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PERSONAL HOLDING COMPANIES, TAX PROGRESSIVITY, AND INEQUALITY

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ABSTRACT

Tax avoidance through personal holding companies has long been viewed as a key challenge for progressive income taxation. We exploit twenty years of administrative micro-data linking firms to owners in Sweden and Norway to analyze how the use of personal holding companies varies across the income distribution and to quantify its implications in a quasi-experimental setting. About half of the income of the top 0.1% is retained in personal holding companies defined, as in US tax law, as firms for which five or fewer owners own more than 50% of the stock and that derive more than 60% of income from investment income. Event studies of shocks to operational firms' value-added show that holding companies shield around half of dividend distributions from individual income taxation. Profits tend to remain in holding companies for long periods of time, with cumulative payout rates of 15%–20% over two decades for the highest income groups. Wealth taxes do not provide an effective backstop due to the low valuation (or exemption) of shares in private businesses. As a result, effective tax rates, all taxes included, fall from about 50% for the upper middle class to about 15%–20% among the highest-net-worth individuals. Accounting for income in holding companies erases half of the difference in the 1980–2020 rise of the top 1% fiscal income share between Nordic countries and the United States, where rules penalizing the use of holding companies have been in place since the 1930s.

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1 Introduction

The progressive income tax is a key component of modern tax systems and a major determinant of the long-run evolution of income concentration (e.g., Chancel et al., 2026; Hubmer, Krusell and Smith, 2020). Ever since its inception, the use of personal holding companies has been understood as a core challenge to its very feasibility. In 1933, the *New York Times* revealed that J.P. Morgan, one of the largest American fortunes of the time, paid no income tax in 1931 and 1932 (Thorndike, 2003). This prompted the U.S. government to launch investigations into the tax-planning strategies used by high-income individuals, which highlighted the use of holding structures to retain investment income. These investigations led to the enactment of the Personal Holding Company tax in 1934, subjecting the undistributed income of personal holding companies to a 20% surtax, and to its strengthening in 1937. Concerns about the use of personal holding companies extend beyond the United States and have been a recurring feature of global tax debates since the beginning of the 20th century.

Yet despite the importance of this concern, little is known about the extent of tax avoidance through personal holding companies, how it has evolved over time, and what its economic implications are. This lack of evidence stems from two difficulties. First, studying this issue requires data rarely available to researchers, namely micro-data linking individuals to the various corporate structures—including personal holding companies—they own. Few countries collect administrative data that allow researchers to comprehensively trace the ownership of corporations. Moreover, even when firms can be linked to their owners, understanding the economic consequences of using holding structures raises major identification challenges. Are holding companies harmless conduits, or do they effectively block income from flowing to individual income tax returns? Do they merely allow their owners to defer taxes, or do they enable them to avoid taxes permanently? Due to the lack of longitudinal data and of suitable research designs, these questions have remained unanswered.

This paper breaks new ground in this area by offering a first in-depth description and quasi-experimental analysis of tax avoidance through personal holding structures. Our data environment is Sweden and Norway, two countries with linked firm-owner administrative micro-data covering two decades. These data allow us to quantify the amount of income retained in holding structures across the income distribution, changes in these amounts over time, and the implications of this phenomenon for tax progressivity and inequality.

Leveraging shocks to the value added of operational businesses, we provide quasi-experimental evidence of how holding companies reduce the pass-through of corporate profits into taxable

individual income. Whenever operational businesses are owned through holding companies, dividends flow to holding companies and remain there, free of the individual income tax. This tax avoidance is not offset by a higher amount of corporate tax liability, because dividends earned by holding companies are typically exempt from corporate taxation. The ultimate consequences of the use of holding companies vary with wealth. For life-cycle savers—predominant among the rich, but not the super-rich—a significant fraction of income retained in holding companies ends up being distributed and taxed over a period of two decades. For dynastic families—prevalent at the very top of the distribution—the bulk of retained profits are permanently rolled over, free of tax. This income tax avoidance translates into a sharp drop-off in total effective tax rates at the top of the income distribution.

Norway and Sweden offer a striking laboratory to study this issue. Widely seen as some of the most equal countries in the world, featuring some of the world’s highest tax-to-GDP ratios, and known for their broad tax bases and efficient tax collection (e.g., Kleven, 2014), one might assume that both countries tax the very wealthy heavily. Counterintuitively, very-high-net-worth individuals face remarkably low effective tax rates, primarily because they can avoid taxation by retaining income in holding companies. Effective tax rates—all taxes included—fall from about 50% in the middle and upper-middle part of the income distribution to about 15%–20% among the top 0.0005%—broadly the population of US dollar billionaires—in 2018–20. This rate is lower than the one observed in the United States, 24% for the top 400 wealthiest Americans in 2018–20 (see Balkir et al., 2025, and our discussion of the related literature in Section 2), even though the overall level of taxation is much higher in Scandinavia. Because the incentives and rules governing the use of holding companies are similar in almost all countries other than the United States, our findings are likely to have external validity. Holding companies shield global (non-US) dynastic wealth from income taxation.

Our main quantitative findings can be summarized as follows. First, as shown in Section 3, the use of personal holding companies is pervasive at the top of the income distribution in both Norway and Sweden. The share of income retained in holding companies rises from 0% at the 90th percentile of the distribution, to 15% between the 95th and the 99th percentile, and 50%–60% in the top 0.01% in 2020. Income retained in holding companies rose gradually in Sweden over the first two decades of the 21st century, while it jumped in Norway immediately after the introduction of a dividend tax in 2006. In the early 2000s, the top 0.1% retained about 20%–30% of all its income in personal holding companies in both Sweden and Norway. In 2020 this share had risen to 40% in Sweden and 50% in Norway.

Second, holding companies do not act as mere conduits but effectively shelter income from

taxation (Section 4). To establish this, we exploit exogenous increases in an operating firm’s value added. Event studies show that positive value-added shocks raise dividend distributions relative to firms that do not experience such shocks. However, while half of these payouts flow to direct owners and show up on personal tax returns where they are subject to the individual income tax, the other half flow to holding companies and remain there for at least four years, with no distribution from the holding to the ultimate individual owners. Over a period of two decades, about 50%–60% of overall income retained in companies ends up being distributed and subject to the individual income tax for moderately wealthy individuals. But the payout rate collapses to 15%–20% for the top 0.0005%.

Third, this tax avoidance has significant consequences on the progressivity of the tax system, which we detail in Section 5. In effect, holding companies allow wealthy individuals to save tax free and to transform the income tax into a consumption tax. As one moves up the distribution, saving rates converge to nearly 100% and the individual income tax becomes trivial relative to income. We estimate that for the top 0.0005% of the income distribution, less than 5% of income is subject to individual income taxation. The use of holding companies explains about 60% of the loss of tax base among the highest incomes, with the rest being due to retained earnings in corporations other than holding companies. These results illustrate how, more than one century after its invention, the progressive income tax remains an unfinished creation. For most people it taxes nearly all income (between 80% and 100% in Norway and Sweden up to the 99th percentile) no matter whether income is consumed or saved, while for the very rich it taxes only the (small) fraction of income that is consumed. Norway’s wealth tax offers little backstop against this limitation of the income tax, because of the low valuation of private businesses, the key form of wealth at the top. We find that shares in private businesses enter the wealth tax base for only a tenth of their market value.

Fourth, because of the large and growing amount of income retained in holding companies, there is a large and growing wedge between “taxable income” and “economic income” inequality measures, as detailed in Section 6. The case of Sweden—which unlike Norway did not experience sharp changes in incentives to retain vs. distribute income over our period of study—is particularly interesting. Accounting for income retained in personal holding companies reveals a sizable rise in the top 1% income share, from about 7% in the early 2000s to 12% in 2020. Holding companies alone erase nearly half of the difference in the 1980–2020 rise of the top 1% income share between Sweden and the United States, where rules penalizing the use of holdings have been in place since the 1930s. We relate this finding to the fast rise of the wealth of Swedish billionaires, for whom the ratio of fiscal income to economic income is particularly low and has

collapsed since the early 2000s.

Our findings have implications for policy. In the Conclusion (Section 7) we discuss two potential reforms, the creation of a progressive wealth tax based on the full market value of wealth, and the pass-through taxation of all corporate income. We show that a wealth tax based on such market values would serve as an effective backstop to the income tax. Treating all corporations as transparent for tax purposes—as partnerships and S-corporations in the United States—would also fix the issue of tax regressivity at the top. We discuss how such fundamental reforms could be implemented, leaving a full welfare analysis to future work.

2 Related Literature

2.1 Income Shifting

We first contribute to the literature on income shifting between the personal and the corporate income tax base. It is well understood (e.g., Slemrod, 1995) that when the corporate tax rate is lower than the top marginal individual income tax rate, there can be incentives to avoid taxes on wages and business income by reporting income as corporate rather than individual income.¹ Self-employed individuals and certain employees can incorporate. Businesses can opt for organizational forms subject to the corporate tax rather than to the individual income tax. A body of work studies these forms of income shifting and policies to mitigate it, including in Scandinavian countries where the adoption of dual income tax system in the 1990s increased incentives to shift to the corporate base (see, e.g., Selin and Simula, 2020; Pirttilä and Selin, 2011; Alstadsæter and Jacob, 2016; Tazhitdinova, 2020).

Our contribution to this literature is to provide a first forensic analysis of another form of shifting: the use of personal holding companies to avoid taxes on investment income. It turns out that this shifting is key at the top of the income distribution and markedly different than the usual personal–corporate shifting that has been the focus of the literature so far. Because investment income earned by holding companies is typically not subject to the corporate tax, the corporate tax rate is not a main determinant of this shifting. In principle, this makes this shifting broadly advantageous. In practice it faces some constraints. It is limited by general

¹In practice incentives to shift depend on other factors, e.g., the dividend tax rate, the capital gains tax rate, and rules regarding basis step-up at death. For very high-income individuals who chose to incorporate and can afford to save virtually all their income, the dividend tax rate is irrelevant. If there is a step up of basis at death (as in the United States and France), the capital gains tax rate is irrelevant too, as the capital gains tax liability caused by the accumulation of retained earnings in companies is erased when companies are transferred to heirs. In that case, shifting from the personal to the corporate tax base is advantageous as long as the corporate rate is lower than the top marginal individual income tax rate.

anti-abuse provisions that can invalidate structures created with the sole purpose of avoiding taxes. Moreover, some investment income earned by holding companies can remain subject to the corporate tax.² All of this makes the magnitude of this form of tax avoidance an open empirical question. Our paper provides a first quantification of the amount of income shifted to holding companies.

2.2 Distributional Tax Analysis

Our paper also contributes to the burgeoning literature using linked firm-owner data to estimate comprehensive effective tax rates across the distribution all the way up to ultra-high-net-worth individuals. Bruil et al. (2025) in the Netherlands, Bach et al. (2025) in France, and Balkir et al. (2025) in the United States find that, all taxes included, billionaires (in euros or US dollars) have relatively low effective tax rates.³ In these three countries, the individual income tax rate collapses at the top of the distribution. This decline is partly offset by an increase in corporate income tax paid, but the decline in the personal income tax dominates. The important work by Bach et al. (2025) finds that ultra-high-net-worth individuals are more likely to be shareholders of holding companies in France, suggesting a causal link between the use of holding companies and tax regressivity at the top.

Our main addition to this literature is our quasi-experimental analysis of holding companies, made possible by our long time series, which allows us to move beyond descriptive evidence and to establish the causal effects of personal holding structures on the low average tax rates of very-high-net-worth individuals.⁴ We propose a method to identify personal holding companies in administrative data and a research design to quantify the extent to which their use reduces the passthrough of firm profits into individual income and decreases income tax payments. To our knowledge, this is the first time that such an analysis is conducted in any country.

²In Norway, dividends and capital gains originating from corporations in the European Economic Area (EEA) are tax exempt. Non-EEA dividends and capital gains are exempt if they come from large (> 10%) ownership shares. Interest (and similar, e.g., money-market fund) income is not tax exempt. In Sweden, the dividends and capital gains exemption applies only for large shareholdings.

³See Zucman (2024, 2026) for a summary of these studies. This body of work builds on an earlier literature studying tax progressivity following the founding work of Colm and Tarasov (1942) and Musgrave et al. (1951) which typically did not mobilize linked firm-owner data. Recent studies in that tradition include Atria and Otero (2021) in Latin America; Guzzardi et al. (2022) in Italy; Landais et al. (2011) in France; Advani et al. (2023) in the UK; Saez and Zucman (2019) and Leiserson and Yagan (2021) in the United States.

⁴Both Bruil et al. (2025) and Bach et al. (2025) have linked firm-owner data for one year, 2016. Balkir et al. (2025) have linked firm-owner data for 2019.

2.3 Measurement of Inequality

Last, we add to the literature on the measurement of inequality over time and across countries. A classic issue in this literature is how to account for corporate retained earnings. Alstadsæter et al. (2025) and Aaberge et al. (2025) leverage Norway’s administrative data to quantify the importance of retained earnings at the top of the distribution and draw lessons for the measurement of inequality in other countries, such as the United States (see the debate between Piketty et al., 2018, 2024 and Auten and Splinter, 2024 on the rise of US income inequality).⁵

Our contribution to this line of work is to quantify the role of the different treatment of holding companies in Europe vs. the United States to the differential evolution of observed inequality (Blanchet et al., 2022). In the United States, stronger anti-abuse rules prevent the use of personal holding companies, while their use has been on the rise in Norway and Sweden. We quantify the implications of this asymmetry for the measurement of inequality, a task which could not be done before for lack of data on the amount of income retained in personal holding companies.

3 Holding Companies Across the Distribution

We are interested in measuring how much income is retained by individuals in personal holding companies. We start by defining income, before explaining how we construct households’ ownership stakes in corporations, and how we identify personal holding companies.

3.1 Definition and Measurement of Economic Income

Our baseline measure of income in this paper (used, e.g., to rank households) is economic income, defined as fiscal income—income reported by individuals on their income tax returns—plus employer payroll taxes, corporate retained earnings, and corporate taxes paid. Economic income is significantly larger than fiscal income at the top of the distribution while remaining fully based on micro-data, thereby eschewing the need for imputations. It is constructed in three main steps.

