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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 shareholders are associated with higher payments from the firm to the shareholder and with lower cash holdings, investments, sales, and performance in the firm. A one percentage-point increase in the shareholder's wealth-tax-to-liquidity ratio is on average followed by a half percentage-point increase in the firm's dividends-to-earnings ratio, a one-third percentage-point decrease in investment, and a half percentage-point decrease in sales growth and profitability. These findings suggest that even strictly personal liquidity shocks to shareholders have causal effects on firm behavior. We find the strongest effects when small and medium-sized firms are controlled by shareholders with relatively low wealth. This 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.

Keywords: household finance; corporate finance; illiquidity; wealth tax; dividends; cash holdings; growth; performance

JEL Classifications: G32, G35, G51, H24

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Abstract

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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. Private firms are often unknown to new investors, facing the firms with higher costs of external finance than public firms do. 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.

We find that when controlling shareholders experience a negative personal liquidity shock that is unrelated to the firm, the firm's subsequent dividend and salary payments to the shareholder increase, while the firm's cash holdings, investment, sales growth, and profitability decrease. Thus, shocks to household finance propagate to corporate finance. We find that this channel is particularly strong when the household has low liquidity and low wealth. 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 base.

We use proprietary tax-return data from Norway for the population of private, family-controlled firms and their shareholders. To identify the relationship between personal illiquidity and firm behavior, we use a shock to shareholder liquidity that is independent of the firm and also of the shareholder's income and preexisting liquidity. Specifically, we exploit regulatory changes in the tax value of the shareholder's personal home, i.e., residential real estate. This tax value was increased annually by a fixed percentage per year across the board in four consecutive years, producing a cumulative increase of 67%.

Almost nine out of ten 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. Because the increased tax value is also unrelated to market value, there is no effect on collateral value, ruling out any effect on the firm's financing capacity (Chaney, Sraer, and Thesmar 2012). Because the tax applies exclusively to non-firm assets and is paid by the shareholder, the firm can be affected only indirectly, and only if the personal liquidity shock induces the

shareholder to take out larger dividends or salary from the firm. Such increased payouts would reduce the firm's liquidity, which in turn might reduce investment, growth, and profitability if the firm is financially constrained. This is the chain of events we follow.

The tax value of private homes in Norway was gradually increased during 2006–2010, raising the wealth tax liability of most business owners. Unlike other taxes, such as income taxes, an increased wealth tax liability is not associated with an increase in the cash available to pay the tax. As a first step, business owners can use their personal liquid assets to pay the increased tax bill. 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.

Using the controlling shareholder's wealth-tax-to-liquidity ratio (wealth tax payment per unit of liquid assets) as our major independent variable, we have two main results. First, the increased tax value of the controlling shareholder's personal home, which produces higher wealth tax payments, is associated with higher dividend and salary payments to the shareholder and with lower cash holdings in the firm. On average, when the controlling shareholder's wealth-tax-to-liquidity ratio increases by 1 percentage point, the firm's payout ratio (dividends plus salary paid to the controlling shareholder per unit of firm earnings before salary) increases by 0.54 percentage points, and the firm's cash ratio (cash holdings per unit of assets) decreases by 1.09 percentage points. Firms are also more likely to pay dividends after a wealth tax shock. Thus, the shock to personal liquidity propagates to the firm's liquidity because the shareholder withdraws cash to cover larger personal tax payments. This is particularly the case when the shareholder has moderate wealth.

Our second main result is that the larger payout to shareholders has real effects on the firm through lower investment, lower growth, and lower performance. We find that a 1 percentage-point increase in the shareholder's wealth-tax-to-liquidity ratio is on average associated with a 0.30 percentage-point decrease in the next year's investments and a 0.45 percentage-point decrease in the next year's sales growth. The effect on employment is also negative, but is usually not statistically significant, perhaps because employment tends to be unusually stable in family-controlled firms (Sraer and Thesmar 2007). Finally, there is a negative and significant effect on firm performance, because a 1 percentage-point increase in the wealth-tax-to-liquidity ratio is followed by a 0.49 percentage-point decrease in returns 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 2000–2010; the tax shocks we investigate occur annually from 2006 to 2010, and the tax system has uniform, flat personal taxation of dividends and other capital income. Also, the tax on capital income is aligned with the tax on labor income. Thus, every shareholder is subject to the same dividend tax rate, and nobody has tax reasons for shifting income between dividends and salary.

We take two actions to ensure the tax shock is validly measured. First, our main sample includes only firms where the tax value of the controlling shareholder's home changes by exactly the standard change implied by the tax rule. This sample filter ensures the shock is due to a new, higher tax value of the same home rather than to home improvements or home transactions. Second, we instrument the family's wealth-tax-to-liquidity ratio. This ratio may be high for reasons related to the firm, which we want to avoid. For instance, owners of more profitable firms may have accumulated more cash, and wealthier owners are more likely to be taxpayers. Further, the wealth-tax-to-liquidity ratio reflects the wealth tax paid on all taxable assets rather than just on the personal home. We reduce such sources of bias by instrumenting the wealth-tax-to-liquidity ratio by the change in the tax value of the family's home and by the home's tax value as a proportion of the family's assets. As desired, these instruments capture the family's tax shock and liquidity, and they are independent of the firm.

The firm's behavior does not just depend on the owner's need for liquidity. We account for firm-specific determinants of financial and real effects, such as the firm's age, size, risk, and debt. Moreover, we account for owner characteristics, such as personal wealth and debt. We include year fixed effects, which may be particularly important because the sample period includes the recent financial crisis. We include firm fixed effects to capture the impact of time-invariant, unobservable variables, such as predetermined dividend and growth strategies. Because the firm has the same controlling family throughout the entire sample period in 94% of the cases, our firm fixed effects also reflect time-invariant properties of the family.

Our instrumental variable regressions show that a larger tax shock relative to the owner's personal liquidity results in higher outflows from the firm to the owner and in negative real effects on the firm. A different way to identify these effects is by comparing owners having high vs. low exposure to the shock. Therefore, we also run difference-in-difference regressions, using firms controlled by wealth-tax-paying families with a personal home as the treatment group. The control group includes the remaining firms, where the majority shareholder is a family that either rents its home or owns it, but does not pay wealth tax. We find that after the personal wealth tax shock, firms in the treated group decrease investment, growth, and profitability more than do firms in the control group. Our findings are also robust to how we construct the sample, account for heterogeneous firms and shareholders, measure the tax valuation shock and the personal liquidity shock, account for the market value of the home, measure debt capacity, and to structural shifts in family and firm characteristics.

We extend the existing literature in five 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 liquid 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 2020), 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.[1]

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, only 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 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 (*Financial Times* 2019). 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 (*Financial Times* 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; Brülhart 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

[1] 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.

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.[2] This principle also applies to property taxes, which are widespread and an important source of tax revenue (OECD 2019).[3] 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 that one should carefully consider the distortive effects on firm liquidity, investment, growth, and performance.

Our fourth contribution is to identify shareholder liquidity needs as a new determinant of firm payout (DeAngelo, DeAngelo, and Skinner 1992). There is evidence from public firms that reduced share liquidity is associated with increased dividends (Banerjee, Gatchev, and Spindt 2007; Griffin 2010). These studies implicitly assume, however, that shareholders can easily construct their homemade dividend policy by trading the firm's shares, and that control over the firm does not affect the trading decision (Miller and Modigliani 1961). In contrast, all shares in our sample firms are illiquid, and the controlling shareholder may want to keep the shares to preserve private benefits. This situation makes the cost of not receiving dividends higher in private firms than elsewhere. This property of our sample firms allows for a more powerful test of how shareholder liquidity interacts with dividend policy.

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, Bøhren, 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

[2] 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.
[3] 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%).

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 examine the relationship between wealth tax shocks and the firm's payout and cash holdings in Section 5, analyze how wealth tax payments interact with the firm's investment, growth, and performance in Section 6, and make robustness tests in Section 7. We conclude in Section 8.

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*.[4]

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.

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

[4] 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. The controlling owner may also own shares in listed firms, which we count at market value and include in the family's liquid wealth.

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 2000 to NOK 700,000 in 2010.[5] 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). 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. Nevertheless, we account for the family's possible response by carving out a sample where we know for sure that the family remains in the same home and has not remodeled.

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

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

households.[6] 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 very large dividend payments not just based on current earnings, but also accumulated on cash reserves. This dramatic dividend tax effect produced volatile and unrepresentative payout levels (Alstadsæter, Kopczuk, and Telle 2014), making it difficult to run meaningful difference-in-difference tests for wealth tax effects on dividends for the period before vs. after the first wealth tax shock in 2006. We exploit this tax change effect and focus our main statistical test of the payout effect only on the period after the dividend tax reform.[7] This sampling focus increases the power of our test as the higher personal dividend tax in our sample period actually makes it costlier to mitigate shareholder illiquidity problems by paying cash from the firm.[8]

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 2000–2010.[9] 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*.[10] Moreover, the

[6] The shock is also difficult to avoid because it comes from the house people live in. It would be rather extreme to sell the house and start renting, or to move abroad.
[7] For completeness, we also perform difference-in-difference tests, which include pre-2006 dividends. The results support the evidence from the instrumental-variables approach.
[8] 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.
[9] 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).
[10] 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*.

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 positive.

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. Because our tax data reflect all residential real estate items in the family rather than each separate item, the observed change could come from a change in the tax value of items held the previous year, from improvements, or from transactions. We want to pick up the first, but not the latter two, which we ensure by using one sampling procedure for 2006–2009 and one for 2010.

The annual tax-rule shocks in 2006–2009 involve a standard percentage increase in book valuation of 25% in 2006 and 10% in each of the three subsequent years. As we show below, the observed percentage change in the tax value of the family's home equals the standard percentage in about three of four cases. Therefore, we ensure our sample has no cases of home improvements or transactions by using only observations where the change in tax value exactly equals the change implied by the new tax rule.[11] Thus, the taxpayer we observe lives in the same house with the same characteristics before and after the tax shock.

[11] To allow for possible rounding, we allow for a deviation of +/- 1%.

The final sample year (i.e., 2010) involves a change in valuation principle from book value to market value. To ensure we exclude improvements and transactions, we include only owners for whom the change in tax value is between NOK -100,000 and NOK +500,000. This narrow range is likely to reflect only the change in valuation.

These sampling criteria produce the sample for our instrumental-variable (IV) regressions, which we use to analyze financial and real effects in the period 2006–2010.[12] We call this sample *the clean sample* in the following.

Our alternative estimation technique is the difference-in-difference (DiD) approach, which we use only to explore real effects. We do not use it for financial effects because of the large dividend-tax increase just before 2006. The sample period for the DiD is 2001–2010. We define the treatment group as the firms where the controlling family owns a home and is a wealth tax taxpayer 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 either owns or rents its home but does not pay wealth tax. 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 32,563 firms on average per year.

Table 1

The average wealth tax paid per family increases from NOK 35,284 in year 2000 to NOK 57,004 in 2006 and to NOK 66,245 in 2010, representing an 87.7% nominal growth over a

[12] Because our sample selection for 2010 is not perfect, we also present results that exclude 2010.

decade (53.9% 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 92,347 and 44,140, respectively, while the growth rates are 137.8% and 96.3%, respectively.[13] The proportion of controlling shareholders owning a home remains high and stable, being 85.5% on average.[14]

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 decreasing proportion of families paying wealth tax. For instance, while 63.4% of those owning their home pay wealth tax in 2000, only 49.4% 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 3.6% for families owning a home, 2.9% for families not owning a home, and 7.4% for home-owning families who also pay wealth tax.

Table 2 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 2000–2010 is 157.6% (111.8%). 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 1 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.[15] While market values grow steadily, tax values grow much more 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.

[13] 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.
[14] 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).
[15] We measure market value as market price per m^2 for residential real estate (Source: Statistics Norway).

Figure 1

The impact of the personal tax shock at the personal and corporate levels may depend on family and firm characteristics. Table 3 shows the mean and median values of such characteristics for the clean sample described in Section 3, which is also the sample used in our IV regressions.[16] In the following, we compare mean characteristics for controlling shareholders with and without residential real estate.

Table 3

Controlling families with residential real estate own more assets (gross wealth) than do those without (mean of NOK 5.33 mill. vs. 3.23 mill.). Their net wealth is twice as large (NOK 3.61 mill. vs. 1.80 mill.), their assets are less liquid (liquid assets to gross assets is 0.26 vs. 0.38), while their wealth tax payment requires more of their liquid assets (3% vs. 2%).[17] The family may receive salary from other sources than the controlled firm, but the average amount is small (NOK 0.16 mill. vs. 0.08 mill.), and most families receive nothing.[18]

As we will discuss in Sections 5–7, 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 larger (mean sales of 9.11 mill. vs. 7.92 mill. NOK), older (14.5 years vs. 13 years), less leveraged (total-liabilities-to-assets ratio of 0.70 vs. 0.75), and more profitable (return on assets of 9% vs. 7%), while the assets are less tangible (tangible assets to gross assets of 0.20 vs. 0.25). The ratio of sales to assets, which is our proxy for growth opportunities, is very similar (2.4 vs. 2.5).[19] This is also the case for retained earnings to equity (0.61 for both) and for risk, which we measure as the coefficient of variation of sales over the past three years (0.32 vs. 0.35).

The summary statistics for financial and real effects of shareholder illiquidity on the firm are in the lower part of the table. 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 (0.16 vs. 0.10). This tendency is also reflected in the sum of dividends and

[16] The clean sample for 2006–2009 includes only firms controlled by a family that either has no residential real estate or experiences a standard change in its tax value. For 2010, when no standard change was made, we restrict the sample of shareholders with residential real estate to those with a change in tax value in the narrow range of NOK -100,000 to NOK +500,000.
[17] 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.
[18] In order to avoid changes in firm payout that the shareholder cannot control, we ignore changes in salary received from other firms.
[19] Firms generating high sales with their existing assets may need to invest to support their growth. Therefore, a higher sales-to-assets ratio may reflect lower slack and hence a stronger need to invest.

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 (0.65 vs. 0.59).

We measure real effects as the impact of the owner's personal liquidity shock on the firm's investment, sales growth, employment growth, and performance. The summary statistics show that mean investment, measured as the annual increase in real assets, is independent of whether the firm's controlling shareholder owns a home (7%). Mean sales growth is slightly lower for homeowners (7% vs. 8%), while employment growth is independent of homeownership (2%). The median firm has the same number of employees in two subsequent years regardless of homeownership (0% growth). This finding of stable employment is similar to earlier findings in French family firms (Sraer and Thesmar 2007). Finally, and as already mentioned, mean performance is higher when the controlling family owns its home (9% vs. 7% mean return on assets).

Table A1 in the Appendix shows the equivalent of Table 3 when we include all family-controlled firms (i.e., also those where the family does not experience a standard change in the tax value of its home). The table shows that the family characteristics, firm characteristics, and firm behavior variables in this extended sample are quite close to those in Table 3, although some shareholders are wealthier than those in the restricted sample.

