.057
Number of firms	26,409	26,409	26,409	26,409	26,409	26,409

This table presents difference in difference results where the treatment group (Homeowner) consists of firm owners with residential real estate at the end of 2005 and the control group consists of owners without residential real estate at the same point. The sample includes all active limited-liability firms in Norway where a nuclear family (i.e, parents and their underage children) holds more than 50% of the equity. The post-treatment period starts from 2006, the beginning of the tax increases for residential real estate. The dependent variables are: wealth tax (the log of wealth tax payments, inflation adjusted), liquidity (the log of the sum between the owner's personal liquid assets and the share of the cash in the firm, inflation adjusted), and revenues (the log of the firm's revenues, inflation adjusted). The regressions also include a control for local market residential real estate prices. All regressions use firm fixed effects, and standard errors are clustered at the firm level. Regressions (1) to (3) also include year fixed effects, while regressions (4) to (6) use year times industry fixed effects. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively. Standard errors are in brackets.

Table A3: Controlling for market real estate prices

Dependent variable	All firms			All firms		
	(1) Fixed assets	(2) Employment	(3) ROA	(1) Fixed assets	(2) Employment	(3) ROA
Homeowner*After 2005	-0.0797** (0.0369)	-0.0213*** (0.00627)	-0.00588*** (0.00220)	-0.0569 (0.0371)	-0.0198*** (0.00620)	-0.00595*** (0.00220)
Percentage change in local real estate prices	0.252 (0.165)	0.0227 (0.0155)	0.0120 (0.00748)	0.275* (0.166)	0.0191 (0.0154)	0.0129* (0.00747)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	220,881	220,888	220,823	220,881	220,888	220,823
R-squared	0.005	0.010	0.013	0.008	0.025	0.018
Number of firms	26,409	26,409	26,409	26,409	26,409	26,409

Dependent variable	(1) Fixed assets	(2) Employment	(3) ROA	(1) Fixed assets	(2) Employment	(3) ROA
Homeowner*After 2005	-0.0797** (0.0369)	-0.0213*** (0.00627)	-0.00593*** (0.00220)	-0.0568 (0.0371)	-0.0199*** (0.00620)	-0.00600*** (0.00220)
Local real estate prices	0.157 (0.0992)	0.0289 (0.0176)	0.0264*** (0.00639)	0.151 (0.0993)	0.0297* (0.0173)	0.0267*** (0.00639)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes			
Year*industry fixed effects				Yes	Yes	Yes
Observations	220,881	220,888	220,823	220,881	220,888	220,823
R-squared	0.005	0.011	0.013	0.008	0.025	0.018
Number of firms	26,409	26,409	26,409	26,409	26,409	26,409

This table presents difference in difference results where the treatment group (Homeowner) is firm owners with residential real estate at the end of 2005 and the control group is owners without residential real estate at the same point. The sample includes all active limited-liability firms in Norway where a nuclear family (i.e, parents and their underage children) holds more than 50% of the equity. The post-treatment period starts from 2006, the beginning of the tax increases for residential real estate. The dependent variables are: fixed assets (the log of the firm's fixed assets, inflation adjusted), employment (the log of the number of employees in the firm), and the return on assets (the ratio between after tax operating income and total assets). The regressions also include a control for local market residential real estate prices. All regressions use firm fixed effects, and standard errors are clustered at the firm level. Regressions (1) to (3) also include year fixed effects, while regressions (4) to (6) use year times industry fixed effects. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively. Standard errors are in brackets.

Table A4: Difference-in-difference results with kernel-based propensity score matching

Panel A. Matching on gross wealth

	(1)	(2)	(3)
Dependent variable	Wealth tax	Liquidity	Revenues
Homeowner* After 2005	0.114*** (0.043)	-0.038*** (0.013)	-0.024*** (0.008)
t-statistic	2.66	2.86	3.24
p-value	0.008	0.004	0.001

Panel B. Matching on gross wealth and personal leverage

	(1)	(2)	(3)
Dependent variable	Wealth tax	Liquidity	Revenues
Homeowner* After 2005	0.152*** (0.043)	-0.037*** (0.013)	-0.022*** (0.008)
t-statistic	3.58	2.9	2.97
p-value	0.000	0.004	0.003

Panel C. Matching on multiple owner and firm characteristics

	(1)	(2)	(3)
Dependent variable	Wealth tax	Liquidity	Revenues
Homeowner* After 2005	0.121*** (0.042)	-0.034*** (0.013)	-0.023*** (0.008)
t-statistic	2.84	2.62	3.08
p-value	0.005	0.009	0.002

This table presents difference-in-difference results with kernel-based propensity score matching. The treatment group is firm owners with residential real estate at the end of 2005 and the control group is owners without residential real estate at the same point. The sample includes all active limited-liability firms in Norway where a nuclear family (i.e, parents and their underage children) holds more than 50% of the equity. The post-treatment period starts from 2006, the beginning of the tax increases for residential real estate. The dependent variables are: wealth tax (the log of wealth tax payments, inflation adjusted), liquidity (the log of the sum between the owner's personal liquid assets and the share of the cash in the firm, inflation adjusted), and revenues (the log of the firm's revenues, inflation adjusted). In Panel A, treatment and control observations are matched on the gross wealth of the owners. In Panel B, they are matched on the gross wealth and personal leverage of the owners. In Panel C, they are matched on the gross wealth, personal leverage and personal liquid assets of the owners, as well as on firm age and size (total assets). Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively. Standard errors