Step 1. Fiscal income. We start with fiscal income as reported in tax returns, to which we add employer payroll taxes. To avoid any double counting with corporate retained earnings, we

⁵Other attempts to include retained earnings in the study of inequality include Wolfson et al. (2016) in Canada, Fairfield and Jorratt De Luis (2016) in Chile, Palomo et al. (2025) in Brazil, and Del Carmen et al. (2025) in Honduras.

remove realized capital gains from fiscal income. The treatment of capital gains is of limited empirical relevance in Sweden and Norway due to the specific features of capital gains taxation in these countries.⁶

Step 2. Retained earnings. In a second step, we add micro-level retained earnings to fiscal income. To do so we follow the same general principles in both Sweden and Norway; Section 3.2 below details their implementation in each country separately.

We first compute retained earnings at the firm level using firms’ financial statements. Retained earnings equal profits minus dividends distributed.⁷ For firms that only file unconsolidated accounting statements, profits equal after-tax profits (net of interest paid, corporate tax, and depreciation). For firms that file consolidated accounting statements, we consider after-tax profits net of minority interests. We use consolidated financial statements whenever available. Using consolidated accounting statements allows us to capture profits booked in foreign subsidiaries. This is important in small open economies like Sweden and Norway where a sizable fraction of wealth owned at the very top corresponds to shares in firms with foreign operations.

Once we have a measure of firm-level retained earnings, we allocate these to individuals using the micro-level ownership stakes detailed below. The main advantage of the resulting individual-level measure of business income is that it is neutral with respect to business organizational forms (corporate vs. non-corporate) and dividend distribution policies, thus facilitating income comparisons over time. Bach et al. (2025) in France, Bruil et al. (2025) in the Netherlands, Balkir et al. (2025) in the United States, and Palomo et al. (2025) in Brazil also follow the same methodology, thus facilitating comparisons across countries. In contrast to Bach et al. (2025), we include all apportioned retained earnings, whether individuals own more than 10% or less than 10% of a firm’s equity. As we show below, retained earnings in firms less than 10%-owned are small; restricting to 10%-owned firms makes no difference to our results. Due to the lack of micro-level data on the owners of pension funds, we do not include equity stakes held indirectly through pensions funds.⁸

⁶In Sweden, losses must be used in the year they accrue; carryforwards are not possible. Most realized capital gains reflect real estate capital gains. In Norway, capital gains are reduced by a risk-free return allowance that cumulates over time. Because the flow of realized capital gains in fiscal income is small, our results are not sensitive to the treatment of capital gains.

⁷Dividends enter with a one-year lag relative to when they appear in accounting statements: from year- t profits we subtract the dividend proposed in the year $t-1$ statement and paid out during year t , rather than the dividend proposed in the year- t statement. This aligns the deduction of dividends from profits with the year in which the dividend is distributed and taxed (as in Aaberge et al., 2025).

⁸We account for pensions wealth and the associated income flows in our analysis of inequality in Section 6 below.

Panel (a) of Figure 1 shows the aggregate amount of retained earnings allocated to households, expressed as a fraction of total economic income. In both Sweden and Norway this has been on a rising trend since the beginning of the 21st century, from very low amounts in 2000-02 (in the context of the dot-com recession which largely erased corporate profits) to about 10% of economic income in 2020. As shown by Alstadsæter et al. (2025) and Aaberge et al. (2025) there is a sharp rise in retained earnings in Norway following the introduction of a dividend tax in 2006. In Sweden the increase is more gradual.⁹

Step 3. Corporate taxes. Last, we allocate corporate taxes to the owners of the corresponding corporations. To do so we proceed just like for retained earnings, i.e., we start with firms’ financial statements and apportion corporate taxes to owners using the micro-level ownership stakes described below. Bach et al. (2025), Bruil et al. (2025), Balkir et al. (2025) and Palomo et al. (2025) follow the same approach. “Shifting” the corporate tax (e.g., allocating some of it to workers or to capital owners other than shareholders) would reduce effective tax rates at the top.

Corporate taxes are taken from firms’ financial statements as current tax liability. When consolidated statements are used, taxes include taxes paid by foreign affiliates, eschewing the need for imputation. Taxes are grossed up to account for unobserved taxes paid on non-interest financial income. Specifically, all non-interest financial income received by a firm is assumed to have been taxed at the statutory corporate tax rate τ . If a firm has \$1 of non-interest financial income, we gross-up the pre-tax amount of income by $1/(1-\tau)$ and impute $\tau/(1-\tau)$ in corporate tax paid. This allows us to account for foreign taxes paid by unconsolidated foreign entities.¹⁰

3.2 Construction of Ownership Stakes

Norway. To construct ownership stakes in Norway, we use the share register maintained by Statistics Norway and that has been exploited successfully in previous research (Berglann et al., 2011; Thoresen et al., 2012; Alstadsæter et al., 2025; Aaberge et al., 2025). This register includes the universe of firm-to-firm and firm-to-person ownership links of domestic entities. We compute each individual’s ultimate ownership share in every company by multiplying stakes along chains of intermediate companies as in Aaberge et al. (2025) and Alstadsæter et al. (2025).

The main difference with this earlier work is that we also have access to consolidated ac-

⁹Appendix Figure A1 shows the amount of retained earnings allocated to other institutional sectors (government, foreign owners).

¹⁰In Sweden, foreign taxes paid are instead multiplied by two.

counting statements, which we use whenever available. Using consolidated accounting statements allows us to capture profits obtained in foreign subsidiaries, which would be missed using standard data sources.¹¹ This allows us to provide a symmetric treatment of cross-border profits. That is, profits made by foreign-owned Norwegian companies are discarded (as in previous work), but profits made by consolidated foreign subsidiaries of Norwegian companies are included in our measure of economic income, to the extent that these Norwegian parents have Norwegian individual owners. To avoid double counting, we zero out ownership in any company that is consolidated into a group. We also zero out ownership in associated companies (20-50% ownership), since these profits are already reflected in the consolidated statements.¹²

Sweden. While Sweden does not maintain a comprehensive share register, it is possible to link businesses to owners by using tax forms issued when dividends are distributed, as done in previous work (Bach, Calvet and Sodini, 2020; Jakobsen et al., 2025). We extend this work by using new data sources which allow us to capture links even when no dividends are distributed.

First, we collect information on shares held in unlisted firms from K10 tax returns. Owners of closely-held businesses file K10 returns annually; these statements determine how owners' compensation gets taxed.¹³ We retrieve the universe of K10 returns during 2000-2020. These records include information on the active individual Swedish owners with links to firm identifiers.

¹¹Aaberge et al. (2025) and Alstadsæter et al. (2025) only use unconsolidated accounting statements, which are the only accounting statements available from Statistics Norway. We supplement these with the universe of consolidated accounting statements obtained from the data vendor Proff.no. Unconsolidated accounting statements typically record profits in subsidiaries using the cost method: that is, profits are only recorded once distributed to the parent as dividends. In consolidated statements, majority-owned companies' profits are naturally reflected in the consolidated statements. In addition, stakes between 20% and 50% are accounted for under the equity method: no intra-group dividend is recorded, but the investor's share of the investee's net income is recognized. In unconsolidated statements, however, such stakes are typically carried at cost, so that only dividends received from the investee are recorded as financial income on the investor's income statement, as they are for stakes below 20%. To verify these accounting practices, we review annual reports for 2018: a random sample of 300 among the roughly 42,700 Norwegian firms holding a stake of between 20 and 50 percent in another company, and another 100 among the roughly 3,500 such firms that file consolidated accounts. In the random sample, 46% of reports state the method applied to such stakes, and 96% of those report the cost method. Parent statements of consolidated filers (the 100-firm sample) are similar: 65% state a method, of which 89% report cost. Among the consolidated statements themselves, however, 84% of those stating a method report the equity method.

¹²Example 1: Consider a person I who owns 100% of P that owns 10% of A, where P is the parent in a consolidated group. In this case, A is an associated company of P, and thus the consolidated accounts of P include, as financial income, the ownership-adjusted share of profits in A. Hence, when we allocate retained earnings, we treat I's iterated ownership share in A as if it is zero. Example 2: Consider person I who owns 100% of P that owns 75% of D. While I's iterated ownership share in D is 75%, we treat it as zero whenever we see that P and D belong to the same consolidated group in the business register data.

¹³There is a limit to how much income owners can earn as dividends that are taxed at the preferential dividend tax rate. This limit is determined by the so-called 3:12 rules and depends, among other things, on past wage payments to owners.

We similarly collect information on shares in listed firms from K31 returns. These returns are filed annually for each listed firm and owner in listed firms and include dividends paid to the individual. They determine the dividend component from listed companies in capital income taxes due. For the 2000-2007 period when Sweden taxed wealth, these records also include information on shares held.

Second, we match the K10 and K31 returns to the Serrano database, a longitudinal database with financial history of Swedish companies, provided to us by the Data Center of the Swedish House of Finance. The Serrano database retrieves information on financial statements and on ownership structures from the Companies Registration Office (Bolagsverket). We combine K10 and K31 returns with Serrano to determine ownership shares as follows. For listed firms that pay dividends, we divide the dividends reported in K31 returns by the total dividend payments recorded in Serrano. For listed firms that do not pay dividends, we follow the imputation methods of Bach et al. (2020). For unlisted firms, we obtain ownership shares by dividing ownership stakes in K10 returns by the aggregate outstanding number of shares from Serrano.

We validate our ownership stakes by comparing them to an external source of firm ownership information. Specifically, we use the Holdings database from Modular Finance, which provides ownership snapshots for firms at various points in time. The database reports firm identifiers, the names of listed owners, and their ownership shares. For some firms, it also separately records direct vs. indirect ownership stakes. Coverage is concentrated among larger firms and is substantially more comprehensive in recent years. To maintain a consistent ownership measure over time, we do not incorporate these data into our main ownership stakes calculations. Instead, the top panel of Appendix Figure A2 compares ownership shares in unlisted firms measured using our individual-by-firm ownership data with those reported in the Holdings database. The two sources are nearly perfectly correlated, providing reassurance that our ownership measures are both accurate and unbiased.

In Sweden, firm-to-firm ownership data only covers corporate group linkages: that is, we only observe ownership links between an owning and an owned firm whenever the owned firm is either an associated company (20-50% ownership) or a group company ($> 50\%$ ownership). Hence, we do not iterate on ownership. Instead, we rely on consolidated profits from the Serrano database whenever they are available.¹⁴ Revenues and costs (and thus profits) from group companies are already reflected in the consolidated statements. Profits from associated companies are reflected

¹⁴For parent companies, the Serrano database reports both parent-level income statements and consolidated financial statements for the corporate group, with subsidiary contributions consolidated into the parent company's accounts.

in the financial income in the consolidated statements, always booked using the equity method in consolidated accounting statements. Hence, there is no need to use the firm-to-firm ownership links.

3.3 Definition and Measurement of Holding Companies

Definition of holding companies. We define personal holding companies as firms more than 50%-owned by 5 or fewer individuals and for which 60% of income or more is investment income (dividends, interest, capital gains, rents).¹⁵ This is the definition used in the US tax law for the enforcement of personal holding company tax, a 20% tax on the undistributed income earned by holdings in force since 1934.

In our baseline estimates, to reduce noise we classify as personal holding companies in year t the firms that meet these criteria for three years in a row onward, i.e., in t , $t + 1$, and $t + 2$. In supplementary results, we also consider a number of alternative definitions. First we implement a strict US definition where we classify as holding companies in year t all the firms that satisfy the above criteria in year t . Second, for robustness we also consider a definition that does not rely on the identification of beneficial owners, namely firms classified in the holding company sector, that employ less than 5 employees, and for which 60% of income or more is investment income.

Prevalence of holding companies. Panel (b) of Figure 1 counts the number of holding companies and divides this by the adult population. The number of personal holding companies has increased from 3 per 1,000 adults in both Norway and Sweden at the beginning of the 21st century to 6 per 1,000 in Sweden and 8 per 1,000 in Norway in 2020. Just like for retained earnings, there is a sharp rise in the number of holdings in Norway at the time of the introduction of the dividend tax, while the rising trend is smoother in Sweden.

Panels (c) and (d) show the fraction of households owning at least one personal holding company, by economic income group. This fraction rises sharply with income—from less than 5% for households between the 90th and the 99th percentile of the income distribution, to 70% for the top 0.01% in Sweden and nearly 100% in Norway. For almost all groups, there is a clear rising trend over time. Two additional points are worth noting. First, in Norway the prevalence of holding company ownership in the top 0.01% was already very high before the introduction of the dividend tax. This suggests that factors other than dividend tax avoidance are at play behind the use of holding companies, such as the management of a portfolio of companies, or

¹⁵Holdings are defined using unconsolidated financial statements.

wealth and inheritance tax avoidance.¹⁶ Second, for all groups below the top 0.01% holding ownership rose significantly at the time of the introduction of the dividend tax. This points to dividend tax avoidance being a significant reason behind the creation of such structures.

Size of income retained in holding companies at the top. Figure 2 shows the fraction of economic income that corresponds to undistributed corporate earnings (gross of corporate income taxes) by income group in both Sweden (panel a) and Norway (panel b). A number of results are worth noting. First, in both cases this fraction converges to nearly 100% at the top of the distribution. For the top economic income groups fiscal income amounts to only about 0%–5% of economic income. Accounting for undistributed income is crucial to properly measure the level and trend in top income shares, a point emphasized in the literature on top incomes (e.g., Kopczuk and Zwick, 2020; Alstadsæter et al., 2025).

Second and adding to previous work, our analysis reveals that most undistributed earnings are in personal holding companies. In both Sweden and Norway, about 50%–60% of all income earned by the top 0.01% is earned and retained in such personal holding companies. The rest is almost entirely earned in other controlled businesses, whether they are 100% owned (but do not satisfy the holding definition, e.g., because most of their income is non-financial), 50% owned or 10% owned. Retained earnings in businesses that are less than 10%-owned are marginal. Panels (c) and (d) of Figure 2 show the rise in the fraction of economic income earned through holding companies by the top 0.1% over time. In Norway this fraction rose from about 35% before the dividend tax reform to nearly 70% just after, before settling around 50%–60% in more recent years. The increase is more gradual in Sweden, from about 30% in the early 2000s to over 40% in the late 2010s. In both cases, whether one looks at the number of holding companies or the amount of income retained in these structures, holding companies appear increasingly prevalent among the rich.