In order to illustrate the magnitude of the tax shock, we relate the cumulative, forward-looking effect of tax increases to the current liquidity position. The ability to pay the wealth tax liability may depend not just on the current shareholder liquidity, but also on the cumulative tax effect. This is because the liquidity drain in any particular year reoccurs every subsequent year because the tax increase is permanent. Therefore, the ability to pay the tax bill depends on shareholder liquidity when the wealth tax started increasing, and on the sum of wealth tax liabilities over subsequent years. Table 4 presents an overview of the cumulative effect of the tax shock during our sample period. We define cumulative-wealth-tax-to-initial-liquidity as the sum of increased wealth tax on the home during 2006–2010 divided by the shareholder's liquid assets in 2005.[20] This ratio reflects how much the new tax hikes consume

[20] The increase in the wealth tax liability is calculated by applying the time-invariant tax rate of 1.1% to the increase in the home's tax value. For instance, we take the 25% increase in 2006, apply 1.1% to it, and consider the fact that this increased liability also applies to the remaining years our sample period, i.e., 2007 to 2010. Using the clean sample, we relate the cumulative wealth tax liability to the personal liquid assets available to the owner at the end of 2005, which is prior to the tax shock. Another liquidity source for the owner is salary from outside the firm during 2006–2010. As shown in Table 3, however, this source is minor. Results that include salaries from outside the firm are quite similar and are available upon request.

of what used to be the shareholder's annual liquid position. The table shows descriptive statistics of this ratio across shareholders with different levels of wealth.

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. Thus, the increased wealth tax is economically significant 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 25^{th}–50^{th} percentiles of the distribution, average wealth is only 1.8 mill. in the 50^{th}–75^{th} percentiles.

Panel C takes a first look at the relationship between the shareholder's tax shock and the cash flow from the firm to the shareholder. We compare two groups. 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 numbers reflect 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. We will use this insight in our regression analyses.

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 increases by exactly the standard rate in three out of four cases, producing a particularly clean sample for our statistical tests. The tax increase is often large relative to personal liquidity for shareholders with moderate wealth. Compared to controlling families that do not own their home, those that do own have on average more assets, more net wealth, and pay more wealth tax relative to their liquid assets. The firms they control are on average larger,

more profitable, less liquid, pay higher dividends, and grow slightly more slowly. Thus, both owner and firm characteristics correlate with whether the controlling family owns its home. We will account for these characteristics in Sections 5–7, where we analyze how liquidity shocks to the controlling family change the firm's behavior.

5. Shareholder Illiquidity and Financial Effects on the Firm

Personal liquidity may be insufficient to finance the family's cash outflow after a liquidity shock. Therefore, the family may choose to withdraw cash from the firm, transforming the personal liquidity shock into a liquidity shock for the firm, which may have financial and real effects. We use the following model to analyze the hypothesized financial effects, where *i* is the firm, *t* is time, *f* is firm fixed effects, *z* is year fixed effects, and ε is the residual:

$$\begin{aligned} Financial\ effect_{it} &= \alpha + \beta_1 Personal\ liquidity\ shock_{it} + \beta_2 Family\ characteristics_{it} \\ &\quad + \beta_3 Firm\ characteristics_{it} + f_i + z_t + \varepsilon_{it} \end{aligned} \tag{1}$$

We regress several dependent variables reflecting financial effects in the firm on measures of the personal liquidity shock, accounting for family and firm characteristics. We use two-stage OLS (2SLS) panel regressions with instrumented wealth tax payments, firm fixed effects to account for unobserved, time-invariant firm and family characteristics, and year fixed effects to account for the business cycle. We cluster the standard errors at the firm level to account for correlated observations.

We use four alternative dependent variables. The first is the classic *Dividends to earnings* (the dividends ratio), which we measure as dividends to operating earnings.[21] We test whether the personal liquidity shock for the shareholder is followed by unusually high dividends. Our second measure uses the extensive margin with a dummy variable that equals 1 if the firm pays dividends in a given year and 0 otherwise (*Dividend payer).*

The firm may have a controlling owner who receives salary from the firm. What matters for this owner may be the sum of dividends and salary rather than each component. Our third dependent variable is *Dividends and salary to earnings before salary*. We measure this

[21] We ignore repurchases because less than 1% of our sample firms buy back their shares. This very low propensity is not surprising, because the sample firms are private and have illiquid shares. Also, because the tax rate is the same for dividends and capital gains, there is no tax advantage for repurchases.

variable as the sum of the dividends and salary the controlling shareholder receives from the firm divided by the shareholder's part of the firm's operating earnings and salary.

Finally, the increased cash flow from the firm to shareholders facing a liquidity shock may reduce the firm's cash holdings. We capture this possibility by our fourth dependent variable, *Change in cash to assets*, which we measure as the difference in the firm's cash-to-assets ratio from the previous year.

Our main independent variable for the year-by-year liquidity shock is the family's *wealth-tax-to-liquidity* ratio. The higher it is, the heavier burden the wealth tax puts on the family's liquidity, and the stronger the need for liquidity from other sources, such as the family firm. This measure takes into account both the tax liability and the family's ability to cover it with its own liquid assets. However, running an OLS regression of financial effects in the firm on this ratio may create endogeneity problems. First, there may be characteristics that influence both sides of the equation. For instance, successful firms may pay larger dividends, and their owners may be wealthier and hence pay larger wealth tax. Second, the wealth tax payment is based on all personal assets the shareholder owns, including the shares in the firm. Third, the shareholder's personal liquidity may depend on firm characteristics.

For these reasons, there may be omitted variables correlated with both the wealth-tax-to-liquidity ratio and the firm's payout and liquid assets. This possibility is why we instrument the wealth-tax-to-liquidity ratio by the change in the tax value of the home and by the home's tax value as a proportion of the family's gross assets. The instruments capture the importance of the tax shock coming from the residential real estate (the relevance criterion). Neither variable is likely to influence the firm's payout, growth, or profitability except indirectly through their impact on the family's need to finance its wealth tax payments (the exclusion criterion).

The owner's wealth tax obligations and liquidity are not the only characteristics that may influence the cash flow from the firm to its owners. Therefore, we also include variables in the regression that reflect family and firm characteristics. Regarding family characteristics, we account for the family's gross assets because wealthier families may need less cash from the firm. A high pre-shock leverage for the family may increase the need for cash if a large part of

the family's liquidity is already used to cover debt payments. We account for this possibility by personal indebtedness measured as the ratio of debt to gross assets.[22]

Regarding firm characteristics, firms with larger liquidity reserves (measured as the cash-to-assets ratio) and higher profitability (measured as return on assets) are more likely to pay higher dividends (DeAngelo, DeAngelo, and Stulz 2006). Conversely, firms with higher growth opportunities and higher risk tend to pay less (Grullon, Michaely, and Swaminathan 2002). We measure growth opportunities by the sales-to-assets ratio and risk by the coefficient of variation of sales over the previous three years.

Larger and older firms are more likely to pay dividends (Fama and French 2001). Therefore, we include the firm's sales and age, taking logs in both cases to reduce skewness. Firms with higher leverage may find it difficult to pay their owners large amounts because of contractual obligations to creditors (Jensen 1988). Because mature firms are more likely to pay dividends (Grullon et al. 2002), we include the ratio of retained earnings to equity as a proxy for firm maturity (DeAngelo et al. 2006). We lag personal and family leverage one year to reduce effects of endogenous response to the wealth tax shock.

Appendix Table A2 shows the estimates for the first stage of the 2SLS regression, which are consistent with our predictions. The estimates from the second stage in Table 5 show that, regardless of how we measure payout (as dividends to earnings, payer/non-payer, or dividends plus salary to earnings before salary), a higher liquidity drain on the controlling family is associated with a higher cash flow paid from the firm to the family. Moreover, the regression using the change in the cash-to-assets ratio as the dependent variable shows that a larger liquidity drain on the family is associated with lower cash holdings in the firm.

Table 5

The payout effect and the cash-holding effect on the firm are the two main results in this section. They support the hypothesis that liquidity shocks to the owner induce the firm to pay out more to mitigate the shock, which reduces the firm's liquid position. Economically, a one percentage-point increase in the wealth-tax-to-liquidity ratio increases the expected dividend payout ratio by 0.49 percentage points, increases total cash payments to shareholders per unit of firm earnings before salary by 0.84 percentage points, and decreases the firm's cash-to-

[22] Owners faced with higher wealth tax payments can also react by reducing their personal consumption. We do not observe personal consumption, but the fact that we find effects on the firm implies that personal consumption adjustments were insufficient to cover the increased liquidity need.

assets ratio by 1.09 percentage points. The sample means for the dividend payout ratio, total cash payout ratio, and cash-to-assets ratio are 16%, 66%, and 30%, respectively.

The coefficients of the control variables have the expected signs: Families with low gross assets and high debt more often receive cash after a tax shock that is unrelated to the firm. Higher payout also associates positively with slow-growth firms that are more liquid, more profitable, larger, less risky, less leveraged, and older.[23]

Summing up this section, we find that a higher wealth tax payment for the firm's controlling owner due to a higher tax value of the owner's personal home is associated with higher dividends and salaries paid from the firm to the owner, with more often being a dividend payer, and with reduced cash holdings in the firm. These findings suggest a causal effect from the owners' personal liquidity position to the firm's payout and liquidity.

6. Real Effects of Shareholder Illiquidity

The results in Section 5 identify an effect going from owner liquidity to firm liquidity. In the absence of financing frictions in the firm, however, sudden cash drains on the firm should not have real effects. New funding for profitable projects would be raised at no extra cost from investors unaffected by the liquidity shock. If market frictions such as information asymmetry makes it costly to raise finance from other investors, however, profitable projects may be lost. This lost value would be a cost of the firm's financial constraints.

Our sample consists of private firms with concentrated ownership that are generally less known to investors and thought to be more financially constrained than are public firms. Therefore, we hypothesize that the controlling owner's personal tax shock, which generates higher payout and lower cash holdings in the firm, will slow down the firm. Our first model for real effects has the following structure:

$$\begin{aligned} Real\ effect_{it+1} = {} & \alpha + \beta_1 Personal\ liquidity\ shock_{it} + \beta_2 Family\ characteristics_{it} \\ & + \beta_3\ Firm\ characteristics_{it} + f_i + z_t + \varepsilon_{it+1} \end{aligned} \tag{2}$$

We first measure the real effect by the firm's investment. The second measure is growth, alternatively considering the growth rates of sales and of employment. We use the investment

[23] The large dividend tax reform in 2006 means that the payout ratios before and after 2006 are not directly comparable. For completeness, however, we report DiD results for financial effects in Panel A of Appendix Table A9. The estimates are consistent with those in Table 5.

and the growth in year $t + 1$ to capture the effect of the increased wealth tax payment in year t. The negative liquidity shock on the firm may affect not just its investment and growth, but also its earnings. Therefore, our third measure of real effects is profitability, which we measure as return on assets in year $t + 1$.

As in Section 5, we measure the personal liquidity drain as the wealth tax levied on the family divided by the family's liquid assets. We again use an IV approach to reduce endogeneity bias, instrumenting the wealth-tax-to-liquidity ratio by the change in the home's tax value and by the home's tax value as a proportion of the family's gross assets.[24]

Basic firm characteristics like size and age can be seen as proxies for financial constraints (Hadlock and Pierce 2010) which may influence both payout and growth. We use a similar set of family and firm characteristics as in Section 5, expecting that wealthier families find it easier to support firm growth, while more leveraged families find it harder. Larger, more mature, and more leveraged firms may grow more slowly, while cash-rich firms may find it easier to support growth. Higher risk may hinder the financing of growth. We expect that family and firm characteristics fostering growth relate positively to profitability.

We use the clean sample for 2006–2010 to avoid effects of transactions or improvements in the home, we lag personal and family leverage one year to reduce effects of endogenous response to the wealth tax shock, and we include firm and year fixed effects to account for the impact of unobservable firm characteristics and of the business cycle, respectively. Finally, we cluster standard errors at the firm level to account for dependent observations.

Panel A of Table 6 shows the results of the IV estimation. The estimates reflect that higher wealth tax payments for the shareholder are associated with lower investment and lower sales growth for the firm. The coefficient on employment has the expected negative sign, but it is not statistically significant at conventional levels.[25]

Table 6

[24] Endogeneity bias may, for instance, occur if the firm is downsizing, selling assets above the book value used for wealth tax purposes, and paying its shareholders proceeds from the sale as dividends that will increase the wealth tax. In such cases, we would observe both slower growth for the firm and higher wealth tax payment for the owner, but causality would go from firm behavior to the owner's tax payments rather than the opposite way. Our instruments ensure that we capture only the exogenous part of the tax payment coming from the change in the tax value of the controlling shareholder's home.

[25] Bjørneby et al. (2020) also find that the impact of the wealth tax on employment is limited. They consider multiple sources of change in wealth taxation, however, including those coming from changes in the tax value of the firm itself. We avoid the resulting identification problems by studying a change in wealth tax payments which comes exclusively from the owner's personal assets rather than the firm.

The estimates also show that a stronger wealth tax shock is followed by lower returns on assets.[26] Thus, the drain on the firm's liquidity, the lower investment, and the slower growth after the personal liquidity shock are followed by decreased profitability. The propagation of a strictly personal tax shock to the firm reflects the close interaction between the finances of the household and the behavior of the firm. This close link also suggests that just excluding corporate assets from the tax base of the wealth tax, which France did in 2018, will not prevent taxation shocks to personal, non-corporate assets from spilling over to the firm.

Some controlling shareholders own their home, while others do not. Also, some have net wealth above the deduction threshold at the time of the shock, while others are below. Thus, homeowners with net wealth above the threshold are likely to face higher wealth tax payments than others after 2005. Accordingly, an alternative way of analyzing how shareholder illiquidity can have real effects on the firm is to compare firms where the controlling owner does vs. does not experience a wealth tax shock from 2006 on. We use the DiD approach to make this comparison. The treatment group is the firms where the controlling family owns its home and pays wealth tax in 2005, while the remaining firms are the control group. We compare the pre-tax-increase period (2001–2005) with the tax-increase period (2006–2010), using the same dependent variables as in Panel A:

$$\begin{aligned} Real\ effect_{it+1} = {} & \alpha + \beta_1 Homeowner_{it} + \beta_2 After\ tax\ shock_{it} \\ & + \beta_3 Homeowner_{it} \cdot After\ tax\ shock_{it} \\ & + \beta_4 Family\ characteristics_{it} + \beta_5 Firm\ characteristics_{it} + ind_j + \varepsilon_{it+1} \end{aligned} \quad (3)$$

Homeowner equals 1 if the controlling shareholder owns residential real estate and pays wealth tax in 2005, and 0 otherwise. *After tax shock* equals 1 in year 2006 or later, and 0 otherwise. We account for family and firm characteristics and include industry fixed effects (*ind*). Figure A1 in the Appendix shows the evolution of investment, the two growth rates, and of performance in the treatment group and the control group. The trends of the four proxies for real effects appear parallel in both groups.[27]

The estimates from the DiD approach in Panel B of Table 6 are consistent with those from the IV approach in Panel A. The negative interaction term shows that the firm's sales

[26] This result suggests that family-controlled firms tend to have increasing returns to scale, possibly because financial constraints make them operate at sub-optimal size. The estimates of (3) when we also use lagged performance as an independent variable are quite similar and are available upon request.

[27] The wealth tax payments are much larger in the treatment group than in the control group, and they evolve differently over time. In a balanced panel, the controlling family of firms in the treatment group paid 1.84 billion (in 2010 kroner) between 2001 and 2005, and 2.76 billion between 2006 and 2010. The corresponding figures in the control group are 351 and 356 million kroner, respectively.

growth is significantly lower after 2005 if its majority shareholder owns a home and pays wealth tax. The effect is also economically significant, because the expected annual growth rate of sales slows down by one percentage point more in treated firms than in control firms. The result for investment is slightly weaker economically, but still statistically significant. As in Panel A, the coefficient for employment growth is negative, but insignificant. Finally, the estimates show that profitability is reduced in the wealth-tax-shock period if the family owns its home and pays wealth tax. Thus, the effects on investment, growth, and profitability all go in the same, negative direction. Overall, the DiD results confirm those from the IV.

The wealth tax shock is likely to have stronger effects on the firm if its owners have smaller buffers of personal liquidity. Indeed, Table 4 shows that lower personal liquidity is associated with higher payout. To have a closer look at real effects, we extend the DiD analysis by ranking the sample based on the proportion of liquid assets in the owners' personal wealth at the end of 2005, which is just before the shock. We choose the lowest quartile (where the proportion is below 14.4%) and the highest quartile (where the proportion is above 58.2%) to represent owners with low and high personal liquidity, respectively. We rerun the DiD regressions on these two subgroups and show the results in Table 7.

Table 7

Comparing the estimates in Panel A (the low personal-liquidity subgroup) and Panel B (the high personal-liquidity subgroup), the effect of the personal liquidity shock on the firm is larger when personal liquidity is low. While there is a strong negative effect on investment, revenue growth, and profitability in the low personal-liquidity group, the effect on investment and growth are statistically insignificant in the high personal-liquidity group, and the effect on profitability is less statistically significant and smaller economically. Table 4 shows that the low-liquidity owners are on average also the less wealthy ones. Put together, the evidence in Tables 4 and 7 implies that the negative effect of the wealth tax shock on the firm may be reduced by a sufficiently high threshold for taxable wealth.

Summarizing, we have shown in this section that the liquidity shock propagating from the controlling owner to the firm does not affect only the firm's payout policy and cash balance as documented in Section 5. There are real effects on top of these financial effects, because firms with a controlling family owner subject to wealth tax shocks on the personal home experience reduced investment, sales growth, and profitability, especially if the owners' personal wealth is illiquid. This evidence suggests that in private firms with concentrated ownership, shocks to the shareholder's personal liquidity produce shocks to the firm's liquidity, investment,

growth, and performance. These effects show that the financial dependence between the owner and the firm can be costly.

7. Robustness

In this section we address seven potential concerns about our main results. These concerns are how we construct the sample, account for heterogeneous firms and shareholders, measure the personal liquidity shock, account for the market value of the personal home, measure debt capacity, specify the DiD regression, and measure the tax valuation shock.

7.1. The Sample

We constructed the clean sample in year 2010 for the IV regressions in Table 5 and Table 6 by imposing a rather narrow window of acceptable changes in the tax value of the home (between NOK -100,000 and +500,000). We did this to minimize noise and bias by excluding cases where the family's home was improved or sold during the year. Because Table 2 shows that this window represents less than the typical tax value of a home, we think our approximation is reasonable. Unlike the DiD setup, however, the IV regressions use the (instrumented) actual tax shock. Therefore, the measurement of the tax shock could be an issue, and the time window remains discretionary regardless of what thresholds we choose.

To address this concern, we rerun the IV regressions using a sample that excludes 2010 altogether. The results are reported in Appendix Table A3, which shows financial effects in Panel A and real effects in Panel B. Compared to the baseline results in Table 5 and Table 6B, the estimates are insensitive to whether we include the year where we cannot precisely identify whether the wealth tax change is due only to the new valuation rule in the tax code.

7.2. Propensity Score Matching

The summary statistics in Table 3 show that controlling families who own their home differ from other controlling families in the sample on several dimensions. This is why we account for family characteristics other than the wealth-tax-to-liquidity ratio in our regressions. For the same reason, we include firm characteristics that may matter for financial and real effects, such as size and age. An alternative is to account for such heterogeneity by propensity score matching, where we use these characteristics to match homogenous observations and measure the differences between them regarding financial effects and real effects.

Table A4 presents the results. Panel A uses the 2006–2010 period, where the treatment group consists of firms that are majority-held by families that owned their home and paid

wealth tax in 2005, while the remaining family-controlled firms constitute the control group. We match observations using the family and firm characteristics described in Table 3, as well as year and industry. Because we analyze only 2006–2010, we can meaningfully consider both financial and real effects. Panel A shows the average treatment effect across the eight dependent variables.[28] As we find for the baseline model in Table 5 and Panel A of Table 6, higher wealth tax in the treatment group produces higher dividends and salaries from the firm to the family as well as lower cash holdings, lower growth, and lower profitability in the firm.

We can also combine propensity matching and DiD to account for differences in observed characteristics and in unobserved, time-invariant characteristics. We match treatment and control firms during the pre-treatment period (2000–2005) using the average value of the family's gross assets and leverage as well as the firm's cash-to-assets ratio, return on assets, risk, size, growth, and industry. We run DiD regressions on this sample for the period 2000–2010, producing the coefficients for real effects shown in Panel B. As in Panel A, and as in Panel B of Table 6, we find that firms controlled by wealth-tax-paying, home-owning families have lower investment, sales growth, and profitability when the wealth tax increases.

7.3. The Household's Liquidity Shock

Our main independent variable in the IV regressions is the household's wealth-tax-to-liquidity ratio. The liquid assets in this ratio include listed securities, which may be a source of noise because our sample period includes the financial crisis in 2008–2009. In particular, controlling shareholders who own a home, and who are generally wealthier than other controlling shareholders according to Table 3, may have had higher exposure to the stock market decline. Thus, their wealth-tax-to-liquidity ratio may have grown not because of increasing tax payments, but because of decreasing liquid assets. Although Panel A of Table 1 documents that tax payments do increase more when the shareholder owns a home, there may still be an effect through a decreasing value of listed securities.

To address this possible measurement error of the liquidity shock from a wealth tax shock, we construct a revised ratio where we divide the wealth tax payments by just the bank savings. This ratio is not affected by stock market fluctuations. We rerun the IV regressions using this new measure and show the results in Table A5, where the financial effects are in

[28] We use nearest-neighbor matching. Caliper matching produces very similar results that are available upon request.

Panel A and the real effects are in Panel B. The findings using the alternative liquidity shock measure are consistent with those using the broader measure in Table 5 and Table 6.

7.4. The Market Value of Residential Real Estate

The literature on the collateral channel finds a positive relationship between firm growth and changes in the market value of commercial real estate (Chaney et al. 2012; Kerr et al. 2015; Schmalz et al. 2017). This result suggests that more valuable real estate provides more collateral that can be pledged to raise more debt financing in the firm, which may reduce the firm's financial constraints.

Our concern is not with the role of real estate as collateral, but as a source of personal liquidity shocks. Figure 1 shows, however, that market values and tax values evolve in separate ways. To nevertheless alleviate remaining concerns about a possible correlation between changes in tax value and market value, we account for the average price change per square meter of residential real estate in the local county in a given year, which we match with the home owner's address.[29] We rerun the baseline models augmented by the change in local market prices, which we call *Change in local home prices*.

Table A6 shows the results for financial effects in Panel A, while real effects are in Panel B (IV regressions) and Panel C (DiD regressions), respectively. The estimates show that the results from the baseline model remain unchanged. We also find evidence in Panel C that changes in the market price of residential real estate correlate positively with investment, growth, and profitability. This result is consistent with earlier findings on commercial real estate and the collateral channel (Chaney et al. 2012; Schmalz et al. 2017).

7.5. Debt Capacity

We have so far used leverage to capture the idea that higher existing debt reduces the capacity for more debt and the resulting possibility to use new debt to mitigate the liquidity problem after a wealth tax shock. An alternative approach is to measure debt capacity by asset tangibility, which is a deeper determinant of capital structure than is leverage and is arguably more costly to adjust (Frank and Goyal 2009). Firms with more tangible assets, such as manufacturing firms, have higher debt capacity and may find it easier to raise new debt than do firms with less tangible assets, such as software firms. Unlike leverage, asset tangibility also reflects the ability to borrow rather than the decision to do so. Moreover, asset tangibility can be considered a proxy for the strength of the collateral channel (Chaney et al. 2012).

[29] The data source is Statistics Norway.

We modify the baseline model by excluding personal and corporate leverage and instead use *Asset tangibility*, which we measure as the ratio between the firm's fixed and total assets. Using this revised model, Table A7 reports financial effects in Panel A, while real effects are in Panel B. The results are very close to those from the main specification using leverage.

7.6. Fixed Effects and Interaction Terms

Our DiD regressions in Panel B of Table 6 use a single dummy variable for the shock period, which starts in 2006 and ends in 2010. As a robustness test, we use dummy variables for each year in the shock period to account for the possibility that certain years, such as the financial crisis in 2007 and 2008, have different effects on the main relationships than do other years.

The impact of the control variables on growth and profitability may be different in the tax-shock period than in previous years. For instance, the financial crisis generally reduced firm size, which may shift the relationship between size and performance during the tax-shock period. Therefore, we add interaction terms between the tax-shock dummy and the control variables for family and firm characteristics. Finally, we add firm fixed effects to account for possible time-invariant firm characteristics that are not weeded out by the DiD approach.

The new estimates in Table A8 show that the main, significant relationships from the baseline model in Panel B of Table 6 survive. If anything, this richer specification provides better support for the idea that even employment falls after the tax shock when the firm is controlled by a home-owning family that pays wealth tax. Thus, our main results do not seem to be driven by structural shifts in the baseline model's family and firm characteristics or by unobservable, time-invariant versions of such characteristics.

7.7. The Magnitude of the Valuation Shock

The specification in Table A8 uses a simple dummy variable to distinguish between the treatment group and the control group. An alternative is to use the tax value of residential real estate at the end of 2005. The higher this value, the higher the exogenous increase in the tax base over the subsequent years. Using this measure also brings our DiD specification closer to our IV specification, which measures the impact of the increased tax payments. We present the results in Table A9. To make the results comparable to our IV regressions, we show the results with both financial and real effects as dependent variables.

The findings from this alternative specification are consistent with those in Table A8. A larger tax value of residential real estate is associated with higher dividend and salary payout, a higher likelihood of paying dividends, decreasing firm cash holdings, lower investment,

lower revenue growth, and lower profitability. The dividend payout prior to 2006 is not an optimal benchmark for a DiD specification, however, and the clean sample is the better when calculating the tax effect. Therefore, we prefer the IV and DiD specifications as implemented in our main regression Tables 5 and 6.

Summarizing this section, the robustness tests have shown that the baseline relationship estimated in Sections 5 and 6 between shareholder illiquidity and the firms' financial and real decisions is insensitive to alternative specifications. In particular, the relationship is robust to how we construct the sample, account for heterogeneity between firms and shareholders, measure the personal liquidity shock, account for the market value of the personal home, measure the firm's debt capacity, account for structural shifts in family and firm characteristics, and to how we measure the change in tax valuation.

8. 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.

Our first main finding is that negative shocks to the household's liquidity produce negative shocks to the firm's liquidity. Firms controlled by families with higher personal liquidity needs after a tax shock pay higher dividends and salaries to the family, and the firm's cash holdings decrease. Our second main finding is that the drain on the firm's liquidity after the shareholder's personal liquidity shock reduces the firm's subsequent investment, growth, and profitability. Specifically, a one percentage-point increase in the shareholder's wealth-tax-to-liquidity ratio relates to a half percentage-point increase in the firm's dividends-to-earnings ratio, a one-third percentage-point decrease in investment, and a half percentage-point decrease in sales growth and 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.

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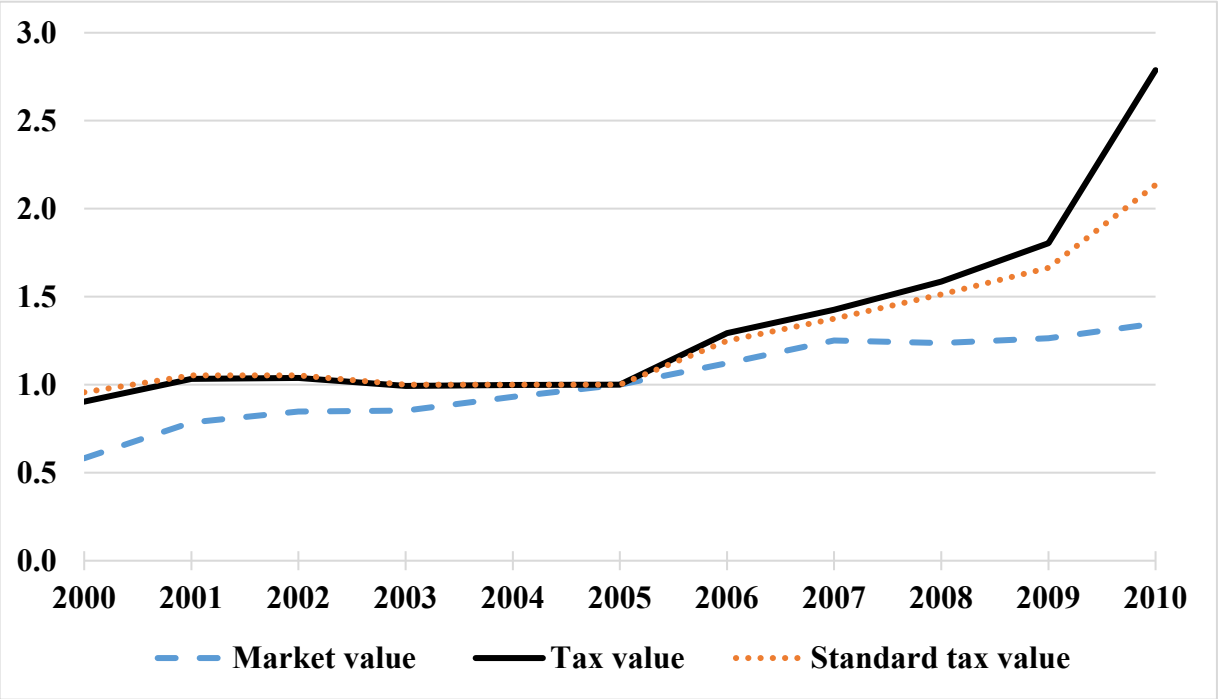