4 The Holding as Blocker: Quasi-Experimental Evidence

4.1 Passthrough of Value-Added Shocks

To what extent do holding companies allow owners to shield income from taxation? In this Section, we provide quasi-experimental evidence on this question by analyzing the windfall gain of an operating business as it travels—or fails to travel—to the personal tax return of its ultimate owners.

¹⁶Norway abolished its inheritance tax in 2014.

Research design. Our research design involves comparing owners of operating firms that experience a sharp, idiosyncratic increase in value added (which we think of as our treated group) to owners of comparable firms that do not (our control group). We track every dividend flow along the ownership chain: from the operating firm directly to the owner; from the operating firm to an intermediary holding company; and from the holding company to the individual owner. This research design allows us to test the hypothesis that holding companies allow firm owners to avoid dividend taxation and to quantify the magnitude of the effect. If holding companies are mere conduits, value-added shocks should raise dividends on owners’ personal tax returns irrespective of whether firms are held directly or indirectly through a holding. If instead holding companies shelter income from the personal dividend tax, value-added shocks should raise dividends received by holding companies but not dividends reported on individual income tax returns. To be clear, dividends received by holding companies are typically tax exempt in the Nordic countries just like in most countries (with the notable exception of the United States).

Implementation. We implement our research design in Norway, where the shareholder register allows us to observe each link of the ownership chain (including business-to-business links) and all dividend payments along the chain, without the need for imputation. Following Lamadon et al. (2022), for every operating (i.e., non-holding) firm we compute the annual change in log value added and classify firm-years with above-median growth (within year) as treated, and firm-years with below-median growth as control. We randomly select one firm-year per firm as the event and impose a balanced panel covering three years before and four years after the event.¹⁷

Using the shareholder register, we then link each firm to its individual owners, both those who hold shares directly and those who hold shares indirectly through a holding company.¹⁸ For indirect owners, we require that dividends from the operating firm account for at least one percent of the holding’s pre-event dividend receipts, which removes negligible stakes from the analysis. All outcomes are measured at the owner-by-firm level and apportioned, i.e., scaled by the owner’s (direct plus indirect) equity share. All specifications include event-time and event-year fixed effects and an indicator for direct ownership.

¹⁷Value added is defined as sales minus the cost of goods sold.

¹⁸We do not use ownership chains with two or more holdings; ownership through a single holding is the most transparent form of indirect ownership and the natural place to start.

Baseline results. Panel (a) of Figure 3 shows the first stage of the analysis, i.e., the change in apportioned value-added for treated vs. control firm owners. In the year of the shock, the apportioned value added of treated owners jumps by about 350,000 NOK (roughly \$35,000) relative to comparison owners, from a pre-event base of about 800,000 NOK. The gap remains close to 300,000 NOK four years later. The gap at the event is mechanical—it is how treatment is defined—but its persistence is not: the shocks we isolate are permanent rather than transitory. Treated owners become durably richer than comparison owners. In the years before the event the two groups evolve similarly. The small pre-event differences work against us: treated firms are converging toward comparison firms from above, so extrapolating the pre-trend would, if anything, lead us to a higher post-event gap.¹⁹

Panel (b) contains our central result. We define *apportioned dividends* as the operating firm’s dividend distributions apportioned by the owner’s total—i.e., direct plus indirect—equity share in the firm. The dark blue series shows that apportioned dividends rise sharply and persistently after a value-added shock, by about 21,000 NOK per year on average in the post-event period. This rise is equivalent to 7% of the value-added effect (roughly 10% net of the corporate tax): owners’ claims on distributed profits respond strongly to the value-added shock. The dashed maroon series show the dividends that actually appear on owners’ personal tax returns, whether received directly from the operating firm or distributed to the owner by a holding company. Only about half of the increase in dividend—some 11,000 NOK per year—shows up on individual income tax returns. This fraction is consistent with the presence of dividend tax avoidance via holding companies.

Mechanisms. Panel (c) presents the mechanisms behind the finding that around half of all apportioned dividends show up in individual tax returns. The green series shows dividends paid by operating firms to holding companies, scaled by the owners’ stakes in the holdings. These dividends received by holding companies rise by about 12,000 NOK per year. This rise corresponds to the entire gap between operational firms’ profit distributions and dividends reported on individual income tax returns shown in panel (b).

The blue series answers the key question: do holding companies pass these dividends on to their owners? They do not. The effect of value-added shocks on dividends paid from holding companies to individual owners is centered around zero, statistically insignificant, and still zero four years after the shock. Holding companies do not simply smooth or delay dividend

¹⁹Appendix Figure A3 plots the raw time series of each outcome for treated and comparison owners. All outcomes display the same pattern: similar levels and trends before the event, and a stable gap opening at the event.

distributions: over the entire period we observe, the dividends they receive from operating firms stay inside the holding company. Because dividends paid to individuals are taxed while inter-company dividends are exempt, dividends stopping in holdings escape taxation. Appendix Figure A4 quantifies the tax revenue consequences of this avoidance. Applying statutory dividend tax rates (about 30% over our period), the tax due under full passthrough rises by 5,800 NOK per owner per year (with a standard error of 1,000), while the actual dividend tax rises by only 2,800 NOK (s.e. 1,500). Half of the dividend tax triggered by the value-added shock is thus avoided through holding companies.²⁰

Passthrough heterogeneity. Who benefits from this tax avoidance? Panel (d) of Figure 3 splits owners into six groups according to their rank in the economic income distribution in the year before the event. We run separate event studies for each group, pooling pre- and post-event years.²¹ For each group, we compute a passthrough rate: the effect of the value-added shock on dividends appearing on owners' personal tax returns divided by its effect on apportioned dividends. A passthrough rate of one means that all the dividends that accrue to an owner reach the owner's individual income tax return: there is no dividend tax avoidance. This can happen either because the owner owns all its shares in the operational business directly, or because it owns some of its shares indirectly through a holding but the holding fully passes through the dividends it receives from the operational business to its individual owner.

The main findings are the following. For the bottom five groups, covering the bottom 95% of the income distribution, passthrough is statistically indistinguishable from one. For the top 5%, passthrough is 0.4, statistically lower than one. For this group, 1 NOK of apportioned dividend translates into 0.4 NOK of taxable dividend at the individual level on average; the remaining 0.6 NOK are retained in holding companies.

The green and orange series make the mechanic of this explicit. Direct dividend distributions (i.e., dividends paid by operational firms to direct owners, shown in the green series) account for essentially all the total passthrough in every income group. In the bottom 95%, owners hold their shares directly, so their dividends are automatically reported and taxed on individual income tax returns. In the top 5% about half of the shares are held directly and hence half of

²⁰This computation is mechanical and is not a revenue estimate of the effect of disallowing the use of holding companies. In the absence of personal holding companies, operational businesses may reduce their dividend distributions, reducing tax collection on dividend income. We discuss these issues in Section 7 below.

²¹Appendix Figure A5 reports the group-specific first stages: all six groups display similar pre-event trends and persistent, statistically significant post-event effects on apportioned value added, so our design has power throughout the income distribution. Appendix Figure A6 reports the corresponding dynamic dividend effects by group.

apportioned dividends mechanically show up on individual income tax forms. Indirect dividend distributions (i.e., dividends paid by holding companies to their individual owners, shown in the orange series) are close to zero for every group: at no point in the income distribution do holding companies pass on the dividends they receive. What distinguishes the top is therefore not different behavior conditional on ownership structure, but the ownership structure itself. Only owners at the top hold a large fraction of their equity through holding companies.

Taken together, this section establishes a causal chain. An exogenous increase in an operating firm’s value added raises dividend distributions. Half of those payouts flow to direct owners and show up on personal tax returns, where they are subject to the individual income tax. The other half flow to holding companies and end there, untaxed, for at least four years. Because ownership through holding companies is concentrated in the top 5% of the income distribution, this avoidance channel operates almost exclusively at the top.

4.2 Is Income Retained in Companies Eventually Taxed?

A natural question is how much income ends up being eventually distributed by holding companies to their owners, beyond the 4 years covered by the event study framework. To investigate this issue, Figure 4 reports cumulated payout rates by income groups over 18 years. We rank individuals i by their economic income in 2002. For each year t until 2020, we then compute the cumulated dividends and realized capital gains reported in i ’s individual income tax returns between 2002 and t , which we divide by the cumulated apportioned corporate profits accruing to i between 2002 and t . This statistic captures all forms of payouts, whether dividend withdrawals or share sales. It is the broadest possible measure of the extent to which corporate profits eventually end up on individual income tax returns. Focusing on outflows from personal holding companies only (e.g., dividends distributed by holdings to their owners as a fraction of income earned by the holdings) would deliver lower payout rates.²²

A number of results emerge. First, cumulated payout rates are well below one for all groups and at all time horizons. Even over nearly two decades, only a fraction of corporate profits show up on individual income tax returns. Payout rates are broadly stable over time in Sweden, while they are hump-shaped in Norway. This pattern can be explained by behavioral responses to the 2006 dividend tax reform. Immediately before its introduction, firm owners took dividends out of their firms to benefit from tax-free distributions—the payout rate rises. Following the introduction of the dividend tax, firm owners retain earnings in companies (often, as we have

²²One challenge in focusing on holding companies is that available data often do not allow us to distinguish capital gains realized from sales of holding-company shares from other capital gains realizations.

seen, in newly created holding companies) and payout rates gradually fall.

Second, payout rates fall sharply as one moves up the income distribution, from about 50%–60% at the 90th percentile of the economic income distribution down to 15%–20% for the top 0.0005%. Over an 18-year window, in both Sweden and Norway, barely a fifth of corporate income is paid out as dividends or realized capital gains in the top income groups. This result highlights how the benefits of holding companies rise with wealth. Holding companies allow individuals to save tax free. For life-cycle savers, the benefits are relatively limited. As consumption eventually exceeds income, income ends up being withdrawn from holding companies and taxed: holding companies merely allow one to defer taxes. By contrast, for dynastic families (e.g., à la Becker and Barro, 1988), consumption is permanently below income. There is no need to withdraw income: the holdings make it possible to avoid the income tax (on the fraction of income that is saved) permanently. Like in the standard dynastic model, ultra-high-net-worth families can afford to save most of their income—potentially forever—as their personal expenditures are small relative to their economic income.²³ This can explain why the use of holding companies rises sharply with wealth at the top.

5 Implications for Tax Progressivity

What are the economic implications of tax avoidance through personal holding companies? In this Section we explore the effects on tax progressivity. We provide descriptive and quasi-experimental evidence that the use of holding companies translates into a sharp decline in effective tax rates at the top of the income distribution.

5.1 Effective Tax Rates by Income Groups

We begin by measuring tax progressivity in Norway and Sweden, taking a comprehensive perspective to maximize the comparability of effective tax rates across income groups: we allocate all taxes to individuals and all pretax national income, subject to some restrictions detailed below. To do so, we follow the methodology for current-tax analysis of Saez and Zucman (2026), which has recently been implemented by Bruil et al. (2025) in the Netherlands, Palomo et al. (2025) in Brazil, and Balkir et al. (2025) in the United States. Labor taxes are allocated to the corresponding workers, consumption taxes to the corresponding consumers, and capital taxes to the corresponding asset owners. As previously, taxes on corporate profits are allocated to

²³In both Sweden and Norway there is a carryover of basis at death, hence heirs might be liable for capital gains taxes upon realization. Studying realization by heirs is a fruitful avenue for future work.

the corresponding firm owners.

Allocation of taxes. With the population-wide administrative micro-data at our disposal, direct taxes can usually be fully traced at the micro-level. The only notable gap is for the corporate tax, since part of corporate taxes are paid by government-owned companies and indirectly by pension funds. To account for this, in our baseline series we proceed as follows. First, we exclude corporate taxes paid by public companies from the analysis (consistently, we exclude profits of public companies from our measure of income, see below). This is only relevant for Norway, where the large oil-producing company Statoil (Equinor since 2018) is publicly owned. Second, we allocate other missing corporate taxes proportionally to economic income (consistently, we allocate the corresponding missing corporate profits proportionally to economic income).²⁴

The main challenge involved with allocating all taxes is VAT. Ideally we would compute VAT with individual data on consumption; such data, however, is not available even in Norway and Sweden. The next best approach involves estimating consumption using the budget-constraint approach (Koijsen et al., 2014; Baker et al., 2022). This requires data on active saving. Pre-2007 Swedish data—before the abolition of the wealth tax—are particularly appropriate for this task. We therefore estimate consumption rates with Swedish data and apply consumption rates, expressed as a percent of economic income, to Norwegian data. We then allocate VAT proportionally to imputed consumption.

More specifically, the consumption imputation follows the procedure of Nekoei and Seim (2023). During 2000-2007, when Sweden taxed wealth, the tax returns include annual snapshots of the number of shares held in each financial security (e.g., stocks and funds). We use this information to measure annual changes in the shares held for each individual and financial security. We value that change using the midpoint of the security’s beginning- and end-of-year price assuming that rebalancing occurs in the middle of the year. We then sum the changes across securities within individual to arrive at a measure of annual savings. Imputed consumption is then the budget-constraint residual that subtracts annual savings from disposable income. After 2007 it is not possible to observe wealth anymore and we assume constant income-consumption profiles after 2007.

Pretax income denominator. To compute tax rates, we divide taxes paid by pretax national income, as defined in the Distributional National Accounts literature (e.g., Piketty et al.,

²⁴In other cases when there is a discrepancy between macro and micro totals, we re-scale micro-level values

2018; Blanchet et al., 2021). Pretax national income (pretax income for short) is equal to labor and capital income after the operation of the pension system and the unemployment insurance system. Pretax income removes contributions to pensions and to unemployment insurance and includes the corresponding benefits. We make only one modification to these standard definitions: we remove profits from publicly-owned corporations from national income. That is, we are interested in the distribution of private national income—and of taxes paid by private economic actors. This modification is only relevant in Norway, where the state-owned oil company’s pre-tax profits can account for 7%–8% of national income, with fluctuation depending on oil prices.²⁵

To maximize transparency, in our baseline series we compute pretax (private) income by simply proportionally adjusting economic income by the same multiplicative factor for all individuals. Thus the distribution of pretax income is the same as the distribution of economic income, which is fully based on micro-data with no imputation. The adjustment to move from economic income to pretax national income only involves a proportional level shift, whose purpose is to make tax rates consistent with macroeconomic aggregates and comparable internationally.²⁶

A classic issue with the computation of effective tax rates for low-earners is how to treat consumption taxes paid on transfer income. Pure monetary transfers (i.e., other than pension and unemployment insurance benefits) are not included in pretax income, but the beneficiaries of these transfers pay VAT on their consumption of transfer income. Following Saez and Zucman (2026), we address this concern by removing the portion of VAT paid out of transfer income from our measure of individual-level VAT. In effect, these taxes are treated as reducing the value of transfers rather than as taxes. This ensures that effective tax rates are well defined at the bottom of the distribution.