Figure 1: The change in the market value and tax value of residential real estate

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

	Tax value (NOK)						
Year	5th percentile	Mean	Median	95th percentile	Median change in tax value	Proportion homeowners with standard tax value change	Number of firms
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

	All		Homeowner		Not homeowner		Number of firms		
Variable	Mean	Median	Mean	Median	Mean	Median	All	Homeowner	Not homeowner
Family characteristics									
Family gross assets	5.02	2.05	5.33	2.17	3.23	1.26	92 204	78 906	13 298
Family leverage	1.01	0.52	0.97	0.52	1.29	0.52	92 204	78 906	13 298
Family net wealth	3.35	0.80	3.61	0.89	1.80	0.37	92 204	78 906	13 298
Family home to gross assets	0.27	0.20	0.32	0.25	0.00	0.00	92 204	78 906	13 298
Family liquid assets to gross assets	0.27	0.21	0.26	0.19	0.38	0.29	92 204	78 906	13 298
Family wealth tax to liquidity	0.03	0.00	0.03	0.01	0.02	0.00	91 970	78 752	13 218
Family salary from outside the firm	0.15	0.00	0.16	0.00	0.08	0.00	91 970	78 752	13 218
Firm characteristics									
Cash to assets	0.30	0.24	0.31	0.25	0.25	0.18	92 187	78 897	13 290
Return on assets	0.09	0.08	0.09	0.08	0.07	0.06	92 187	78 897	13 290
Sales to assets	2.44	2.04	2.43	2.04	2.50	2.04	92 187	78 897	13 290
Volatility of sales	0.32	0.22	0.32	0.22	0.35	0.25	83 397	71 742	11 655
Sales	8.94	3.59	9.11	3.63	7.92	3.31	92 204	78 906	13 298
Firm age	14.31	12.00	14.53	12.00	13.03	11.00	92 204	78 906	13 298
Firm leverage	0.70	0.71	0.70	0.71	0.75	0.74	92 187	78 897	13 290
Asset tangibility	0.21	0.10	0.20	0.09	0.25	0.14	92 187	78 897	13 290
Retained earnings to equity	0.61	0.71	0.61	0.71	0.61	0.70	92 018	78 803	13 215
Financial effects									
Dividend payer	0.22	0.00	0.23	0.00	0.15	0.00	92 204	78 906	13 298
Dividends to earnings	0.15	0.00	0.16	0.00	0.10	0.00	91 361	78 170	13 191
Dividends and salary to earnings before salary	0.64	0.72	0.65	0.73	0.59	0.67	66 997	57 967	9 030
Real effects									
Investment	0.07	0.03	0.07	0.03	0.07	0.03	84 330	72 354	11 976
Sales growth	0.07	0.03	0.07	0.03	0.08	0.03	84 170	72 226	11 944
Number of employees	5.66	3.00	5.73	3.00	5.20	3.00	92 204	78 906	13 298
Employment growth	0.02	0.00	0.02	0.00	0.02	0.00	84 347	72 363	11 984
Performance	0.09	0.08	0.09	0.08	0.07	0.06	92 187	72 226	11 944

This table shows summary statistics for the clean sample of controlling families and the firms they control. The sample period is 2006–2010. The clean 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. "Family gross assets" is the family's total assets in million NOK as of 2010 from the family's tax returns. "Family leverage" is the family's personal debt to gross wealth. "Family net wealth" is the family's total assets less its liabilities in million NOK as of 2010. "Family home to gross assets" is the tax value of the family's home divided by the family's gross wealth. "Family liquid assets to gross assets" is the family's cash, bank savings, and listed securities divided by gross wealth. "Family wealth tax to liquidity" is the family's wealth tax payments divided by its liquid assets. "Family salary from outside the firm" is the amount in million NOK received by the family as salary from sources other than the firm. "Cash to assets" is the firm's cash holdings over the year divided by the firm's assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Sales" is the firm's revenues in million NOK as of 2010. "Firm age" is the number of years since the firm was founded. "Firm leverage" is the firm's liabilities divided by its assets. "Asset tangibility" is the ratio of the firm's fixed assets to total assets. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "Dividend payer" is 1 if the firm pays a dividend and 0 otherwise. "Dividends to earnings" is the ratio of the firm's dividends to operating earnings. "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. "Number of employees" is the number of people working in the firm. "Investment" is the percentage change in real assets over the year. "Performance" is return on assets. The growth of sales and employment are annual rates. The ratio of family wealth tax to liquid assets, cash to assets, sales to assets, retained earnings to equity, volatility of sales, investment, sales growth, and employment growth are winsorized at 97.5%. The return on assets 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						
	10th	25th	50th	75th	90th	95th	99th
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

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

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

	Homeowner, wealth tax taxpayer, above 90th percentile of the cumulative-wealth-tax-to-initial-liquidity ratio		Not home owner or not wealth tax taxpayer, and below 90th percentile of the cumulative-wealth-tax-to-initial-liquidity ratio		p-value for difference tests	
Payout measure	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 sharehoders 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 intervals 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: The controlling owner's wealth tax shock and financial effects on the firm

	Dependent variable							
	Dividends to earnings		Dividend payer		Dividends and salary to earnings before salary		Change in cash to assets	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Family wealth tax to liquidity	0.487 ***	*0.151*	0.537 ***	*0.190*	0.526 ***	*0.136*	-1.085 ***	*0.087*
Family gross assets	-0.003 ***	*0.001*	-0.004 ***	*0.002*	-0.003 ***	*0.001*	0.002 ***	*0.001*
Family leverage	0.003 **	*0.002*	0.006 ***	*0.002*	0.006 ***	*0.002*	-0.001	*0.001*
Firm characteristics								
Cash to assets	0.084 ***	*0.009*	0.111 ***	*0.011*	0.052 ***	*0.009*	0.968 ***	*0.005*
Return on assets	0.245 ***	*0.010*	0.401 ***	*0.012*	-1.024 ***	*0.015*	-0.005	*0.005*
Sales to assets	-0.005 ***	*0.002*	-0.013 ***	*0.002*	0.035 ***	*0.002*	0.001	*0.001*
Volatility of sales	-0.040 ***	*0.012*	-0.045 ***	*0.015*	-0.040 ***	*0.013*	0.006	*0.007*
Size	0.033 ***	*0.005*	0.084 ***	*0.007*	0.004	*0.006*	0.021 ***	*0.003*
Age	-0.012	*0.020*	-0.015	*0.026*	-0.023	*0.021*	0.004	*0.012*
Firm leverage	-0.261 ***	*0.009*	-0.311 ***	*0.012*	-0.173 ***	*0.010*	0.096 ***	*0.005*
Retained earnings to equity	0.011 ***	*0.002*	0.010 ***	*0.002*	0.007 ***	*0.002*	-0.002 *	*0.001*
Firm fixed effects	Yes				Yes		Yes	
Year fixed effects	Yes				Yes		Yes	
R^2	0.079		0.141		0.061		0.127	
Number of observations	77 545		78 263		56 900		78 263	
Number of firms	31 846		31 941		27 078		31 941	

The models estimated in this table reflect how tax shocks to the controlling family's personal wealth influence the cash flow from the firm to the family and the firm's liquid position. We use the clean sample, which 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. "Dividends to earnings" is the ratio of the firm's dividends to operating earnings. "Dividend payer" is equal to 1 if the firm pays dividends in a given year 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. "Change in cash to assets" is the change in the firm's cash-to-total-assets ratio. "Family wealth tax to liquidity" is the family's wealth tax payments divided by its liquid assets. This variable is instrumented by the change in the tax value of the family's residential real estate and by the ratio between residential real estate and the family's gross assets. "Family gross assets" is the family's assets from the tax returns. "Family leverage" is the family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities divided by its assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Standard errors are clustered at the firm level. All ratios are winsorized at 5% (0% if only positive values are meaningful) and 95%. Dividends to earnings, dividends and salary to earnings, cash to assets, sales to assets, volatility of sales, and retained earnings are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table 6: Shareholder liquidity shocks and the firm's subsequent investment, growth, and profitability

Panel A. Instrumental variables (IV) estimation

	Dependent variable							
	Investment		Sales growth		Employment growth		Profitability	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Family wealth tax to liquidity	-0.301 *	*0.159*	-0.450 ***	*0.150*	-0.186	*0.158*	-0.486 *	*0.084*
Family gross assets	0.001	*0.001*	0.001	*0.001*	0.001	*0.001*	0.001 **	*0.001*
Family leverage	-0.002	*0.002*	-0.005 ***	*0.002*	-0.001	*0.002*	0.002 **	*0.001*
Firm characteristics								
Cash to assets	0.024 ***	*0.009*	-0.205 ***	*0.009*	0.087 **	*0.010*	-0.049 ***	*0.005*
Return on assets	-0.046 ***	*0.010*	-0.114 ***	*0.010*	0.018 ***	*0.010*		
Sales to assets	0.170 ***	*0.002*	-0.030 ***	*0.002*	-0.004 ***	*0.002*	0.027 ***	*0.001*
Volatility of sales	0.017	*0.013*	-0.019	*0.012*	0.016	*0.013*	0.001	*0.007*
Size	-0.414 ***	*0.006*	-0.533 ***	*0.005*	-0.063 ***	*0.006*	-0.076 ***	*0.003*
Age	0.059 ***	*0.022*	0.081 ***	*0.021*	-0.004	*0.022*	0.009	*0.012*
Firm leverage	-0.060 ***	*0.010*	0.061 ***	*0.010*	-0.038 ***	*0.010*	0.124 ***	*0.005*
Retained earnings to equity	0.001	*0.002*	-0.001	*0.002*	0.001	*0.002*	0.001	*0.001*
Firm fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
R^2	0.006		0.005		0.010		0.007	
Number of observations	71 841		71 707		71 841		71 830	
Number of firms	28 594		28 564		28 594		28 592	

The models in this table estimate how the controlling shareholder's personal wealth tax payments relate to the firm's real investment, growth, and profitability, using instrumental variables (IV) for the controlling shareholder's wealth tax shock. We use the clean sample, which 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 sample period is 2006–2010. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment in the year after the wealth tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. "Family wealth tax to liquidity" is the controlling family's wealth tax payments divided by its liquid assets. This variable is instrumented by the change in the tax value of the family's home and by the home's tax value as a proportion of the family's gross assets. "Family gross assets" is the controlling family's assets from the family's tax returns. "Family leverage" is the controlling family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Standard errors are clustered at the firm level. Investment, sales growth, employment growth, cash to assets, sales to assets, volatility of sales, and retained earnings to equity are winsorized at 97.5%. Profitability is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Continued on the next page

Table 6: Shareholder liquidity shocks and the firm's subsequent investment, growth, and profitability *(continued)*

Panel B. Difference-in-Difference (DiD) estimation

	Dependent variable							
	Investment		Sales growth		Employment growth		Profitability	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
After tax shock	-0.015 ***	*0.002*	-0.006 ***	*0.002*	-0.001	*0.002*	-0.013 ***	*0.001*
Home owner	0.006 ***	*0.002*	0.011 ***	*0.003*	-0.002	*0.002*	0.018 ***	*0.002*
Homeowner * After tax shock	-0.006 **	*0.003*	-0.010 ***	*0.003*	-0.003	*0.002*	-0.009 ***	*0.002*
Family gross assets	0.008 ***	*0.001*	-0.002 **	*0.001*	-0.004 ***	*0.001*	0.003 ***	*0.001*
Family leverage	0.002 ***	*0.001*	0.002 ***	*0.001*	0.001 *	*0.001*	-0.001 ***	*0.000*
Firm characteristics								
Cash to assets	-0.040 ***	*0.003*	-0.043 ***	*0.004*	-0.008 ***	*0.003*	-0.013 ***	*0.003*
Return on assets	0.095 ***	*0.006*	-0.256 ***	*0.008*	0.078 ***	*0.005*		
Sales to assets	0.024 ***	*0.001*	-0.012 ***	*0.001*	-0.003 ***	*0.000*	-0.005 ***	*0.000*
Volatility of sales	0.033 ***	*0.003*	0.013 ***	*0.004*	-0.001	*0.002*	-0.024 ***	*0.002*
Size	-0.019 ***	*0.001*	-0.008 ***	*0.001*	0.009 ***	*0.001*	0.017 ***	*0.001*
Age	-0.010 ***	*0.001*	-0.025 ***	*0.001*	-0.012 ***	*0.001*	-0.013 ***	*0.001*
Firm leverage	-0.044 ***	*0.003*	0.011 ***	*0.004*	-0.019 ***	*0.003*	0.042 ***	*0.002*
Retained earnings to equity	-0.002 *	*0.001*	-0.004 ***	*0.001*	-0.002 ***	*0.001*	0.002 ***	*0.001*
Industry fixed effects	Yes		Yes		Yes		Yes	
R^2	0.025		0.026		0.010		0.063	
Number of observations	164 271		163 902		164 274		164 249	
Number of firms	26 568		26 557		26 568		26 565	

This table uses a difference-in-difference (DiD) approach to compare the effect on investment, growth, and profitability in the full sample of firms where the controlling family is vs. is not affected by a tax shock on personal residential real estate. The full 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 sample period is 2001–2010. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment the year after the tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. "After tax shock" is 1 for 2006–2010 and 0 otherwise. "Homeowner" equals 1 for firms where the controlling family owns residential real estate and pays wealth tax in 2005, and 0 otherwise. "Family gross assets" is the controlling family's assets from the family's tax returns. "Family leverage" is the controlling family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Investment, sales growth, employment growth, cash to assets, sales to assets, volatility of sales, and retained earnings to equity are winsorized at 97.5%. Profitability is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table 7: Personal liquidity and real effects on the firm

Panel A. Difference-in-Difference (DiD) estimation for low personal-liquidity group

	Dependent variable							
	Investment		Sales growth		Employment growth		Profitability	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
After tax shock	-0.026 ***	*0.004*	-0.003	*0.004*	-0.004	*0.003*	-0.002	*0.002*
Home owner	0.002	*0.005*	0.014 **	*0.006*	-0.004	*0.004*	0.032 ***	*0.003*
Homeowner * After tax shock	0.015 ***	*0.005*	-0.018 **	*0.007*	-0.003	*0.006*	-0.012 ***	*0.003*
Family gross assets	0.009 ***	*0.001*	0.001	*0.002*	-0.003 **	*0.001*	0.003 **	*0.001*
Family leverage	0.003 **	*0.001*	0.001	*0.001*	0.001	*0.001*	-0.001 *	*0.001*
Firm characteristics								
Cash to assets	-0.039 ***	*0.006*	-0.038 ***	*0.009*	-0.014 **	*0.007*	0.073 ***	*0.005*
Return on assets	0.068 ***	*0.009*	-0.253 ***	*0.012*	0.080 ***	*0.009*		
Sales to assets	0.029 ***	*0.001*	-0.015 ***	*0.001*	-0.002 ***	*0.001*	0.003 ***	*0.001*
Volatility of sales	0.021 ***	*0.005*	0.037 ***	*0.007*	0.005	*0.005*	-0.011 ***	*0.004*
Size	-0.026 ***	*0.002*	-0.026 ***	*0.003*	0.009 ***	*0.002*	0.000	*0.001*
Age	-0.012 ***	*0.003*	-0.024 ***	*0.004*	-0.014 ***	*0.003*	-0.003	*0.002*
Firm leverage	-0.031 ***	*0.006*	0.029 ***	*0.008*	-0.031 ***	*0.006*	0.091 ***	*0.004*
Retained earnings to equity	-0.002	*0.002*	-0.002	*0.002*	-0.001	*0.001*	0.000	*0.001*
Industry fixed effects	Yes		Yes		Yes		Yes	
R^2	0.027		0.022		0.010		0.032	
Number of observations	37 642		37 543		37 643		37 630	
Number of firms	26 568		6 366		6 368		6 366	

This table uses a difference-in-difference (DiD) approach to show the effect on investment, growth, and profitability in firms where the controlling owner is in the lowest quartile by the ratio of personal liquid assets to personal gross wealth in 2005. The full 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 sample period is 2001–2010. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment the year after the tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. "After tax shock" is 1 for 2006–2010 and 0 otherwise. "Homeowner" equals 1 for firms where the controlling family owns residential real estate and pays wealth tax in 2005, and 0 otherwise. "Family gross assets" is the controlling family's assets from the family's tax returns. "Family leverage" is the controlling family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Investment, sales growth, employment growth, cash to assets, sales to assets, volatility of sales, and retained earnings to equity are winsorized at 97.5%. Profitability is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Continued on the next page

Table 7: Personal liquidity and real effects on the firm *(continued)*

Panel B. Difference-in-Difference (DiD) estimation for high personal-liquidity group

	Dependent variable							
	Investment		Sales growth		Employment growth		Profitability	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
After tax shock	-0.007 **	*0.004*	-0.007	*0.006*	-0.001	*0.004*	-0.010 ***	*0.002*
Home owner	0.017 ***	*0.005*	0.014 **	*0.006*	0.001	*0.004*	0.027 ***	*0.003*
Homeowner * After tax shock	-0.007	*0.006*	-0.012	*0.007*	-0.002	*0.005*	-0.007 **	*0.003*
Family gross assets	0.008 ***	*0.002*	0.000	*0.002*	-0.004 ***	*0.001*	0.000	*0.001*
Family leverage	0.002	*0.001*	0.000	*0.002*	0.002 *	*0.001*	-0.002 ***	*0.001*
Firm characteristics								
Cash to assets	-0.050 ***	*0.008*	-0.053 ***	*0.008*	-0.003	*0.005*	0.070 ***	*0.004*
Return on assets	0.081 ***	*0.010*	-0.353 ***	*0.013*	0.067 ***	*0.009*		
Sales to assets	0.034 ***	*0.001*	-0.015 ***	*0.001*	-0.003 ***	*0.001*	0.002 **	*0.001*
Volatility of sales	0.044 ***	*0.006*	-0.003	*0.007*	-0.002	*0.004*	-0.017 ***	*0.003*
Size	-0.034 ***	*0.002*	-0.024 ***	*0.003*	0.010 ***	*0.002*	0.010 ***	*0.001*
Age	-0.001	*0.003*	-0.027 ***	*0.004*	-0.009 ***	*0.002*	-0.013 ***	*0.002*
Firm leverage	-0.045 ***	*0.007*	0.030 ***	*0.008*	-0.017 ***	*0.005*	0.071 ***	*0.003*
Retained earnings to equity	-0.001	*0.002*	-0.010 ***	*0.002*	-0.004 **	*0.002*	-0.002	*0.001*
Industry fixed effects	Yes		Yes		Yes		Yes	
R^2	0.019		0.029		0.010		0.052	
Number of observations	42 206		42 117		42 207		42 205	
Number of firms	6 858		6 852		6 858		6 857	

This table uses a difference-in-difference (DiD) approach to show the effect on investment, growth, and profitability in firms where the controlling owner is in the highest quartile by the ratio of personal liquid assets to personal gross wealth in 2005. The full 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. Panel A uses just firms whose owners were in the lowest quartile by the liquid assets to personal gross wealth in 2005, and Panel B uses the top quartile. The sample period is 2001–2010. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment the year after the tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. "After tax shock" is 1 for 2006–2010 and 0 otherwise. "Homeowner" equals 1 for firms where the controlling family owns residential real estate and pays wealth tax in 2005, and 0 otherwise. "Family gross assets" is the controlling family's assets from the family's tax returns. "Family leverage" is the controlling family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Investment, sales growth, employment growth, cash to assets, sales to assets, volatility of sales, and retained earnings to equity are winsorized at 97.5%. Profitability is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Appendix

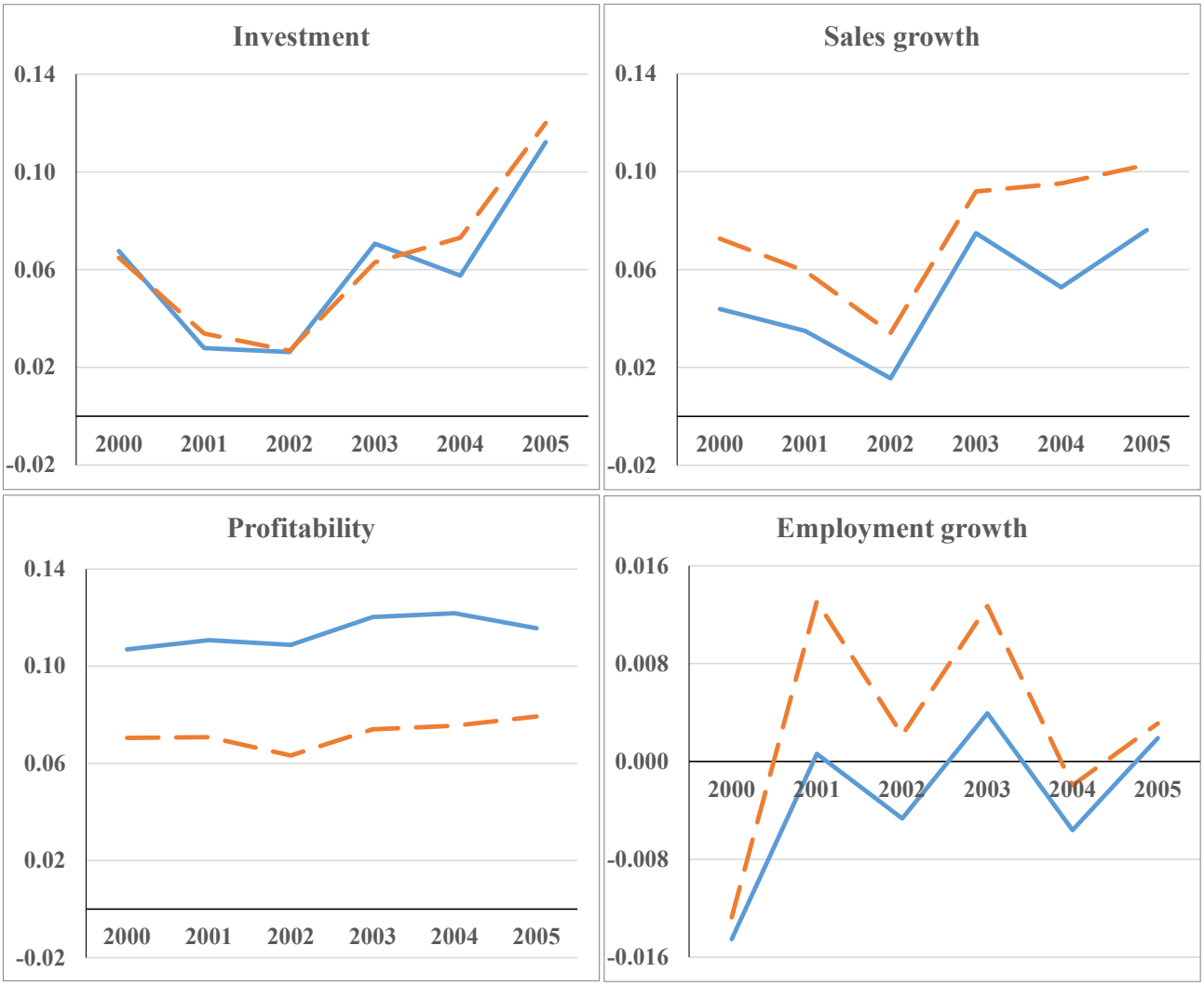

Figure A1: The evolution of growth and performance in the treatment group and the control group

This figure shows, clockwise from upper left, the evolution of investment, sales growth, employment growth, and profitability for the treatment group (solid line) and the control group (dashed line) in the full sample prior to the first wealth tax shock in 2006. The treatment group consists of firms where a family is a majority shareholder, owns a home, and pays wealth tax in 2005. The control group consists of the remaining firms. "Investment" is the percentage change in real assets the year after the tax shock. We measure "Sales growth" and "Employment growth" as the percentage change in the level the following year, while "Profitability" is the return on assets the following year. The full 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 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 A1: Characteristics of the controlling family and the firm in all family-controlled firms

	All		Homeowner		Not homeowner	
Variable	Mean	Median	Mean	Median	Mean	Median
Family characteristics						
Family gross assets	7.52	2.17	8.12	2.31	3.50	1.15
Family leverage	1.09	0.58	1.05	0.58	1.39	0.60
Family net wealth	5.44	0.71	5.96	0.81	1.96	0.25
Family home to gross assets	0.28	0.21	0.32	0.25	0.00	0.00
Family liquid assets to gross assets	0.27	0.20	0.25	0.19	0.39	0.29
Family wealth tax to liquidity	0.04	0.01	0.04	0.01	0.03	0.01
Family salary from outside the firm	0.12	0.00	0.13	0.00	0.06	0.00
Firm characteristics						
Cash to assets	0.30	0.24	0.30	0.24	0.25	0.18
Return on assets	0.09	0.08	0.09	0.08	0.07	0.06
Sales to assets	2.39	2.00	2.37	2.00	2.50	2.06
Volatility of sales	0.34	0.23	0.34	0.23	0.36	0.26
Sales	9.65	3.60	9.87	3.65	8.17	3.27
Firm age	13.40	11.00	13.64	11.00	11.78	9.00
Firm leverage	0.71	0.72	0.70	0.72	0.76	0.76
Asset tangibility	0.21	0.10	0.20	0.09	0.24	0.13
Retained earnings to equity	0.60	0.71	0.61	0.72	0.59	0.69
Financial effects						
Dividend payer	0.21	0.00	0.22	0.00	0.15	0.00
Dividends to earnings	0.15	0.00	0.15	0.00	0.10	0.00
Dividends and salary to earnings before salary	0.63	0.71	0.63	0.71	0.58	0.66
Real effects						
Investment	0.08	0.03	0.08	0.03	0.08	0.03
Sales growth	0.09	0.04	0.09	0.04	0.11	0.04
Number of employees	5.97	3.00	6.06	3.00	5.35	3.00
Employment growth	0.02	0.00	0.02	0.00	0.03	0.00
Performance	0.09	0.08	0.09	0.08	0.07	0.06

This table shows summary statistics for the full sample of controlling families and the firms they control during the sample period 2006–2010. Unlike in Table 3, this table also includes firms where the controlling family does not experience a standard change in the tax value of the family home in 2006–2009. 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. "Family gross assets" is the family's total assets in million NOK as of 2010 from the family's tax returns. "Family leverage" is the family's personal debt to gross wealth. "Family net wealth" is the family's total assets less its liabilities in million NOK as of 2010 from the family's tax returns. "Family home to gross assets" is the tax value of the family's residential real estate divided by the family's gross wealth. "Family liquid assets to gross assets" is the family's cash, bank savings, and listed securities divided by gross wealth. "Family wealth tax to liquidity" is the family's wealth tax payments divided by its liquid assets. "Family salary from outside the firm" is the amount in million NOK received by the family as salary from sources other than the firm. "Cash to assets" is the firm's cash holdings over the year divided by the firm's assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Sales" is the firm's revenues in million NOK as of 2010. "Age" is the number of years since the firm was founded. "Firm leverage" is the firm's liabilities divided by its assets. "Asset tangibility" is the ratio of the firm's tangible fixed assets to total assets. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "Dividends to earnings" is the ratio of the firm's dividends to operating earnings. "Dividends and salary to earnings and 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. "Number of employees" is the number of people working in the firm. "Investment" is the percentage change in real assets over the year. "Performance" is return on assets. The ratio of family wealth tax to liquid assets, cash to assets, sales to assets, retained earnings to equity, volatility of sales, investment, sales growth, and employment growth are winsorized at 97.5%. The return on assets is winsorized at 2.5% and 97.5%.