Patterns in effective tax rates by income group. Figure 5 reports our estimates of effective tax rates by income group in Sweden and Norway, all tax included. A number of striking results emerge. First, as shown in panel (a), in both Norway and Sweden effective tax rates hover around 40%–50% throughout the distribution up until P95-99.²⁷ There is then a

proportionally. The effect is negligible.

²⁵In practice, we implement this restriction in Norway by distributing “mainland” national income, scaling down total national income by the ratio of onshore to total gross national product (two aggregates published by Statistics Norway).

²⁶The main form of unobserved income (i.e., of income in national income but not in economic income) is investment income earned through pension funds. When studying income inequality in Section 6 below, we provide a specific treatment of this form of income, leveraging micro-level proxies for the ownership of pension funds. As we show, this makes little difference to the distribution of pretax private national income.

²⁷In Norway, we include the guaranteed minimum pension as part of pretax income. This minimum pension is

sharp drop-off in effective tax rates, from 50%–55% on average for individuals in P95–99 to about 15%–20% in the top 0.0005%.

As shown in panels (c) and (d) of Figure 5, consumption taxes, payroll taxes, and individual income taxes are significant at the bottom and in the middle of the distribution. The broad tax bases—including low or no income tax exemption threshold—and the high marginal tax rates that apply even in the first income tax brackets are well-known features of Scandinavian tax systems (e.g., Kleven, 2014). After the P95–99 group, the tax system becomes regressive. VAT becomes small relative to income (due to the rise in saving rates), payroll taxes vanish (as capital income, the prevailing source of income at the top, is exempt), and the individual income becomes sharply regressive—falling to nearly 0% of pretax income in the top 0.0005%. The corporate tax rises, but its increase is insufficient to offset the quasi-disappearance of the individual income tax.

Naturally, taxes are only just one side of government intervention in the economy. The evidence in Figure 5 does not capture the redistributive nature of government spending. One may view monetary transfers as negative taxes and subtract these transfers from taxes paid, which would highlight that the tax-and-monetary-transfer system is progressive at the bottom of the distribution. Subtracting in-kind transfers and the value of collective consumption expenditures would further alter the curve, since this spending is roughly akin to a flat amount per person (see, e.g., Piketty, Saez and Zucman, 2018). In all cases, however, a sharp drop-off in tax rates (net of government spending) would remain between the 99th percentile and the top 0.0005%. All these high-income individuals benefit from government spending in a broadly similar manner, but billionaires have tax rates that are only a third of those at the 99th percentile, primarily because of the collapse of the income tax.

The wealth tax, an ineffective backstop. Norway has a wealth tax and Sweden used to have a wealth tax before 2007.²⁸ As shown by panel (d) of Figure 5, however, in 2018–20 the wealth tax absorbs barely 1% of income at the top of the distribution in Norway, despite a

above p20 and is taxable but not subject to payroll tax, which explains the kink in the average tax rate at P20.

²⁸A body of work analyzes the historical and international experience with progressive wealth taxation (e.g., Jakobsen et al., 2020; Ring, 2025; Ring and Thoresen, 2025; Saez and Seim, 2025; Londoño-Vélez and Ávila-Mahecha, 2025; Jakobsen et al., 2025; Bach et al., 2025). Our main contribution here is to clarify whether the wealth tax has been effective at playing the role of backstop for the income tax at the top of the distribution (i.e., at offsetting the decline in the income tax) in Norway and Sweden, two countries seen as having generally broad bases and efficient tax collection. Bach et al. (2025) show that the effective wealth tax rate of ultra-high-net-worth individuals was very low in France. The case of Norway is particularly interesting given that the Norwegian wealth tax does not feature the exemption for large shareholding that was a key feature of the French wealth tax and (as shown by Bach et al., 2025), the main reason for its ineffectiveness at the top.

marginal wealth tax rate on *wealth* of 1.1%. Why does the wealth tax make so little difference?

To address this question, Figure 6) analyzes Norway’s and Sweden’s wealth tax in 2004–06, on the eve of the abolition of Sweden’s wealth tax. In both Norway and Sweden, wealth tax liabilities were capped at a fraction of taxable income in 2004–2006. As Figure 6 shows, however, removing that ceiling would have moved little difference.²⁹ The key feature of the Swedish and Norwegian wealth taxes are the treatments of shares in privately-held businesses. In Sweden, these shares were exempt from the wealth tax. One could avoid the wealth tax entirely by transferring assets (including shares in listed stock) to holding companies. In Norway private businesses benefit from advantageous valuation rules, in effect well below market value. As shown in Figure A7 most of the wealth at the top of the distribution corresponds to shares in private businesses and hence these valuation rules could have first-order effects on effective wealth tax rates.

Figure 6 computes counterfactual effective wealth tax rates (relative to economic income) if the market value of equity in private businesses was included in the base of the wealth tax, keeping other features (exemption threshold and tax rate) of the wealth tax and behavior unchanged.³⁰ The market value of private companies is estimated using valuation multiples observed for publicly listed companies operating in the same sector in Norway, Sweden, Denmark, and Finland. We compute three valuation multiples—price/earning, enterprise value/revenue, and price/book—and apply these multiples to the earnings, revenue, and book value of Norwegian and Swedish private businesses at the micro level. Our estimate of these businesses’ market value is the equal-weighted average of the three multiplier-based valuations. Smith, Zidar and Zwick (2023) use a similar methodology to value private passthrough businesses in the US, which we detail in Appendix A.

The results show that if the wealth tax was based on such estimated market values, wealth tax payments would be an order of magnitude larger than observed. With a top marginal rate of 1.1% as in Norway, a wealth tax on the full market value of wealth would absorb more than 8% of income at the top of the distribution, as opposed to less than 1% in actual facts. This result highlights that low valuation of equity in private business is the key reason for the low observed effective wealth tax rates.

²⁹This ceiling was removed in Norway in 2009.

³⁰We also remove the discount on listed equity that applied in Norway so that shares in listed corporations are also included for their full market value.

5.2 The Role of Holding Companies in the Fall of the Income Tax

What fraction of the decline in effective tax rates at the top of the distribution can be attributed to holding companies?

Base erosion at the top. To begin addressing this question, panel (b) of Figure 5 plots the ratio of taxable income—as reported in individual income tax returns—to economic income. Up to the P95-99 group, about 90% of economic income is taxed. This fraction falls sharply within the top 1%, down to around 5% in the top 0.0005%. Effective income tax rates collapse at the top not primarily because of a change in statutory rates (e.g., the application of preferred rates on investment income), but because a vanishing fraction of income becomes subject to individual income taxation. In turn, this is due to the fact that nearly all income at the top is retained in corporations, primarily in personal holding companies, with the fraction of economic income retained in holding companies rising from almost 0% in P95–99 to 50%–60% in the top 0.0005% (panels c and d of Figure 2).

Mechanical revenue losses. Panels (e) and (f) of Figure 5 report how much tax revenue would be collected if, everything else equal, the effective tax rate remained equal to the observed rate τ^{max} of the P95-99 group—around 55% in both Norway and Sweden—all the way up to the top 0.0005%. Naturally, this should not be interpreted as a revenue estimate of increasing top tax rates to τ^{max} , since behavior would change and the base should shrink. However this mechanical change in tax liability is one of the two sufficient statistics needed to make such an estimation (see, e.g., Saez and Zucman, 2026) and represents an upper bound for how much governments could obtain by enforcing a principle of non-regressivity. This upper bound is significant: the equivalent of around 7% of tax revenue currently collected in both Norway and Sweden.

To isolate the role of holding companies, consider the mechanical change in tax collection resulting from a reform that would force holding companies to distribute all their income as dividends for tax purposes. As shown by Appendix Figure A14, in Norway this would raise the equivalent of 4% of current tax revenues, everything else equal—more than half of what is lost relative to a non-regressivity benchmark. In the top 0.01%, about 60% of the mechanical loss of tax revenue (relative to a flat τ^{max} benchmark) can be attributed to the use of holding companies. Of course, if personal holding companies were forced to distribute all their income for tax purposes, behavioral responses would reduce the base of the new tax. In particular, there would be incentives for firm owners to retain income in operational businesses, a point

we return to in the Conclusion when we consider tax reforms. The point of these computations is simply to quantify the contribution of holding companies to the decline in tax progressivity observed at the top of the distribution. By these metrics, about 50%–60% of this fall can be attributed to the use of personal holding companies.

Mechanisms. How can ultra-high-net-worth individuals meet their spending needs if they retain most of their income in personal holding companies? Figure 7 investigates this question in Norway. As the top panel shows, disposable income (a somewhat broader measure than fiscal income including, e.g., monetary transfers) is close to 100% of economic income at the bottom of the distribution, but negligible relative to economic income at the very top. The bottom panel decomposes disposable income into a number of inflow and outflow sources.³¹ The main outflows at the top are direct tax payments—individual income and wealth tax—which absorb 80% of disposable income in the top 0.0005%. In effect, ultra-high-net-worth individuals pay themselves (e.g., by withdrawing income from holding companies) essentially only what is necessary to cover their taxes—which in practice in Norway means the wealth tax.

The remaining 20% of disposable income are supplemented by additional inflows: net borrowing and repayment of shareholder capital, primarily. However, contrary to a widely held view but consistent with the work of Fox and Liscow (2025) in the United States, these flows are small. Net borrowing is equivalent to 20% of disposable income, which itself is very small relative to economic income. Ultra-high-net-worth individuals do not appear to fund large amounts of consumption by borrowing. Instead, their consumption is small relative to their economic income. Most of their income is saved through holding companies. As we have seen this saving is permanent among dynastic families. As a result, as illustrated by Appendix Figure A9, effective tax rates remain low at the top even if one cumulates income and taxes over eighteen years.

5.3 The Rise of Holding Companies and the Decline in Progressivity

To what extent has the rise of holding companies documented in Section 3 led to a decline in effective tax rates at the very top?

Evolution of effective tax rates at the top. To provide context, Figure 8 displays the dynamic of effective tax rates over time for the top 0.01% and the bottom 99.99% over the

³¹ Appendix Figure A8 shows inflow and outflows separately, and decomposes net borrowing into new borrowing and loan repayments.

2000–2020 period. In both Sweden and Norway, we observe a significant decline in top effective tax rates over time. In Sweden the top 0.01% effective tax rate was halved between 2000 and 2020, from 30% to 15%. This is due to both a decline in the corporate income tax—as the statutory fell from 28% in 2000 to 21.4% in 2020—and a collapse in individual income tax revenues. Bottom 99.99% effective tax rates, by contrast, have remained broadly stable.

In Norway the effective individual income tax rate at the top of the distribution was lower than in Sweden at the beginning of the 20th century. Before the introduction of the dividend tax in 2006, firm owners could earn distributed profits free of tax. Moreover, the absence of a dividend tax provided incentives to shift income away from the personal labor income base to the more lightly taxed corporate base (e.g., Thoresen and Alstadsæter, 2010). A key goal of the 2006 dividend tax reform was to reduce incentives for such tax avoidance and improve the progressivity of the tax system. However, the introduction of the dividend tax was accompanied by an increase in the use of holding companies. As a result top effective tax rates also experienced a decline, albeit from a lower base level than in Sweden.

Quasi-experimental evidence from Norway’s dividend tax. To establish causality, we analyze how the ease of creating holding companies affects ownership structure, earnings retention, and ultimately effective tax rates. We exploit the fact that the 2006 dividend tax reform allowed some, but not all, investors to transfer their stocks into a holding company at zero cost, i.e., without realizing capital gains.

Specifically, the 2006 dividend tax was announced in the fall of 2004. Shareholders were allowed to move stocks into holding companies without having to realize gains by transferring the stocks before December 31st, 2005. This was done to address the fact that the reform would otherwise favor individuals who already had holding structures. The initial requirement for a tax-free stock transfer was that the shareholder should own at least 90% of the shares. This rule was amended in June of 2005 to allow for tax-free transfers whenever the new owner (holding company) would own at least 10% of the shares.³²

Panel (a) of Appendix Figure A10 shows indirect ownership shares for investors with different ex-ante ownership structures. The blue line (triangles) shows a modest uptick from 9% to 12% in the indirect ownership share (share of profits originating from indirectly-held firms) for individuals who, ex-ante, saw more most of their profits originate in firms in which they held less than 10% of the shares. For those who primarily owned more than 10%, however, there is a

³²After December 31st, 2005, the (presumably only) way to obtain an indirect ownership position was through a “triangle merger” in which the target firm is merged with the subsidiary of a holding company and original owners are compensated with shares in the holding company.

more substantial rise from about 6% to 22%. The ability to transfer stocks without realization allowed >10% owners to more easily create holding structures.

Panel (b) of Appendix Figure A10 shows the same findings using a differences-in-differences methodology, comparing individuals who primarily owned more than 10% of their portfolio companies (which we think of our treated group) to those who owned less than 10% (control).³³ The idea is that <10% owners faced larger costs of transferring stocks into a holding company. Accordingly, we see a clear differential increase in indirect ownership shares of about 12–13 percentage points. Panel (c) considers the profit-retention share at the individual level, that is, the ratio of retained earnings to total allocated profits. We see a sharp rise by about 10 percentage points following the reform in the treated group relative to the control group. This indicates that the ability to shift to indirect ownership facilitated higher profit retention, which mechanically reduces effective tax rates by reducing the amount of dividend taxes the individual pays. Panel (d) confirms this by plotting the effect of the reform on average tax rates. Exogenous policy changes that increase the use of personal holding companies lead to an increase in earnings retained in holdings and a decline in effective tax rates.