Table A2: The first stage of the instrumental variables estimation

Dependent variable: Family wealth tax to liquid assets

Independent variable	Coefficient		SE	Coefficient		SE	Coefficient		SE
Instruments									
Change in home's tax value	0.078	***	*0.003*	0.036	***	*0.003*	0.036	***	*0.003*
Home's tax value to family gross assets	-0.062	***	*0.001*	-0.064	***	*0.002*	-0.064	***	*0.002*
Family characteristics									
Family gross assets				0.003	***	*0.000*	0.003	***	*0.000*
Family leverage				-0.002	***	*0.000*	-0.002	***	*0.000*
Firm characteristics									
Cash to assets				-0.002		*0.002*	-0.003	***	*0.002*
Return on assets				-0.007	***	*0.002*			
Sales to assets				-0.001	*	*0.000*	0.000	***	*0.000*
Volatility of sales				0.010	***	*0.003*	0.010	***	*0.003*
Size				0.003	**	*0.001*	0.001	***	*0.001*
Age				-0.026	***	*0.004*	-0.026	***	*0.004*
Firm leverage				-0.018	***	*0.002*	-0.021	***	*0.002*
Retained earnings to equity				0.001	***	*0.000*	0.001	***	*0.000*
Firm fixed effects				Yes			Yes		
Year fixed effects				Yes			Yes		
R^2	0.047			0.033			0.032		
Number of observations	86 473			78 263			78 263		
Number of firms	35 141			31 941			31 941		

The models in this table use the clean sample and the 2006–2010 period to estimate the first stage of the instrumental variables (IV) regressions. The clean 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. "Family wealth tax to liquid assets" is the family's wealth tax payments divided by its liquid assets. "Change in home's tax value" is the change in the tax value of the family's residential real estate, and "Home's tax value to family gross assets" is the tax value of the family's residential real estate as a proportion of the family's gross assets. "Family gross assets" is the family's assets from the family's tax returns. "Family leverage" is the family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Standard errors are clustered at the firm level. Cash to assets, sales to assets, volatility of sales, and retained earnings to equity are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table A3: Financial and real effects in 2006–2009

Panel A. Financial effects

	Dependent variable							
	Dividends to earnings		Dividend payer		Dividends and salary to earnings before salary		Change in cash to assets	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Family wealth tax to liquidity	0.326 *	*0.172*	0.311	*0.217*	0.377 ***	*0.150*	-1.176 ***	*0.100*
Family gross assets	-0.002 **	*0.001*	-0.003 **	*0.001*	-0.002 ***	*0.001*	0.001 **	*0.001*
Family leverage	0.004 **	*0.002*	0.006 **	*0.002*	0.007 **	*0.002*	-0.001	*0.001*
Firm characteristics								
Cash to assets	0.089 ***	*0.010*	0.117 ***	*0.013*	0.056 ***	*0.010*	1.030 ***	*0.006*
Return on assets	0.240 ***	*0.011*	0.400 ***	*0.014*	-1.012 ***	*0.017*	-0.011 *	*0.006*
Sales to assets	-0.004 **	*0.002*	-0.013 ***	*0.002*	0.036 ***	*0.002*	0.001	*0.001*
Volatility of sales	-0.042 ***	*0.015*	-0.045 **	*0.019*	-0.053 ***	*0.016*	0.005	*0.009*
Size	0.035 ***	*0.006*	0.085 ***	*0.008*	0.003	*0.007*	0.022 ***	*0.004*
Age	0.006	*0.026*	-0.005	*0.034*	-0.002	*0.027*	-0.016	*0.015*
Firm leverage	-0.289 ***	*0.011*	-0.352 ***	*0.014*	-0.206 ***	*0.011*	0.091 ***	*0.006*
Retained earnings to equity	0.012 ***	*0.002*	0.011 ***	*0.002*	0.007 ***	*0.002*	-0.002 *	*0.001*
Firm fixed effects	Yes				Yes		Yes	
Year fixed effects	Yes				Yes		Yes	
R^2	0.080		0.144		0.065		0.130	
Number of observations	63 918		64 489		47,403		64 489	
Number of firms	28 945		29 041		24,511		29 041	

The models estimated in this table use the clean sample for the subperiod in 2006–2009 to show how tax shocks to the controlling family's personal wealth relate to the cash flow from the firm to the family and to the firm's liquidity position. The clean subsample 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 or experiences a standard change in the home's tax value plus/minus 1% (2006–2009). We exclude financials, business groups, holding companies, the families with zero gross wealth, and the smallest 5% of firms by assets, sales, and employment. "Dividends to earnings" is the ratio of the firm's dividends to operating earnings. "Dividend payer" is equal to 1 if the firm pays dividends in a given year 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. "Change in cash to assets" is the change in the firm's cash-to-total-assets ratio. . "Family wealth tax to liquidity" is the family's wealth tax payments divided by its liquid assets. This variable is instrumented by the change in the tax value of the family's home and by the home's tax value as a proportion of the family's gross assets. "Family gross assets" is the family's assets from the family's tax returns. "Family leverage" is the family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Standard errors are clustered at the firm level. Investment, sales growth, employment growth, cash to assets, sales to assets, volatility of sales, and retained earnings to equity are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Continued on the next page

Table A3: Financial and real effects in 2006–2009 *(continued)*

Panel B. Real effects

	Dependent variable							
	Investment		Sales growth		Employment growth		Profitability	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Family wealth tax to liquidity	-0.367 **	*0.181*	-0.442 ***	*0.171*	-0.284 *	*0.182*	-0.501 ***	*0.096*
Family gross assets	0.000	*0.001*	0.000	*0.001*	0.000	*0.001*	0.001 *	*0.001*
Family leverage	-0.001	*0.002*	-0.007 ***	*0.002*	-0.001	*0.002*	-0.001	*0.001*
Firm characteristics								
Cash to assets	-0.062 ***	*0.011*	-0.128 ***	*0.011*	0.014	*0.011*	-0.062 ***	*0.006*
Return on assets	0.016	*0.012*	-0.212 ***	*0.011*	0.084 ***	*0.012*		
Sales to assets	0.181 ***	*0.002*	-0.030 ***	*0.002*	-0.007 ***	*0.002*	0.026 ***	*0.001*
Volatility of sales	0.003	*0.016*	-0.079 ***	*0.016*	0.016	*0.016*	-0.006	*0.009*
Size	-0.460 ***	*0.007*	-0.583 ***	*0.007*	-0.062 ***	*0.007*	-0.084 ***	*0.003*
Age	0.044	*0.029*	0.103 ***	*0.027*	0.021	*0.029*	-0.003	*0.015*
Firm leverage	-0.047 ***	*0.012*	0.070 ***	*0.011*	-0.035 ***	*0.012*	0.110 ***	*0.006*
Retained earnings to equity	0.001	*0.002*	-0.001	*0.002*	0.000	*0.002*	-0.002 **	*0.001*
Firm fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
R^2	0.01		0.01		0.01		0.01	
Number of observations	59 027		58 916		59 027		59 017	
Number of firms	25 925		25 895		25 925		25 922	

This table shows how the controlling owner's wealth tax payments relate to the firm's investment, growth, and profitability in the clean subsample in the subperiod 2006–2009. The clean subsample 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). We exclude financials, business groups, holding companies, the families with zero gross wealth, and the smallest 5% of firms by assets, sales, and employment. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment in the year after the wealth tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. "Family wealth tax to liquidity" is the family's wealth tax payments divided by its liquid assets. This variable is instrumented by the change in the tax value of the family's home and by the home's tax value as a proportion of the family's gross assets. "Family gross assets" is the family's assets from the family's tax returns. "Family leverage" is the family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Standard errors are clustered at the firm level. Investment, sales growth, employment growth, cash to assets, sales to assets, volatility of sales, and retained earnings to equity are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table A4: Results using propensity score matching

Panel A. Matching on family and firm characteristics

	Average treatment effect		SE	Number of observations
Financial effects				
Dividends to earnings	0.006	*	0.035	98,345
Dividend payer	0.013	***	0.005	99,278
Dividends and salary to earnings before salary	0.011	**	0.005	73,640
Change in cash to assets	-0.018	***	-0.006	99,126
Real effects				
Investment	-0.003	**	0.015	91,177
Sales growth	-0.015	***	0.004	90,992
Employment growth	-0.008	***	0.003	91,178
Profitability	-0.003	*	0.002	91,164

Panel B. Difference-In-Difference (DiD) estimation with matching

Real effects	Difference before (treatment-control)	Difference after (treatment-control)	Difference in difference		SE
Investment	0.013	0.009	-0.004	**	0.002
Sales growth	0.015	0.001	-0.014	***	0.003
Employment growth	-0.001	-0.005	-0.004	*	0.002
Profitability	0.015	0.008	-0.008	***	0.001

This table presents results using propensity score matching in the full sample. Panel A shows the average treatment effect for our proxies of the firm's financial effects and real effects. "Dividends to earnings" is the ratio of the firm's dividends to operating earnings. "Dividend payer" is equal to 1 if the firm pays dividends in a given year 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. "Change in cash to assets" is the change in the firm's cash-to-assets ratio. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment in the year after the wealth tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. All ratios are winsorized at 5% (0% if only positive values are meaningful) and 95%. "SE" is standard error. The full 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 is vs. is not affected by a tax shock on the personal home. 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 sample period is 2006–2010. We match on industry, year, firm, and family characteristics. Panel B shows difference-in-difference results for matched firms where the controlling shareholder is vs. is not affected by a tax shock on the personal home. We match on industry, firm, and family characteristics measured as averages over the 2000–2005 period, which is prior to the tax shock. "SE" is standard error. The time period is 2000–2010. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table A5: Robustness to the liquidity shock measure

Panel A. Financial effects

	Dependent variable							
	Dividends to earnings		Dividend payer		Dividends and salary to earnings before salary		Change in cash to assets	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Family wealth tax to bank deposits	0.120 **	*0.058*	0.138 *	*0.074*	0.171 ***	*0.054*	-1.583 ***	*0.109*
Family gross assets	-0.002 *	*0.001*	-0.003 *	*0.002*	0.000 **	*0.001*	0.000 **	*0.002*
Family leverage	0.003 *	*0.002*	0.007 ***	*0.002*	0.007 ***	*0.002*	0.031 ***	*0.003*
Firm characteristics								
Cash to assets	0.088 ***	*0.010*	0.121 ***	*0.012*	-1.041 ***	*0.010*	0.261 ***	*0.018*
Return on assets	0.245 ***	*0.010*	0.405 ***	*0.013*	0.054 ***	*0.016*	1.304 ***	*0.019*
Sales to assets	-0.006 ***	*0.002*	-0.014 ***	*0.002*	0.035 ***	*0.002*	-0.068 ***	*0.003*
Volatility of sales	-0.035 ***	*0.013*	-0.044 ***	*0.016*	-0.030 **	*0.014*	-0.005	*0.024*
Size	0.041 ***	*0.006*	0.092 ***	*0.007*	0.004	*0.006*	0.210 ***	*0.011*
Age	-0.004	*0.022*	-0.006	*0.028*	-0.026	*0.022*	-0.170 ***	*0.041*
Firm leverage	-0.274 ***	*0.010*	-0.323 ***	*0.012*	-0.185 ***	*0.011*	0.012	*0.018*
Retained earnings to equity	0.012 ***	*0.002*	0.010 ***	*0.002*	0.006 ***	*0.002*	0.000	*0.003*
Firm fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
R^2	0.079		0.140		0.050		0.058	
Number of observations	69 717		70354		51 010		70 271	
Number of firms	29 596		29684		25 095		29 655	

The models estimated in this table use a modified measure of the controlling shareholder's wealth tax shock to show how illiquidity shocks to the controlling family's personal wealth influence the cash flow from the firm to the family and the firm's liquid position in the clean sample. The clean 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 sample period is 2006–2010. "Dividends to earnings" is the ratio of the firms dividends to operating earnings. "Dividend payer" is equal to 1 if the firm pays dividends in a given year 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. "Change in cash to assets" is the change in firm's cash-to-assets ratio. "Family wealth tax to bank deposits" is the family's wealth tax payments divided by its bank savings. This variable is instrumented by the change in the tax value of the family's home and by the home's tax value as a proportion of the family's gross assets. "Family gross assets" is the family's assets from the tax returns. "Family leverage" is the family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Standard errors are clustered at the firm level. Dividends to earnings, dividends and salary to earnings, cash to assets, sales to assets, volatility of sales, and retained earnings are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Continued on the next page

Table A5: Robustness to the liquidity shock measure *(continued)*

Panel B. Real effects

	Dependent variable							
	Investment		Sales growth		Employment growth		Profitability	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Family wealth tax to bank deposits	-0.083 *	*0.041*	-0.143 **	*0.058*	-0.045	*0.061*	-0.171 ***	*0.033*
Family gross assets	0.000	*0.001*	0.000	*0.001*	0.000	*0.001*	0.000 **	*0.001*
Family leverage	-0.002	*0.002*	-0.003 *	*0.002*	0.000	*0.002*	0.002 *	*0.001*
Firm characteristics								
Cash to assets	0.010	*0.010*	-0.205 ***	*0.010*	0.107 ***	*0.010*	-0.053 ***	*0.006*
Return on assets	-0.054 ***	*0.011*	-0.117 ***	*0.011*	0.019 *	*0.011*		
Sales to assets	0.174 ***	*0.002*	-0.032 ***	*0.002*	-0.003	*0.002*	0.029 ***	*0.001*
Volatility of sales	0.022	*0.014*	-0.008	*0.013*	0.048 ***	*0.014*	-0.005	*0.008*
Size	-0.427 ***	*0.006*	-0.553 ***	*0.006*	-0.089 ***	*0.006*	-0.083 ***	*0.003*
Age	0.077 ***	*0.024*	0.083 ***	*0.022*	0.040	*0.024*	0.020	*0.013*
Firm leverage	-0.053 ***	*0.010*	0.060 ***	*0.010*	-0.040 ***	*0.010*	0.123 ***	*0.005*
Retained earnings to equity	-0.001	*0.002*	-0.002	*0.002*	0.000	*0.002*	-0.003 ***	*0.001*
Firm fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
R^2	0.006		0.005		0.010		0.007	
Number of observations	64 895		64 780		64 895		64 885	
Number of firms	26 846		26 816		26 846		26 843	

The models estimated in this table use a modified measure of the controlling shareholder's wealth tax shock to show how illiquidity shocks to the controlling family's personal wealth influence the firm's investment, growth, and profitability in the clean sample. The clean 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 sample period is 2006–2010. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment in the year after the wealth tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. "Family wealth tax to bank deposits" is the family's wealth tax payments divided by its bank savings. This variable is instrumented by the change in the tax value of the family's home and by the home's tax value as a proportion of the family's gross assets. "Family gross assets" is the controlling family's assets from the family's tax returns. "Family leverage" is the controlling family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Standard errors are clustered at the firm level. Investment, sales growth, employment growth, cash to assets, sales to assets, volatility of sales, and retained earnings to equity are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table A6: Accounting for the market value of residential real estate

Panel A. Financial effects using IV regressions

	Dependent variable							
	Dividends to earnings		Dividend payer		Dividends and salary to earnings before salary		Change in cash to assets	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Family wealth tax to liquidity	0.494 ***	*0.151*	0.544 ***	*0.190*	0.536 ***	*0.136*	-1.087 ***	*0.087*
Family gross assets	-0.003 ***	*0.001*	-0.004 ***	*0.002*	-0.003 ***	*0.001*	0.002 ***	*0.001*
Family leverage	0.003 **	*0.002*	0.006 ***	*0.002*	0.006 ***	*0.002*	-0.001	*0.001*
Firm characteristics								
Cash to assets	0.084 ***	*0.009*	0.111 ***	*0.011*	0.052 ***	*0.009*	0.969 ***	*0.005*
Return on assets	0.245 ***	*0.010*	0.401 ***	*0.012*	-1.023 ***	*0.015*	-0.005	*0.005*
Sales to assets	-0.005 ***	*0.002*	-0.013 ***	*0.002*	0.035 ***	*0.002*	0.000	*0.001*
Volatility of sales	-0.040 ***	*0.012*	-0.045 ***	*0.015*	-0.040 ***	*0.013*	0.006	*0.007*
Size	0.033 ***	*0.005*	0.084 ***	*0.007*	0.004	*0.006*	0.021 ***	*0.003*
Age	-0.011	*0.020*	-0.014	*0.026*	-0.022	*0.021*	0.003	*0.012*
Firm leverage	-0.261 ***	*0.009*	-0.311 ***	*0.012*	-0.173 ***	*0.010*	0.096 ***	*0.005*
Retained earnings to equity	0.011 ***	*0.002*	0.010 ***	*0.002*	0.007 ***	*0.002*	-0.002 *	*0.001*
Change in local home prices	0.046	*0.031*	0.075 *	*0.039*	0.073 **	*0.031*	0.029	*0.018*
Firm fixed effects	Yes				Yes		Yes	
Year fixed effects	Yes				Yes		Yes	
R^2	0.08		0.14		0.06		0.13	
Number of observations	77 516		78 234		56 878		78 234	
Number of firms	31 833		31 928		27 067		31 928	

The models in this table estimate how the controlling owner's tax payments relate to the firm's payout and cash holdings when we account for changes in market value of the controlling owner's personal home and use instrumental variables (IV) estimation in the clean sample. The clean 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 sample period is 2006–2010. "Dividends to earnings" is the ratio of the firm's dividends to operating earnings. "Dividend payer" is equal to 1 if the firm pays dividends in a given year 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. "Change in cash to assets" is the change in the firm's cash-to-assets ratio. "Family wealth tax to liquidity" is the family's wealth tax payments divided by its liquid assets. This variable is instrumented by the change in the tax value of the family's residential real estate and by the ratio between residential real estate and the family's total gross assets. "Family gross assets" is the controlling family's assets from the family's tax returns. "Family leverage" is the controlling family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings o total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "Change in local home prices" is the change in the price per square meter for residential real estate in the county. "SE" is standard error. Standard errors are clustered at the firm level. Dividends to earnings, dividends and salary to earnings, sales growth, asset growth, employment growth, cash to assets, sales to assets, volatility of sales, and retained earnings are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

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Table A6: Accounting for the market value of residential real estate *(continued)*

Panel B. Real effects using IV regressions

	Dependent variable							
	Investment		Sales growth		Employment growth		Profitability	
Independent variable	Coefficient	SE	Coefficient	SE	fficient	SE	Coefficient	SE
Family characteristics								
Family wealth tax to liquidity	-0.303 *	*0.159*	-0.450 **	*0.150*	-0.187	*0.158*	-0.486 ***	*0.084*
Family gross assets	0.001	*0.001*	0.001	*0.001*	0.001	*0.001*	0.001	*0.001*
Family leverage	-0.002	*0.002*	-0.005 **	*0.002*	-0.001	*0.002*	0.001	*0.001*
Firm characteristics								
Cash to assets	-0.046 **	*0.010*	-0.114 **	*0.009*	0.070 ***	*0.010*	-0.049 ***	*0.005*
Return on assets	0.025 **	*0.010*	-0.030 **	*0.010*	0.017 **	*0.010*		
Sales to assets	0.170 ***	*0.002*	-0.019 **	*0.002*	-0.003 *	*0.002*	0.027 ***	*0.001*
Volatility of sales	0.017	*0.013*	-0.533	*0.012*	0.009	*0.013*	0.001	*0.007*
Size	-0.414 ***	*0.006*	0.079 **	*0.005*	-0.049 ***	*0.006*	-0.076 ***	*0.003*
Age	0.059 ***	*0.022*	0.061	*0.021*	0.002	*0.022*	0.009	*0.012*
Firm leverage	-0.060 ***	*0.010*	0.070 **	*0.010*	-0.033 ***	*0.010*	0.124 ***	*0.005*
Retained earnings to equity	0.001	*0.002*	-0.001	*0.002*	0.001	*0.002*	-0.002 ***	*0.001*
Change in local home prices	-0.042	*0.033*	-0.014	*0.032*	0.016	*0.033*	0.006	*0.018*
Firm fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
R^2	0.01		0.01		0.01		0.01	
Number of observations	71 818		71 684		71 818		71 807	
Number of firms	28 582		28 552		28 582		28 580	

This table shows how the controlling owner's tax payments on residential real estate relate to the firm's investment, growth, and profitability when we account for changes in market value of the controlling owner's personal home and use instrumental variables (IV) estimation in the clean sample. The clean 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 sample period is 2006–2010. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment in the year after the wealth tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. "Family wealth tax to liquidity" is the family's wealth tax payments divided by its liquid assets. This variable is instrumented by the change in the tax value of the family's residential real estate and by the ratio between residential real estate and the family's total gross assets. "Family gross assets" is the family's assets from the family's tax returns. "Family leverage" is the family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the sum of the firm's operating earnings divided by total assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "Change in local home prices" is the change in the price per square meter for residential real estate in the county. "SE" is standard error. Standard errors are clustered at the firm level. Investment, sales growth, employment growth, cash to assets, sales to assets, volatility of sales, and retained earnings to equity are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

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Table A6: Accounting for the market value of residential real estate *(continued)*

Panel C. Real effects using DiD regressions

	Dependent variable							
	Investment		Sales growth		Employment growth		Profitability	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
After tax shock	-0.016 ***	*0.002*	-0.008 ***	*0.002*	-0.001	*0.002*	-0.014 ***	*0.001*
Homeowner	0.006 ***	*0.002*	0.011 ***	*0.003*	-0.002	*0.002*	0.018 ***	*0.002*
Homeowner * After tax shock	-0.005 **	*0.003*	-0.012 ***	*0.003*	-0.003	*0.002*	-0.010 ***	*0.002*
Family gross assets	0.008 ***	*0.001*	-0.001	*0.001*	-0.004 ***	*0.001*	0.003 ***	*0.001*
Family leverage	0.002 ***	*0.001*	0.002 ***	*0.001*	0.001 *	*0.001*	-0.001 ***	*0.000*
Firm characteristics								
Cash to assets	-0.039 ***	*0.003*	-0.043 ***	*0.004*	-0.008 ***	*0.003*	0.115 ***	*0.003*
Return on assets	0.090 ***	*0.006*	-0.263 ***	*0.008*	0.078 ***	*0.005*		
Sales to assets	0.024 ***	*0.001*	-0.011 ***	*0.001*	-0.003 ***	*0.000*	-0.005 ***	*0.000*
Volatility of sales	0.032 ***	*0.003*	0.012 ***	*0.004*	-0.001 ***	*0.002*	-0.024 ***	*0.002*
Size	-0.020 ***	*0.001*	-0.008 ***	*0.001*	0.009 ***	*0.001*	0.017 ***	*0.001*
Age	-0.010 ***	*0.001*	-0.025 ***	*0.001*	-0.012 ***	*0.001*	-0.013 ***	*0.001*
Firm leverage	-0.048 ***	*0.003*	0.005	*0.004*	-0.019 ***	*0.003*	0.040 ***	*0.002*
Retained earnings to equity	-0.001	*0.001*	-0.003 ***	*0.001*	-0.002 ***	*0.001*	0.003 ***	*0.001*
Change in local home prices	0.239 ***	*0.011*	0.330 ***	*0.013*	-0.007	*0.010*	0.115 ***	*0.006*
Industry fixed effects	Yes		Yes		Yes		Yes	
R^2	0.025		0.029		0.010		0.066	
Number of observations	164 209		163 840		164 212		164 187	
Number of firms	26 554		26 543		26 554		26 551	

This table uses a difference-in-difference (DiD) approach to compare the effect on investment, growth, and profitability in the full sample of firms where the controlling family is vs. is not affected by a tax shock on the personal home. The full 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 sample period is 2001–2010. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment in the year after the wealth tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. "After tax shock" is 1 for 2006–2010 and 0 otherwise. "Homeowner" equals 1 for firms where the controlling family owns residential real estate and pays wealth tax in 2005, and 0 otherwise. "Family gross assets" is the controlling family's assets from the family's tax returns. "Family leverage" is the controlling family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "Change in local home prices" is the change in the price per square meter for residential real estate in the county. "SE" is standard error. Standard errors are clustered at the firm level. Investment, sales growth, employment growth, cash to assets, sales to assets, and volatility of sales are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table A7: Using asset tangibility to measure debt capacity

Panel A. Financial effects using IV regressions

	Dependent variable							
	Dividends to earnings		Dividend payer		Dividends and salary to earnings before salary		Change in cash to assets	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Family wealth tax to liquidity	0.896 ***	*0.147*	1.024 ***	*0.185*	0.654 ***	*0.134*	-1.237 ***	*0.085*
Family gross assets	-0.001 ***	*0.001*	-0.005 ***	*0.002*	-0.003 ***	*0.001*	0.001 ***	*0.001*
Firm characteristics								
Cash to assets	0.103 ***	*0.010*	0.137 ***	*0.012*	0.064 ***	*0.010*	0.976 ***	*0.005*
Return on assets	0.155 ***	*0.010*	0.295 ***	*0.012*	-1.094 ***	*0.015*	0.032 ***	*0.006*
Sales to assets	-0.014 ***	*0.002*	-0.024 ***	*0.002*	0.028 ***	*0.002*	0.005 ***	*0.001*
Volatility of sales	-0.038 ***	*0.012*	-0.043 ***	*0.015*	-0.034 **	*0.013*	0.006	*0.007*
Size	0.041 ***	*0.005*	0.092 ***	*0.007*	0.007	*0.006*	0.018 ***	*0.003*
Age	-0.030	*0.021*	-0.037	*0.026*	-0.032	*0.021*	0.011	*0.012*
Asset tangibility	-0.031 **	*0.013*	-0.023	*0.015*	-0.022	*0.014*	0.073 ***	*0.007*
Retained earnings to equity	0.004 ***	*0.002*	0.001	*0.002*	0.003 *	*0.002*	0.001	*0.001*
Firm fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
R^2	0.06		0.11		0.06		0.12	
Number of observations	77 561		78 345		56 949		78 329	
Number of firms	31 852		31 982		27 105		31 976	

The models in this table estimate how the controlling owner's tax payments relate to the firm's cash flows when we use asset tangibility to replace leverage in the clean sample. The clean 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 sample period is 2006–2010. "Dividends to earnings" is the ratio of the firm's dividends and operating earnings. "Dividend payer" is equal to 1 if the firm pays dividends in a given year 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. "Change in cash to assets" is the change in firm's cash-to-assets ratio. "Family wealth tax to liquidity" is the family's wealth tax payments divided by its liquid assets. This variable is instrumented by the change in the tax value of the family's residential real estate and by the ratio between residential real estate and the family's gross assets. "Family gross assets" is the family's assets from the tax returns. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Asset tangibility" is fixed assets divided by total assets. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Standard errors are clustered at the firm level. Dividends to earnings, dividends and salary to earnings, cash to assets, sales to assets, volatility of sales, and retained earnings are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

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Table A7: Using asset tangibility to measure debt capacity *(continued)*

Panel B. Real effects using IV regressions

	Dependent variable							
	Investment		Sales growth		Employment growth		Profitability	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Family wealth tax to liquidity	-0.218 **	*0.102*	-0.533 ***	*0.144*	-0.131	*0.151*	-0.743 ***	*0.082*
Family gross assets	0.001	*0.001*	0.001	*0.001*	0.001	*0.001*	0.001 ***	*0.001*
Firm characteristics								
Cash to assets	0.004	*0.010*	-0.187 ***	*0.010*	0.058 ***	*0.010*	-0.047 ***	*0.006*
Return on assets	-0.040 ***	*0.010*	-0.128 ***	*0.010*	0.022 ***	*0.010*		
Sales to assets	0.167 ***	*0.002*	-0.028 ***	*0.002*	-0.004 ***	*0.002*	0.031 ***	*0.001*
Volatility of sales	0.018	*0.013*	-0.022 *	*0.012*	0.009	*0.013*	0.002	*0.007*
Size	-0.412 ***	*0.006*	-0.534 ***	*0.006*	-0.048 ***	*0.006*	-0.071 ***	*0.003*
Age	0.054 **	*0.022*	0.085	*0.021*	-0.002	*0.022*	0.013	*0.012*
Asset tangibility	-0.001	*0.012*	-0.035 ***	*0.013*	0.004	*0.012*	0.033 **	*0.007*
Retained earnings to equity	-0.001	*0.002*	0.001	*0.002*	0.000	*0.002*	0.001	*0.001*
Firm fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
R^2	0.01		0.01		0.01		0.01	
Number of observations	71 906		71 772		71 906		71 895	
Number of firms	28 622		28 593		28 622		28 622	

The models in this table present the clean sample estimates of how the controlling owner's tax payments relate to the firm's investment, growth, and profitability when we use asset tangibility to replace leverage. The clean 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 sample period is 2006–2010. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment in the year after the wealth tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. "Family wealth tax to liquidity" is the family's wealth tax payments divided by its liquid assets. This variable is instrumented by the change in the tax value of the family's residential real estate and by the ratio between residential real estate and the family's total gross assets. "Family gross assets" is the family's assets from the tax returns. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Volatility of sales" is the coefficient of variation of sales over the past three years. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Asset tangibility" is fixed assets divided by total assets. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "SE" is standard error. Standard errors are clustered at the firm level. Investment, sales growth, employment growth, cash to assets, sales to assets, volatility of sales, and retained earnings to equity are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table A8: Real effects with year fixed effects, firm fixed effects, and interaction effects for the control variables

	Dependent variable							
	Investment		Sales growth		Employment growth		Profitability	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Homeowner * After tax shock	-0.008 **	*0.003*	-0.022 ***	*0.004*	-0.006 *	*0.003*	-0.005 ***	*0.002*
Family gross assets	-0.003 **	*0.001*	-0.006 ***	*0.002*	-0.001	*0.001*	-0.005 ***	*0.001*
Family gross assets* After tax shock	-0.003 *	*0.001*	-0.008 ***	*0.002*	0.000	*0.002*	0.000	*0.001*
Family leverage	-0.001	*0.001*	-0.001	*0.001*	-0.001	*0.001*	0.002 ***	*0.001*
Family leverage* After tax shock	0.001	*0.001*	-0.002	*0.002*	0.001	*0.001*	-0.001 *	*0.001*
Firm characteristics								
Cash to assets	-0.073	*0.006*	-0.127 ***	*0.008*	0.015 **	*0.006*	0.002	*0.003*
Return on assets	0.016 **	*0.008*	-0.328 ***	*0.009*	0.101 ***	*0.008*		
Sales to assets	0.121 ***	*0.001*	-0.032 ***	*0.001*	-0.006 ***	*0.001*	0.016 ***	*0.001*
Volatility of sales	0.014 **	*0.006*	0.030 ***	*0.007*	0.034 ***	*0.006*	0.008 ***	*0.003*
Size	-0.284 ***	*0.003*	-0.442 ***	*0.004*	-0.050 ***	*0.003*	-0.025 ***	*0.001*
Age	0.070 ***	*0.010*	0.080 ***	*0.013*	-0.016	*0.011*	0.015 ***	*0.005*
Firm leverage	-0.035 ***	*0.006*	0.035 ***	*0.007*	-0.031 ***	*0.006*	0.097 ***	*0.003*
Retained earnings to equity	-0.003 ***	*0.001*	-0.001	*0.002*	-0.002	*0.001*	0.001	*0.001*
Cash to assets* After tax shock	0.052 ***	*0.007*	-0.009	*0.008*	-0.009	*0.007*	-0.013 ***	*0.003*
Return on assets* After tax shock	0.085 ***	*0.010*	0.116 ***	*0.012*	0.015	*0.010*		
Sales to assets* After tax shock	0.007 ***	*0.001*	-0.003 **	*0.001*	0.000	*0.001*	0.000	*0.000*
Volatility of sales* After tax shock	-0.001	*0.006*	0.012 *	*0.007*	0.030 ***	*0.006*	0.013 ***	*0.003*
Size* After tax shock	0.009 ***	*0.002*	0.019 ***	*0.002*	-0.001	*0.002*	0.001	*0.001*
Age* After tax shock	0.006	*0.004*	0.002	*0.005*	0.001	*0.004*	0.003	*0.002*
Firm leverage* After tax shock	-0.051 ***	*0.007*	0.030 ***	*0.008*	-0.006	*0.007*	0.051 ***	*0.003*
Retained earnings to equity* After tax shock	0.005 ***	*0.002*	-0.004 *	*0.002*	0.002	*0.002*	-0.004 ***	*0.001*
D2002	-0.005	*0.003*	-0.027 ***	*0.004*	-0.006 *	*0.071*	-0.009 ***	*0.002*
D2003	0.030 ***	*0.003*	0.019 ***	*0.004*	0.005	*0.158*	-0.002	*0.002*
D2004	0.032 ***	*0.004*	0.020 ***	*0.005*	0.000	*0.934*	-0.001	*0.002*
D2005	0.084 ***	*0.004*	0.048 ***	*0.005*	0.007	*0.127*	-0.005 **	*0.002*
D2006	0.107 ***	*0.026*	0.150 ***	*0.032*	0.006	*0.822*	-0.030 **	*0.013*
D2007	0.043 *	*0.026*	0.104 ***	*0.032*	0.016	*0.548*	-0.054 ***	*0.014*
D2008	0.022	*0.027*	0.022	*0.033*	0.005	*0.846*	-0.063 ***	*0.014*
D2009	0.040	*0.027*	0.071 **	*0.034*	0.014	*0.620*	-0.067 ***	*0.014*
D2010	0.051 *	*0.028*	0.094 ***	*0.034*	-0.002	*0.954*	-0.057 ***	*0.015*
Firm fixed effects	Yes		Yes		Yes		Yes	
R^2: overall	0.011		0.008		0.008		0.001	
within	0.168		0.208		0.008		0.060	
between	0.002		0.002		0.002		0.046	
Number of observations	164 271		163 902		164 274		164 249	
Number of firms	26 568		26 557		26 568		26 565	