6 Implications for the Dynamics of Inequality

This Section analyzes the implications of tax avoidance through holding companies for the measurement of inequality. We start with fiscal income as observed on individual income tax returns, and consider how inequality changes when adding income retained in holding companies.

6.1 Dynamics of Top Income Shares

Top income shares: fiscal vs. economic income. Previous research has uncovered a large gap between the evolution of the concentration of fiscal vs. economic income in Norway since the beginning of the 21st century (Alstadsæter et al., 2025; Aaberge et al., 2025). The introduction of the dividend tax in 2006 led to a collapse of reported dividends, a major source of income at the top. As a result, the top 1% share of fiscal income fell from 10% in 2004 to 7%–8% in the post-2006 period, while the top 1% share of economic income (i.e., including retained earnings) rose. Our results for Norway, shown in Panels (b) and (d) of Figure 9, confirm and are fully consistent with this earlier evidence.

Our analysis makes it possible to quantify the contribution of personal holding companies

³³In principle, the rule allowed a group of individuals to bundle <10% ownership positions and transfer it to a jointly-held holding company. However, since this would involve costly coordination, we still expect <10% owners to be less responsive.

to this evolution. As shown in Panel (b) of Figure 9, starting with fiscal income and simply adding earnings retained in personal holding companies reveals a sharp increase in the top 1% income share, from about 11% in 2002 to 16% in 2020 (black line). This accounts for most of the rise of the top 1% share of economic income (red line).

By construction, this rise only captures private income. In Norway there is a large and growing amount of income earned by the government. Distributing this public income in a lump sum manner reduces the level and rise of inequality, but still leaves a sizable increase, with the top 1% share rising from 10% in 2002 to more than 17% in 2020 (blue line in panel b).³⁴

The more interesting question for our purposes is what happens in Sweden, which unlike Norway did not experience a sharp change in the incentive to report fiscal income (nor a booming oil sector and sovereign wealth fund), and may thus be more representative of other countries. Panel (a) of Figure 9 shows that while fiscal income concentration has been relatively stable in Sweden since the turn of the 21st century, adding income retained in personal holding companies makes a significant difference not only to the level but to the trend of the top 1% income share. The top 1% share of fiscal income rose from 5.9% in 2000 to 7.6% in 2020 (+1.7 points). When earnings retained in personal holding companies are added to fiscal income, we instead observe a rise from 7.2% to 12.2% (+ 5.0 points).

Adding other retained earnings, there is a rise of 6.2 points in the top 1% share of economic income. As shown by panel (c), this rise is particularly pronounced at the very top of the distribution. The share of economic income earned by the top 0.01% rose from 1.8% in 2000 to nearly 5% in 2020. The concentration of economic income appears to have increased markedly, with most of the rise masked by the use of personal holding companies.

Accounting for pension income. To assess the reliability of this finding, we provide a number of robustness tests. First, we allocate investment income earned by the large and growing Swedish pension funds using micro-level proxies for the ownership of pension funds. Recall that we do not observe stakes in pension funds and hence in our baseline estimates we allocate all investment income earned through pensions funds (like other unobserved income) in a distributionally neutral manner, i.e., proportionally to observed economic income.

Panel (a) of Figure 9 reports a supplementary series where we allocate investment income earned by pension funds using individual-level proxies for pension funds ownership. Specifically,

³⁴Practically, we allocate government investment income as reported in the national accounts (which essentially corresponds to dividends received from Statoil/Equinor and investment income earned by the Norwegian sovereign wealth fund) as a lump sum per adult.

we observe wage income and private pension distributions. Following Jakobsen et al. (2020), we assume that 40% of pension wealth belongs to wage earners and 60% belongs to retirees. We then allocate the pension wealth of workers proportionally to their wage incomes (winsorized at the 99th percentile of the wage distribution) and the pension wealth of retirees proportionally to their private pension benefits paid out of pension funds.³⁵ Jakobsen et al. (2020) checked that this imputation closely approximates the actual distribution of pension wealth in Denmark in 2012. Saez and Zucman (2016) use a similar imputation procedure in the United States. As shown by panel (a) of Figure 9 this makes very little difference to our baseline results.

Income of billionaires. Second, we analyze the income share of Sweden’s richest individuals ranked by *wealth*. To do so, we use annual rankings compiled by the magazine *Veckans Affärer* between 1998 and 2016, and *Forbes* magazine between 2017 and 2020, to identify the 0.00045% wealthiest households each year. This group includes 22 households in 2020, roughly the population of resident billionaires (in US dollars) in 2020. As in Balkir et al. (2025), we match this group to their administrative data, including individual income tax returns and apportioned corporate profits. Appendix B provides additional details about the rich lists we use and the matching procedure.

As the top panel of Figure 10 shows, there is a sharp disconnect between the dynamic of fiscal income and the dynamic of economic income in this group of ultra-high-net-worth individuals. The share of fiscal income earned by the top 0.00045% has flatlined at about 0.1% of total fiscal income. Meanwhile its share of economic income rose from 0.3% in 2000 to 1.4% in 2020, consistent with the fast rise observed for the top 0.01% of the economic income distribution in panel (c) of Figure 9.

This result is consistent with the important study of Swedish wealth inequality by Hammar et al. (2026). Based on administrative data, Hammar et al. (2026, Appendix Figure B.3) estimate that the top 0.0001% wealth share increased from 2.9% in 2000 to 4.6% in 2020. As reported in the top panel of Appendix Figure A13, using rich lists data and the same total wealth denominator as Hammar et al. (2026), we find a similar increase of the top 0.0001% wealth share, from 2.9% in 2000 to 5.0% in 2021.³⁶ This similarity of findings is notable given that Hammar

³⁵We assume that pension wealth generates a flow return (dividends, interest) of 3%, flat across the distribution and over time.

³⁶Two points are worth noting for this reconciliation. First, from 2016 onwards available rich lists do not cover the full top 0.0001%, except in 2021 (see Appendix B). This is the reason why we extend the series to (the middle of) 2021, while Hammar et al. (2026)’s series end in (year-end) 2020. Second, in our baseline series of wealth inequality we divide the wealth of top groups (from rich lists) by the official mid-year household wealth totals of Statistics Sweden, obtained by averaging year-end values. Hammar et al. (2026) use another total denominator which is larger by a factor of about 1.5 in 2000 and 1.2 in 2020. In panel (a) of Appendix Figure A13 we report

et al. (2026) do not use rich lists to form their estimates. Our contribution is to show that the economic income of ultra-high-net-worth individuals has increased particularly fast. This does not reflect any disagreement about the dynamics of top-end wealth—the administrative data of Hammar et al. (2026) like the magazine estimates we use both point to a rise in (kronor) billionaire wealth since 2000. Instead, economic income appears to have grown much faster than fiscal income among billionaires. A smaller fraction of their income is subject to the individual income tax in 2020 than in 2000.

6.2 Is Europe More Equal than the U.S.?

The fraction of economic income that shows up on individual income tax returns differs significantly between Europe and the United States. In the United States, Balkir et al (2025) find that this fraction declines as one moves up the wealth distribution, but the decline is much less pronounced than in Sweden and Norway. For the top 0.0002% wealthiest Americans, 40% of economic income is still reported in individual tax returns in 2018–20, as opposed to less than 5% in Norway and Sweden (panel (b) of Figure 5 above). Bach et al. (2025) estimate that a similarly low fraction of income shows up on the tax return of billionaires in France and relate this to the prevalence of holding companies at the top. In the United States, the Personal Holding Company tax imposes a 20% surtax on the undistributed profits of holding companies. In effect, this tax in place since the mid-1930s has made the use of personal holding structures much rarer in the United States than in Europe, contributing to a higher ratio of taxable income to economic income in the United States.

This suggests that comparisons of income inequality based on fiscal income alone are likely to overstate the difference in income concentration between Europe and the United States. Because the ratio of fiscal income to economic income appears to have declined over time in Sweden and Norway, comparisons of trends in income concentration could be biased too.

To quantify the magnitude of the potential bias—and the specific role of holding companies in it—consider first the evolution of the top 1% share of fiscal income (excluding capital gains) in Sweden and the United States. According to the estimates of Roine and Waldenström (2010), this share rose from 4.1% in 1980 to 6.0% in 2000, consistent with Figure 9a above. Extending the series to 2020, the top 1% fiscal income share rose from 4.1% to 7.8%. Meanwhile, over the same period of time the top 1% fiscal income share (also excluding capital gains) rose from 8.2% to 19.2% in the United States (Piketty and Saez, 2003, updated).

the top 0.0001% wealth share using the official Statistics Sweden denominator and the Hammar et al. (2026) denominator.

Consider now what happens when income retained in personal holding companies is added to fiscal income. In the United States this has no impact since personal holding companies are essentially non-existent.³⁷ In Sweden, as shown by panel (a) of Figure 9, the top 1% income share rises by 4.9 points between 2000 and 2020 when holding companies are accounted for, while the fiscal income share rises only 1.8 points. Conservatively assuming that holding companies made no difference to the 1980–2000 evolution, we move from a 1980–2020 rise of the top 1% income share of 3.7 points when disregarding holding companies, to a rise of 6.9 points when accounting for holding companies (as opposed to +11 points in the United States in both cases). Holding companies alone erase nearly half of the 7.3 points difference in the 1980–2020 rise of the top 1% fiscal income share between Sweden and the United States.

Consistent with this finding, a focus on very top wealth shares reveals less of a difference between Sweden and the United States than one might think. As shown by the bottom panel of Figure 10, the share of wealth owned by the top 0.0002% in Sweden group has been multiplied by a factor of nearly 2 from 1.8% to 3.4%. The level and rise of the Swedish top 0.0002% are overall quite similar to what is observed in the United States up to 2020.

7 Conclusion

This paper uncovers the magnitude of tax avoidance through personal holding companies in Norway and Sweden, two countries with administrative micro-data allowing researchers to link firms to their owners and to study the causal effects of holding companies on tax liabilities. Our findings reveal a widespread and growing use of holding companies among the rich, with first-order consequences for the progressivity of the income tax—and the tax system at large—and the dynamic of inequality.

A variety of reforms could in principle overcome this limitation of the income tax. The richness of Norway’s and Sweden’s administrative data allow us to consider two fundamental reforms.

The first would be to create a progressive wealth tax based on the full market value of wealth. A standard argument for progressive wealth taxation is that it can serve as a backstop for the individual income tax, ensuring that wealthy taxpayers pay in proportion to their ability to pay even if they find ways to report little taxable personal income. The Shoup et al. (1949) mission—tasked by Douglas MacArthur during the U.S. occupation of Japan to design a comprehensive

³⁷In 2020, according to official IRS statistics, 2,253 corporations filed as Personal Holding Companies in the United States, or roughly 1 per 100,000 adults. In Sweden and Norway, as we have seen, there is roughly 1 personal holding company (using the same definition as in the US) per 150 adults (panel b of Figure 1).

and equitable tax code for post-World War II Japan—advocated for a progressive wealth tax (in addition to a highly progressive income tax) along those lines. Leveraging our firm-owner linked data, we can estimate the market-value of private businesses. Panel (a) of Figure 11 shows that a wealth tax at a rate of 2% on all wealth above 50 million Norwegian kronor with no exemption would erase most of the regressivity of the Norwegian tax system at the top. As shown in panel (b), a 1.5% wealth tax—which was the nominal rate in Sweden before the abolition of the wealth tax in 2007—would still leave a significant drop-off in average tax rates at the top in Sweden.

Second, corporate income could be fully subject to the individual income tax, like partnerships and S-corporations in the United States. The U.S. experience shows that this passthrough taxation of income is practical, even for large publicly listed companies—as a number of publicly listed companies, with a large number of owners, are taxed as partnerships. Figure 11 shows that everything else equal, this extension of the progressive income could erase regressivity at the top of the income distribution, depending on the top marginal individual income tax rate applied.

More targeted reforms might be less effective. Subjecting the borrowing of high-income individuals to individual income taxation, a reform frequently discussed in the United States, would make little difference, because this borrowing is small. Subjecting holding companies to a dividend tax on all of their income, whether distributed or retained, would raise less revenue than a full passthrough taxation of corporate income, since income retained in operational businesses would be unaffected. In addition to the mechanical loss of revenue involved, this would give high-net-worth-individuals incentives to retain income in operational businesses, instead of retaining it in holding companies. Because the two fundamental reforms we consider have a maximally broad base (either full market value of wealth, or the full value of corporate income, no matter the legal structure used), avoidance would be more limited than in more targeted reform scenarios. Providing a full welfare analysis of these two fundamental reforms raises fruitful avenue for future research.