This table uses a difference-in-difference (DiD) approach to compare the effect of shareholder illiquidity on the firm's investment, growth, and profitability in the full sample. The full 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 sample period is 2001–2010. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment in the year after the wealth tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. "Homeowner" equals 1 for firms where the controlling family owns residential real estate and pays wealth tax in 2005, and 0 otherwise. "After tax shock" is 1 for 2006–2010 and 0 otherwise. "Family gross assets" is the controlling family's assets from the family's tax returns. "Family leverage" is the controlling family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "D200X" is 1 if the observation is from year 200X (X = 2,...,10) and 0 otherwise. "SE" is standard error. Standard errors are clustered at the firm level. Investment, sales growth, employment growth, cash to assets, sales to assets, and volatility of sales are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table A9: Financial and real effects with the actual tax value of residential real estate

Panel A: Financial effects

	Dependent variable							
	Dividends to earnings		Dividend payer		Dividends and salary to earnings before salary		Cash to assets	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Tax value real estate, 2005 * After tax shock	0.032 ***	*0.009*	0.011 *	*0.006*	0.025 ***	*0.007*	-0.005 *	*0.002*
Family gross assets	0.024 ***	*0.003*	0.012 ***	*0.002*	0.017 ***	*0.002*	0.010 ***	*0.001*
Family gross assets* After tax shock	-0.025 ***	*0.003*	-0.011 ***	*0.002*	-0.035 ***	*0.002*	-0.004 ***	*0.001*
Family leverage	-0.003 *	*0.002*	-0.003 **	*0.001*	-0.003 ***	*0.002*	0.001	*0.001*
Family leverage* After tax shock	0.017 ***	*0.002*	0.016 ***	*0.002*	0.008 ***	*0.002*	-0.005 ***	*0.001*
Firm characteristics								
Cash to assets	0.245 ***	*0.011*	0.194 ***	*0.008*	0.123 ***	*0.008*		
Return on assets	0.592 ***	*0.013*	0.720 ***	*0.010*	-0.788 ***	*0.015*	0.194 ***	*0.004*
Sales to assets	-0.013 ***	*0.002*	-0.017 ***	*0.001*	0.027 ***	*0.002*	0.006 ***	*0.001*
Volatility of sales	-0.115 ***	*0.010*	-0.061 ***	*0.007*	-0.111 ***	*0.008*	0.007 ***	*0.003*
Size	0.070 ***	*0.005*	0.095 ***	*0.004*	0.049 ***	*0.004*	-0.006 ***	*0.001*
Age	0.167 ***	*0.019*	0.083 ***	*0.014*	0.089 ***	*0.015*	-0.031 ***	*0.005*
Firm leverage	-0.904 ***	*0.010*	-0.425 ***	*0.008*	-0.615 ***	*0.008*	-0.086 ***	*0.003*
Retained earnings to equity	0.075 ***	*0.002*	0.019 ***	*0.002*	0.049 ***	*0.002*	0.001	*0.001*
Cash to assets* After tax shock	-0.179 ***	*0.012*	-0.096 ***	*0.008*	-0.044 ***	*0.009*		
Return on assets* After tax shock	-0.312 ***	*0.017*	-0.245 ***	*0.013*	-0.149 ***	*0.018*	0.033 ***	*0.005*
Sales to assets* After tax shock	0.018 ***	*0.002*	0.012 ***	*0.001*	0.022 ***	*0.001*	0.007 ***	*0.000*
Volatility of sales* After tax shock	0.137 ***	*0.010*	0.051 ***	*0.007*	0.018 **	*0.008*	-0.006 **	*0.003*
Size* After tax shock	-0.029 ***	*0.003*	-0.010 ***	*0.002*	-0.033 ***	*0.003*	-0.006 ***	*0.001*
Age* After tax shock	0.017 **	*0.007*	0.027 ***	*0.005*	0.010 *	*0.006*	0.002 ***	*0.002*
Firm leverage* After tax shock	0.692 ***	*0.012*	0.188 ***	*0.009*	0.471 ***	*0.010*	-0.030	*0.003*
Retained earnings to equity* After tax shock	-0.078 ***	*0.003*	-0.015 ***	*0.002*	-0.051 ***	*0.003*	0.004 ***	*0.001*
D2002	0.219 ***	*0.006*	0.042 ***	*0.004*	0.135 ***	*0.004*	0.014 ***	*0.002*
D2003	0.120 ***	*0.006*	0.042 ***	*0.005*	0.088 ***	*0.005*	0.023 ***	*0.002*
D2004	0.279 ***	*0.007*	0.099 ***	*0.005*	0.173 ***	*0.005*	0.022 ***	*0.002*
D2005	-0.436 ***	*0.008*	-0.412 ***	*0.006*	-0.267 ***	*0.006*	0.028 ***	*0.002*
D2006	-0.605 ***	*0.047*	-0.398 ***	*0.034*	-0.106 ***	*0.037*	0.114 ***	*0.013*
D2007	-0.598 ***	*0.047*	-0.370 ***	*0.035*	-0.095 **	*0.037*	0.125 ***	*0.014*
D2008	-0.639 ***	*0.049*	-0.410 ***	*0.036*	-0.113 ***	*0.038*	0.131 ***	*0.014*
D2009	-0.646 ***	*0.050*	-0.417 ***	*0.036*	-0.118 ***	*0.039*	0.141 ***	*0.014*
D2010	-0.656 ***	*0.051*	-0.425 ***	*0.037*	-0.125 ***	*0.040*	0.141 ***	*0.014*
Firm fixed effects	Yes		Yes		Yes		Yes	
R^2: overall	0.304		0.279		0.216		0.167	
within	0.314		0.323		0.335		0.064	
between	0.303		0.306		0.139		0.220	
Number of observations	175 444		178 055		132 276		178 055	
Number of firms	29 053		29 071		27 629		29 071	

This table uses a difference-in-difference (DiD) approach to compare the effect of shareholder illiquidity on the firm's investment, growth, and profitability in the full sample. The full 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 sample period is 2001–2010. "Dividends to earnings" is the ratio of the firm's dividends to operating earnings. "Dividend payer" is equal to 1 if the firm pays dividends in a given year 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. "Cash to assets" is the firm's cash-to-assets ratio at the end of the year. "Tax value real estate, 2005" is equal to the tax value of the controlling family's residential real estate at the end of 2005. "After tax shock" is 1 for 2006–2010 and 0 otherwise. "Family gross assets" is the controlling family's assets from the family's tax returns. "Family leverage" is the controlling family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "D200X" is 1 if the observation is from year 200X (X = 2,...,10) and 0 otherwise. "SE" is standard error. Standard errors are clustered at the firm level. Investment, sales growth, employment growth, cash to assets, sales to assets, and volatility of sales are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Continued on the next page

Table A9: Real and financial effects with the actual tax value of residential real estate (*continued*)

Panel B: Real effects

	Dependent variable							
	Investment		Sales growth		Employment growth		Profitability	
Independent variable	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Family characteristics								
Tax value real estate, 2005 * After tax shock	-0.009 *	*0.005*	-0.033 ***	*0.006*	-0.003	*0.005*	-0.009 **	*0.003*
Family gross assets	-0.003 **	*0.001*	-0.006 ***	*0.002*	0.000	*0.001*	0.001	*0.001*
Family gross assets* After tax shock	-0.003 *	*0.002*	-0.007 ***	*0.002*	-0.001	*0.002*	-0.001	*0.001*
Family leverage	-0.002 *	*0.002*	-0.002 *	*0.001*	-0.002	*0.001*	0.002 **	*0.001*
Family leverage* After tax shock	0.002 *	*0.001*	0.002	*0.353*	0.002	*0.001*	-0.001	*0.067*
Firm characteristics								
Cash to assets	-0.072 ***	*0.006*	-0.127 ***	*0.008*	0.015 **	*0.006*	0.002	*0.003*
Return on assets	0.011	*0.007*	-0.339 ***	*0.009*	0.104 **	*0.008*		
Sales to assets	0.122 ***	*0.001*	-0.032 ***	*0.001*	-0.007 **	*0.001*	0.016 **	*0.001*
Volatility of sales	0.011 **	*0.006*	0.027 ***	*0.007*	0.034 **	*0.006*	0.007 **	*0.003*
Size	-0.284 ***	*0.003*	-0.444 ***	*0.004*	-0.052 **	*0.003*	-0.025 **	*0.001*
Age	0.070 ***	*0.010*	0.079 ***	*0.013*	-0.015 **	*0.011*	0.015 **	*0.005*
Firm leverage	-0.034 ***	*0.006*	0.032 ***	*0.007*	-0.034 **	*0.006*	0.095 **	*0.003*
Retained earnings to equity	-0.003 **	*0.001*	0.000	*0.002*	-0.002 *	*0.001*	0.001 **	*0.001*
Cash to assets* After tax shock	0.051 ***	*0.007*	-0.012	*0.008*	-0.010	*0.007*	0.005	*0.003*
Return on assets* After tax shock	0.089 ***	*0.010*	0.126 ***	*0.012*	0.013	*0.010*		
Sales to assets* After tax shock	0.007 ***	*0.001*	-0.002	*0.001*	0.000	*0.001*	0.000	*0.000*
Volatility of sales* After tax shock	0.002	*0.006*	0.017 **	*0.007*	0.031 **	*0.006*	0.014 **	*0.003*
Size* After tax shock	0.009 ***	*0.002*	0.019 ***	*0.002*	-0.001	*0.002*	0.000	*0.001*
Age* After tax shock	0.006	*0.004*	0.002	*0.005*	0.001	*0.004*	0.003	*0.002*
Firm leverage* After tax shock	-0.051 ***	*0.007*	0.035 ***	*0.008*	-0.004	*0.007*	0.053	*0.003*
Retained earnings to equity* After tax shock	0.005 ***	*0.002*	-0.005 ***	*0.002*	0.002	*0.002*	-0.004 **	*0.001*
D2002	-0.006 ***	*0.003*	-0.029 ***	*0.004*	-0.009 **	*0.003*	-0.009 **	*0.002*
D2003	0.029 ***	*0.003*	0.014 ***	*0.004*	0.004	*0.003*	-0.002 **	*0.002*
D2004	0.029 ***	*0.004*	0.015 ***	*0.005*	-0.002	*0.004*	0.000	*0.002*
D2005	0.083 ***	*0.004*	0.045 ***	*0.005*	0.006	*0.005*	-0.005	*0.002*
D2006	0.101 ***	*0.026*	0.120 ***	*0.033*	0.001	*0.027*	-0.035	*0.014*
D2007	0.037	*0.027*	0.074 **	*0.033*	0.012	*0.028*	-0.059	*0.014*
D2008	0.016	*0.027*	-0.008	*0.034*	0.001	*0.028*	-0.068	*0.014*
D2009	0.034	*0.028*	0.041	*0.035*	0.009	*0.029*	-0.073	*0.015*
D2010	0.045 *	*0.029*	0.064*	*0.035*	-0.006	*0.029*	-0.062	*0.015*
Firm fixed effects	Yes		Yes		Yes		Yes	
R^2: overall	0.011		0.008		0.008		0.001	
within	0.167		0.208		0.002		0.058	
between	0.001		0.001		0.001		0.043	
Number of observations	168 682		168 296		168 685		168 659	
Number of firms	28 035		28 021		28 035		28 031	

This table uses a difference-in-difference (DiD) approach to compare the effect of shareholder illiquidity on the firm's investment, growth, and profitability in the full sample. The full 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 sample period is 2001–2010. "Investment" is the log of the percentage change in real assets the year after the tax shock. "Sales growth" and "Employment growth" are the log of the percentage change in sales and employment in the year after the wealth tax shock, respectively. "Profitability" is the return on assets the year after the tax shock. "Tax value real estate, 2005" is equal to the tax value of the controlling family's residential real estate at the end of 2005. "After tax shock" is 1 for 2006–2010 and 0 otherwise. "Family gross assets" is the controlling family's assets from the family's tax returns. "Family leverage" is the controlling family's personal debt to gross wealth lagged. "Cash to assets" is the ratio of the firm's cash holdings to total assets. "Return on assets" is the firm's operating earnings divided by its assets. "Sales to assets" is the ratio of the firm's sales to total assets. "Size" is the log of the firm's revenues in million NOK as of 2010. "Age" is the log of the number of years since the firm was founded. "Firm leverage" is the firm's liabilities to assets lagged. "Retained earnings to equity" is the firm's retained earnings divided by its equity. "D200X" is 1 if the observation is from year 200X (X = 2,...,10) and 0 otherwise. "SE" is standard error. Investment, sales growth, employment growth, cash to assets, sales to assets, and volatility of sales are winsorized at 97.5%. Return on assets is winsorized at 2.5% and 97.5%. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

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