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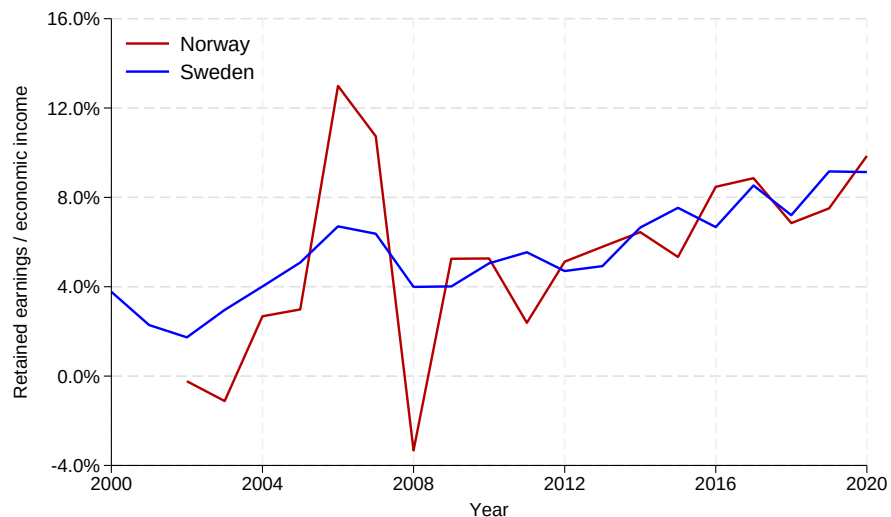
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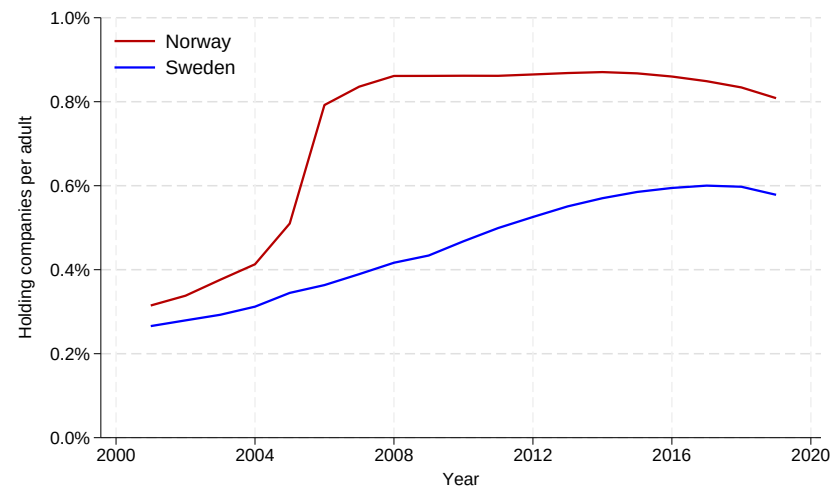
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Figure 1: Trends in Retained Earnings and Prevalence of Holding Companies

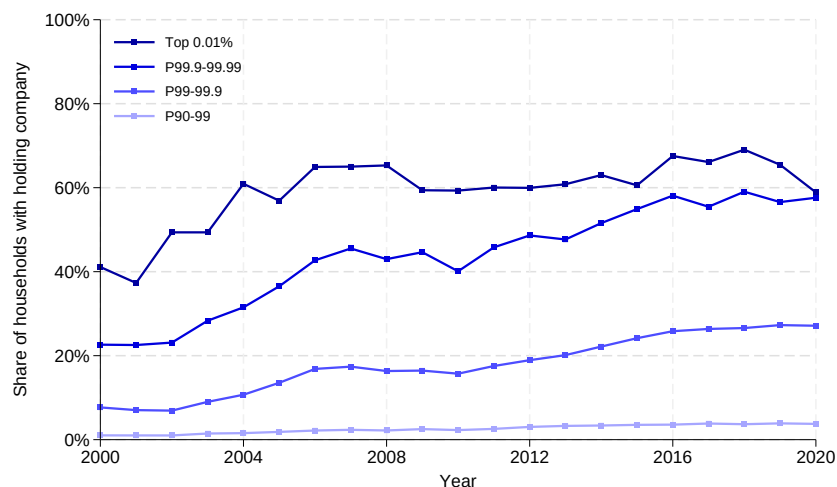
(a) Retained earnings allocated to households



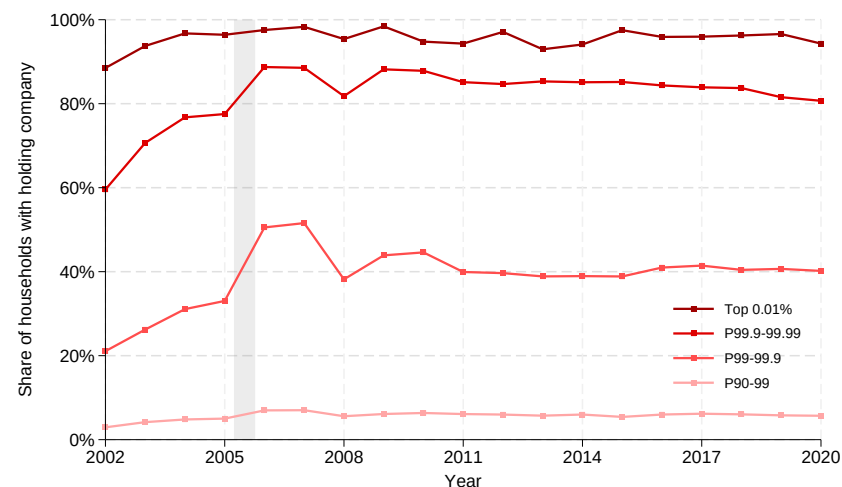
(b) Number of holdings divided by adult population



(c) Prevalence of holding companies (Sweden)



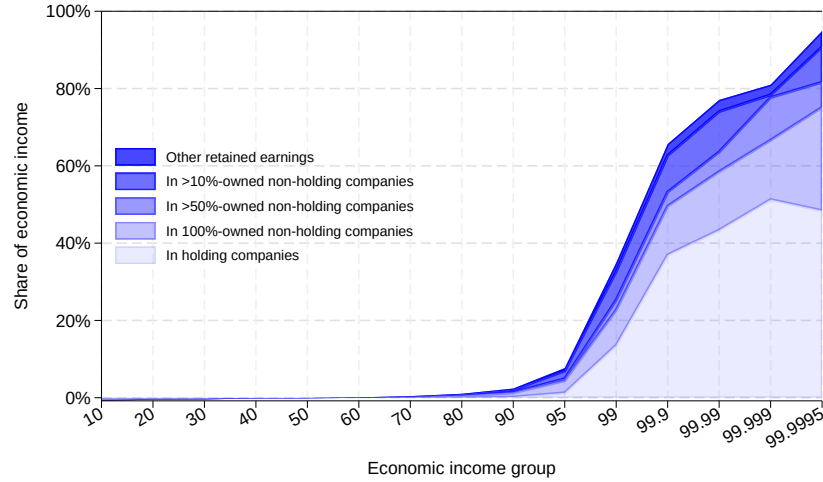
(d) Prevalence of holding companies (Norway)



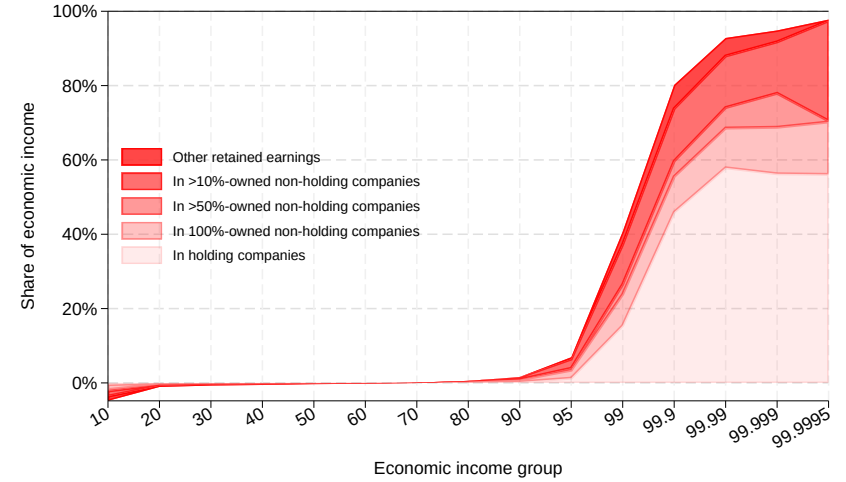
Notes: Panel (a) plots the evolution of corporate retained earnings allocated to resident individuals in Sweden and Norway. Retained earnings are defined as profits net of capital depreciation, interest payments, corporate tax, dividend distributed, and minority interest, and are apportioned to households based on their ownership stakes in the firms. Panel (b) shows the number of holding companies divided by the adult population. Panels (c) and (d) show the share of households owning a holding company, by income group.

Figure 2: Undistributed Income (% of Economic Income)

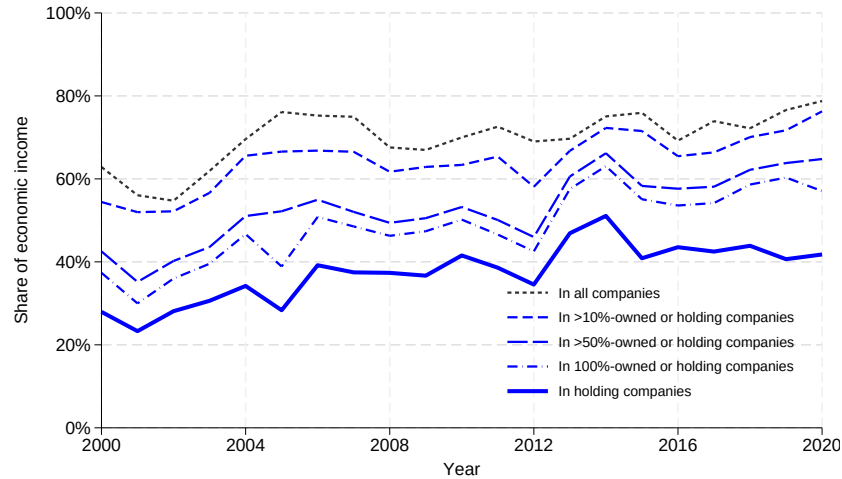
(a) By income group, Sweden (2018–20)



(b) By income group, Norway (2018–20)



(c) In the top 0.1%, Sweden

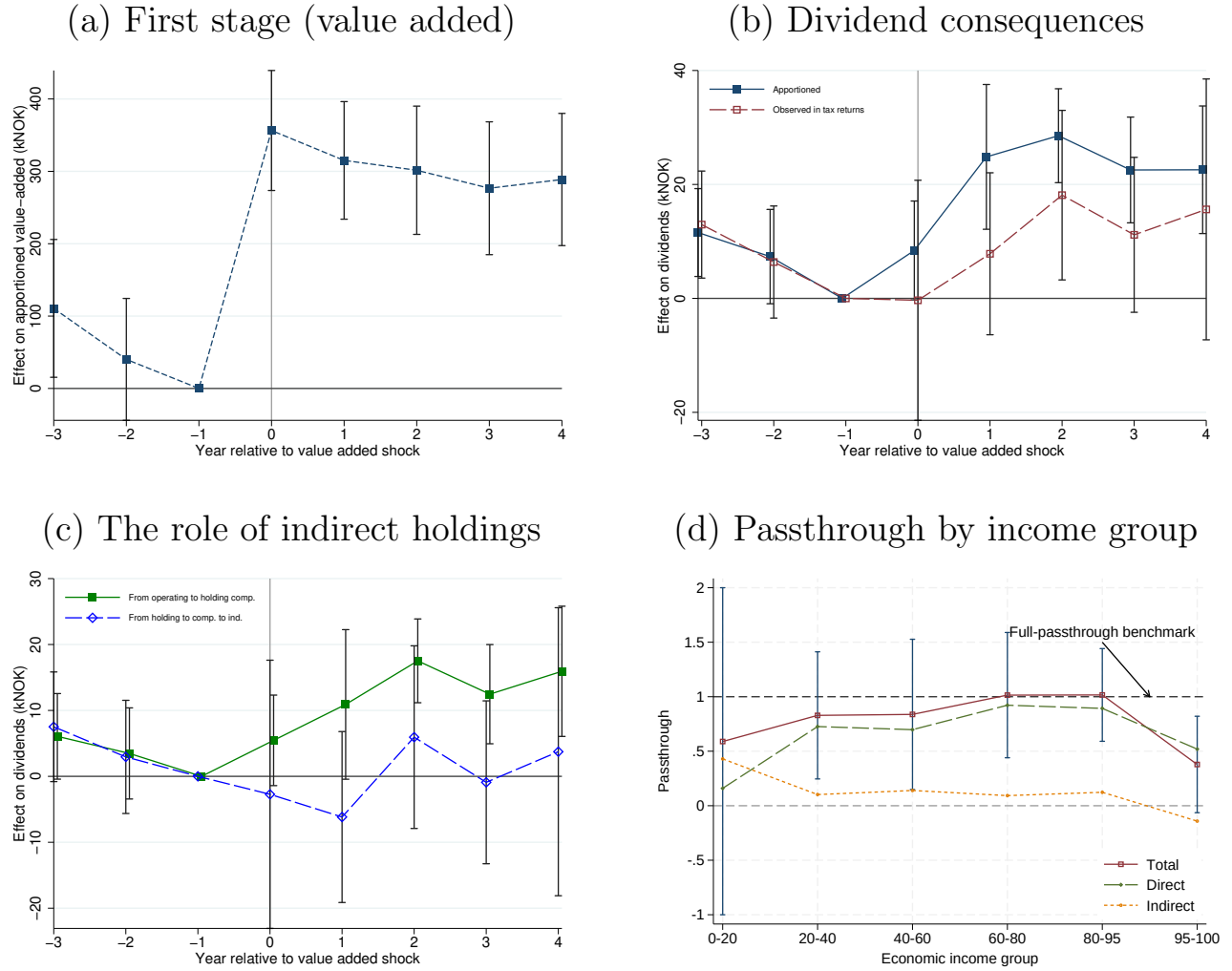


(d) In the top 0.1%, Norway



Notes: Panels (a) and (b) show the fraction of economic income which corresponds to undistributed earnings (gross of corporate taxes paid), by bins of economic income for the period 2018–2020. We separately identify undistributed earnings in five non-overlapping categories of firms: (i) personal holding companies as defined in the US tax law (see text), (ii) firms 100%-owned other than holding companies, (iii) firms 50%-owned, (iv) firms 10% owned, (v) other firms. Panels (c) and (d) show the evolution of undistributed corporate income (gross of corporate taxes) earned by the top 0.1% of the economic income distribution in Sweden and Norway.

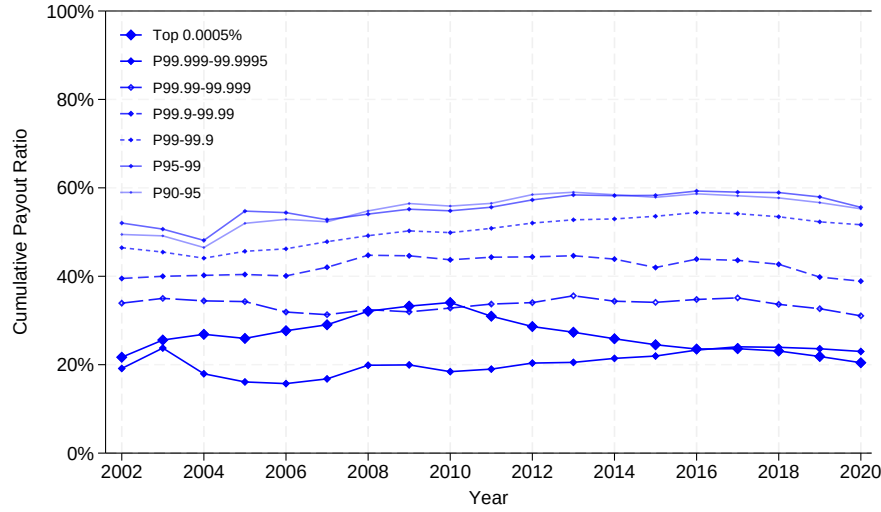
Figure 3: Passthrough of Value Added Shocks



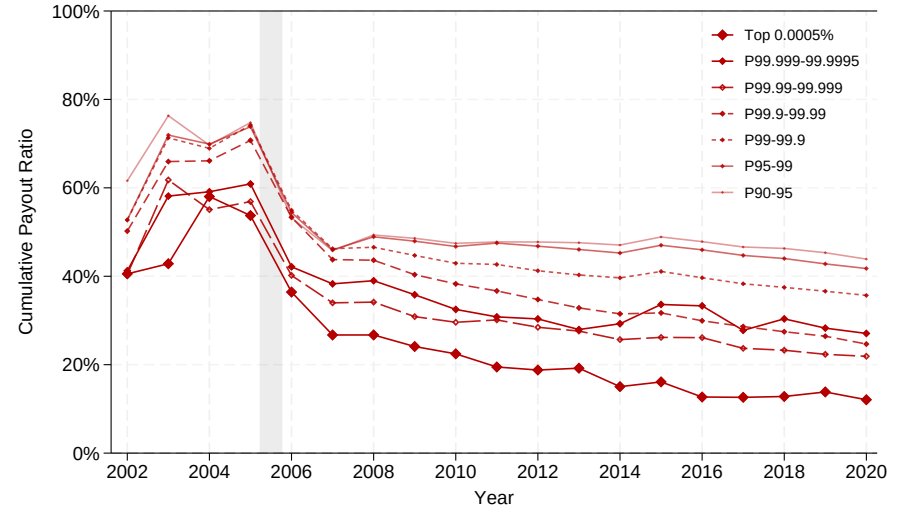
Notes: This figure examines how owners' dividends respond to value-added shocks in operating firms in which they hold equity stakes. The analysis is based on a panel of firm owners linked to firms through either direct or indirect ownership structures in Norway. We restrict attention to indirect ownership through a single holding; see text for details of the sample construction. Panel (a) shows the effect of a value-added shock on apportioned value added, defined as the owner's equity share—direct or indirect—multiplied by the operating firm's value added. Panel (b) traces how these shocks translate into dividend payments. The solid navy series shows the effect on apportioned dividends, i.e., the owner's total equity share multiplied by firm-level dividend payouts. The dashed maroon series shows the effect on dividends observed on owners' personal tax returns, i.e., dividends received directly from the operating firm plus dividends distributed to the owner by the holding company. Panel (c) decomposes the gap between the two series in panel (b). The solid green series shows the effect on dividends paid from the operating firm to the holding company, apportioned by the owner's stake in the holding company; the dashed blue series shows the effect on dividends paid from the holding company to the owner. Panel (d) repeats the analysis separately by comprehensive income rank in year $t = -1$, shown on the x-axis, pooling pre- and post-event years. For each income group, the total passthrough rate (red squares) is the effect on dividends observed on individual tax returns (received directly from the operating firm or distributed by the holding company) divided by the effect on apportioned dividends, i.e., by the hypothetical dividend response if all apportioned dividends had been distributed to individuals. The green series is the direct component of the passthrough rate (directly received dividends divided by apportioned dividends) and the orange series the indirect component (dividends distributed by holding companies divided by apportioned dividends). For all groups except the top income group, the total passthrough rate is statistically indistinguishable from one, consistent with full passthrough of value-added shocks into taxable dividends. For the top 5%, the passthrough rate is 0.4, statistically distinguishable from one and indistinguishable from zero. Monetary values are expressed in thousands of Norwegian kroner. All regressions include event-time fixed effects, shock-year fixed effects, an indicator for high versus low value-added shocks, and an indicator for whether ownership is direct or indirect. The figures display 95% confidence intervals based on robust standard errors. Standard errors in Panel (d) are calculated using the delta method; the confidence interval for the bottom income group is truncated at $[-1, 2]$ for readability.

Figure 4: Heterogeneity in Payout Rates Over Time

(a) Sweden

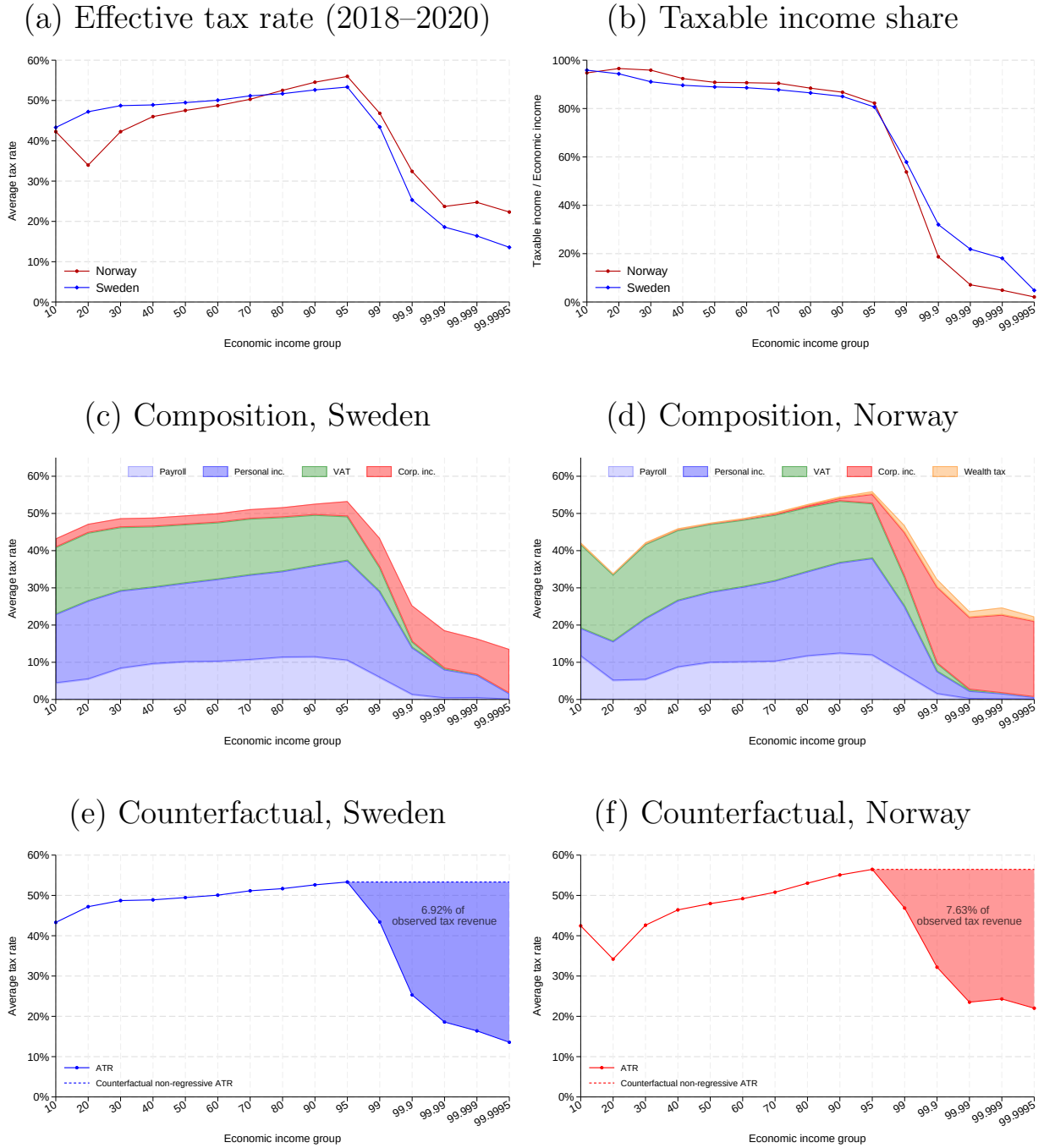


(b) Norway



Notes: This figure shows the evolution of cumulative corporate payout ratios for different groups of the income distribution over the period 2002 to 2020. We rank individuals i by their economic income in 2002. For each year t until 2020, we then compute the cumulated dividends and realized capital gains reported in i 's individual income tax returns between 2002 and t , which we divide by the cumulated apportioned corporate profits accruing to i between 2002 and t . This statistic captures all forms of payouts, whether dividend withdrawals or share sales. It is the broadest possible measure of the extent to which corporate profits eventually end up on individual income tax returns. The dashed area on panel (b) shows the period of the introduction of a dividend tax in Norway.

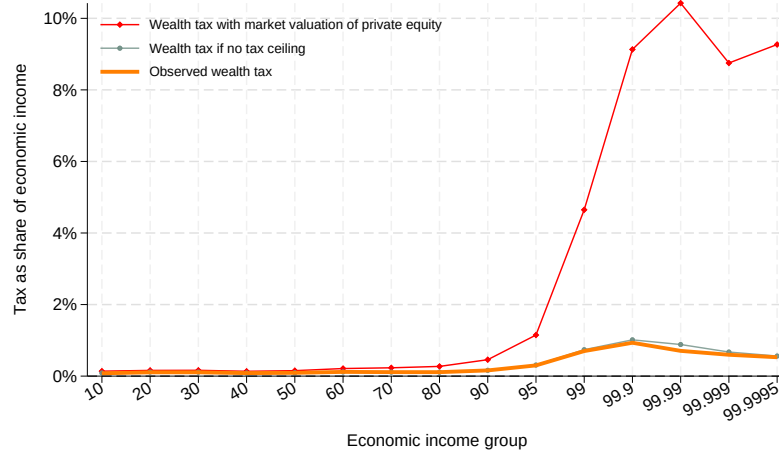
Figure 5: Effective Tax Rates by Income Groups



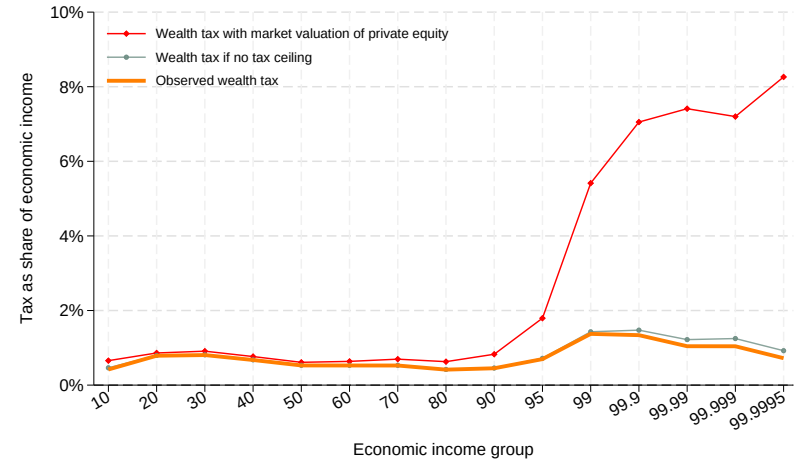
Notes: 2018–2020 averages by economic-income groups. Panel (a): the all-in effective tax rate for Sweden and Norway; for Norway this equals allocated personal income, payroll, VAT, corporate income, wealth, residential and business property, and inheritance taxes, divided by apportioned national income. Panel (b): taxable income as a share of economic income. Panels (c) and (d): the all-in rate decomposed by tax type (payroll; personal income, incl. residential property; VAT; corporate income, incl. business property; wealth). Sweden abolished its wealth tax in 2007, so no wealth-tax layer appears in panel (c). Panels (e) and (f): counterfactual micro effective tax rates (taxes divided by comprehensive income) in which the rate above the 95th percentile is held fixed at its 95th-percentile value; the shaded area represents the revenue gap relative to observed tax revenue.

Figure 6: Observed and Counterfactual Wealth Tax Rates

(a) Sweden, 2004–2006



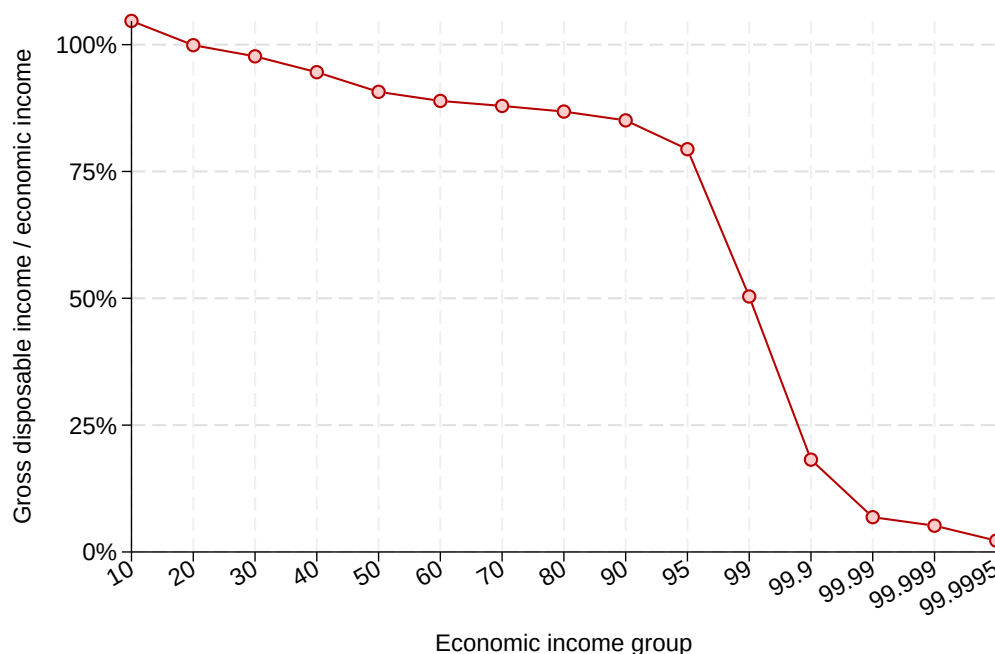
(b) Norway, 2004–2006



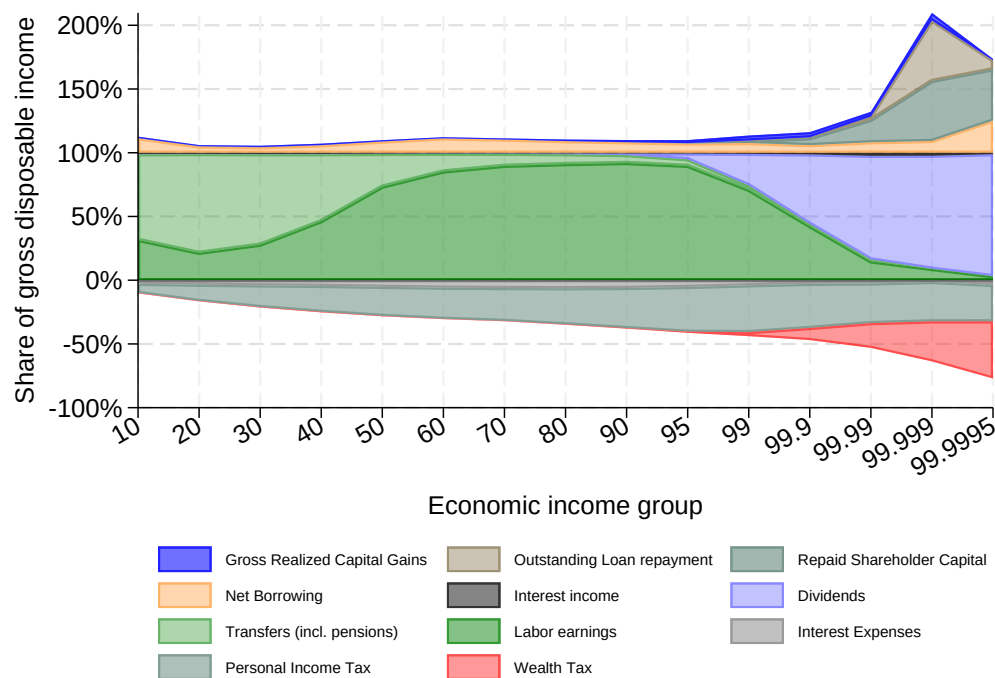
Notes: Realized wealth taxes divided by economic income, by economic-income percentile, 2004–2006. Panel (a), Sweden: the observed wealth tax and a counterfactual in which unlisted equity is valued at market value using the average of price-to-book, 1-year EV/Revenue, and 1-year iterative price-to-earnings multiples. Panel (b), Norway: the observed wealth tax, a counterfactual removing the wealth-tax ceiling, and a counterfactual valuing shares in private firms at market value using the average of price-to-book, 1-year EV/Revenue, and 1-year iterative price-to-earnings multiples. Further wealth-tax counterfactuals for Norway are shown in Figures A15 and A16.

Figure 7: Mechanisms: Sources and Uses of Income

(a) Ratio of gross disposable income to economic income



(b) Inflows and outflows relative to gross disposable income

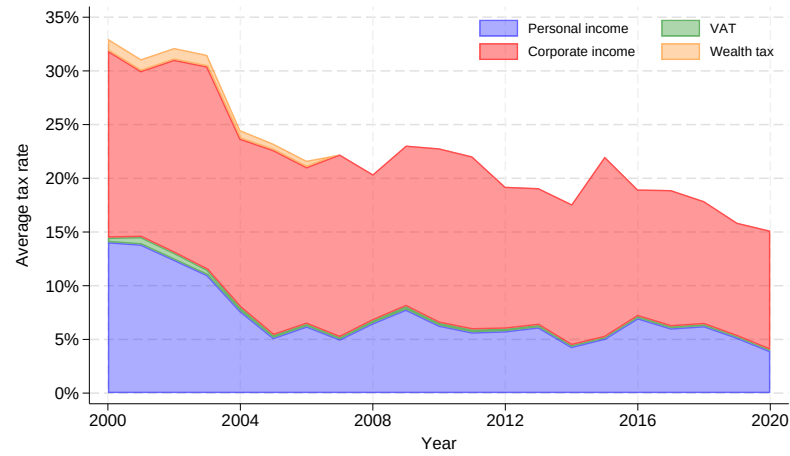


Notes: Both panels are 2018–2020 averages by economic-income percentile. Gross disposable income is labor earnings plus transfers (including pensions) plus interest income plus dividend income, measured per individual. Panel (a) plots the ratio of gross disposable income to economic income across the distribution. Panel (b) expresses incomes and financial flows as shares of gross disposable income, with inflows above zero (labor earnings, transfers, dividends, interest income, net borrowing, repaid shareholder capital, outstanding loan repayment, and gross realized capital gains) and outflows below zero (interest expenses, personal income tax, and the wealth tax).

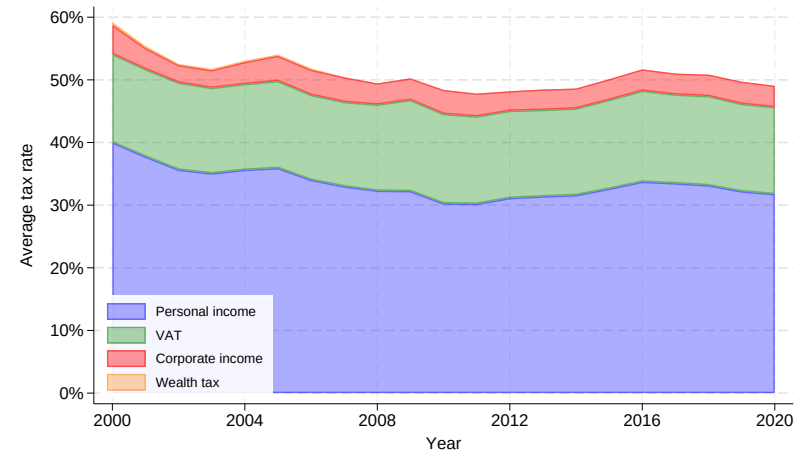
Figure 8: Effective Tax Rates Over Time

Sweden

(a) Top 0.01%

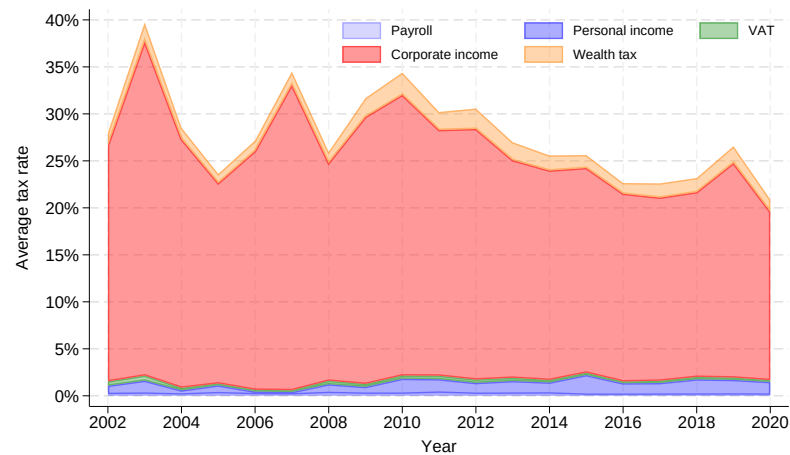


(b) Bottom 99.99%

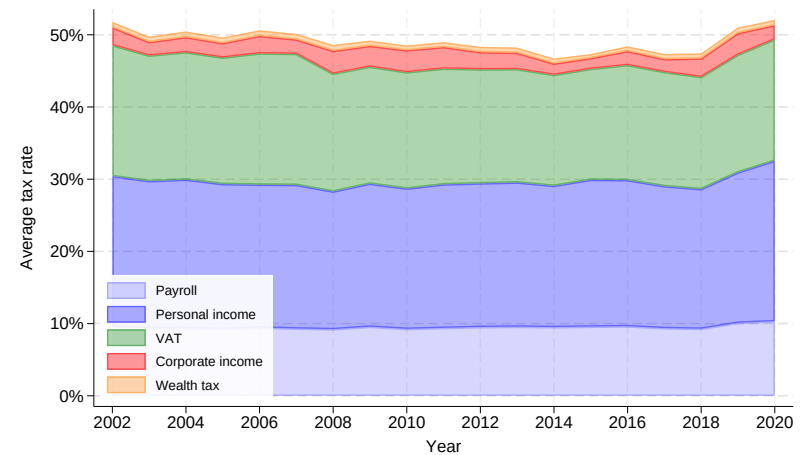


Norway

(c) Top 0.01%



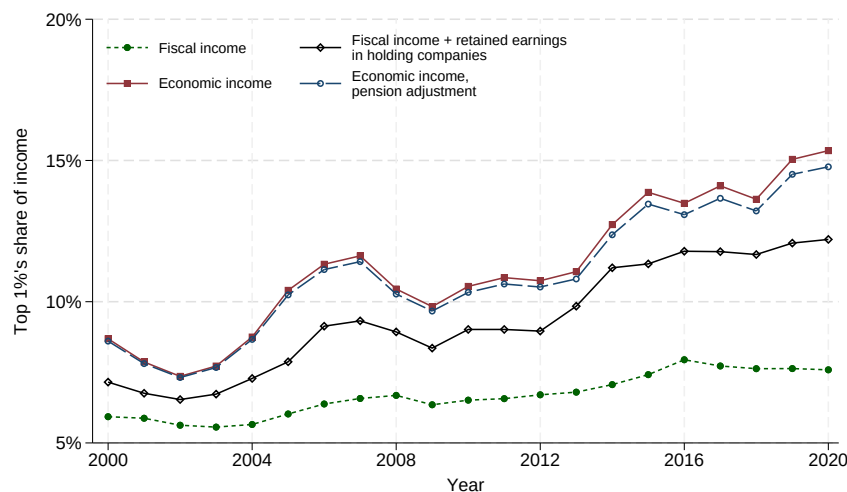
(d) Bottom 99.99%



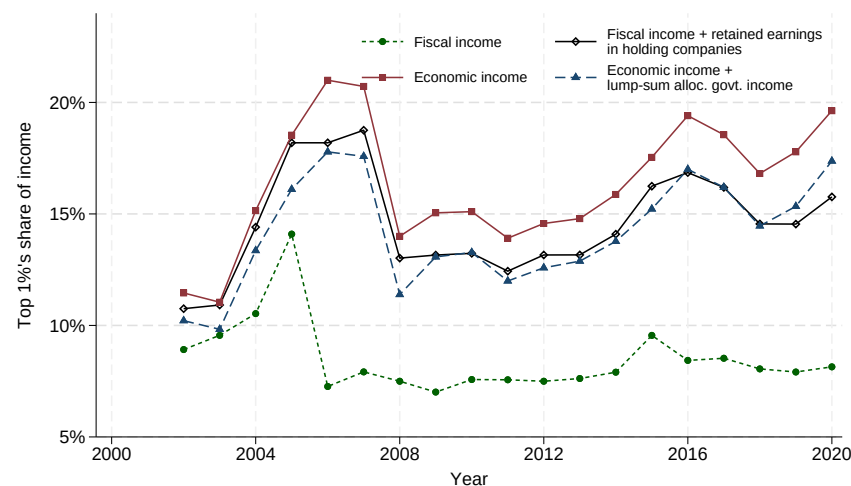
Notes: See text. These figures report all-in effective tax rate over time, decomposed by tax type (payroll, personal income, VAT, corporate income, wealth) as a share of pretax national income, for the top 0.01% and the bottom 99.99%. Note that the y-axis ranges differ across panels.

Figure 9: Inequality of Fiscal Income vs. Economic Income

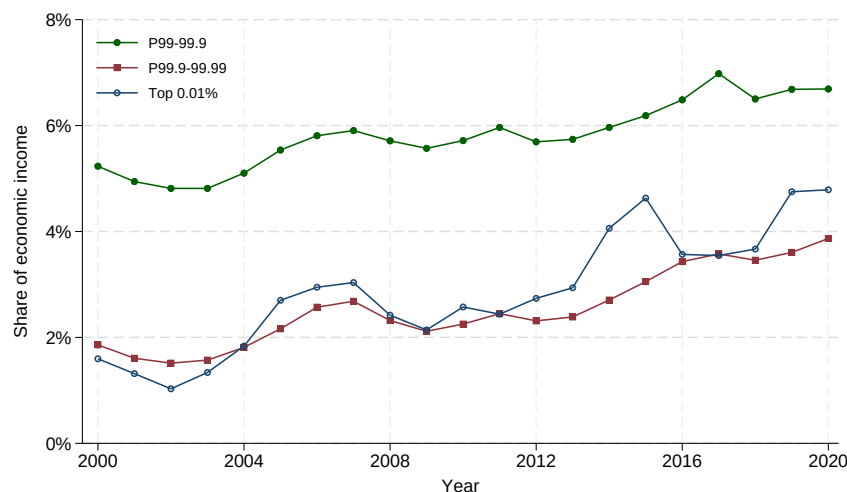
(a) Top 1% share, Sweden



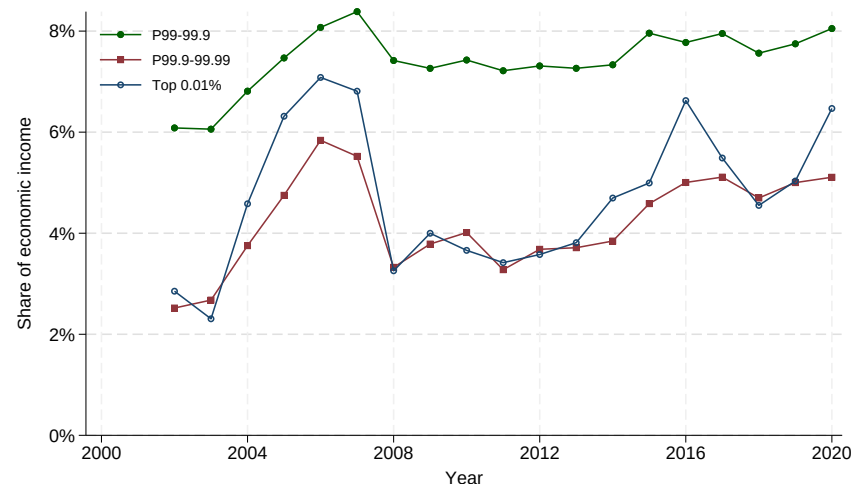
(b) Economic income, Norway



(c) Economic income, Sweden



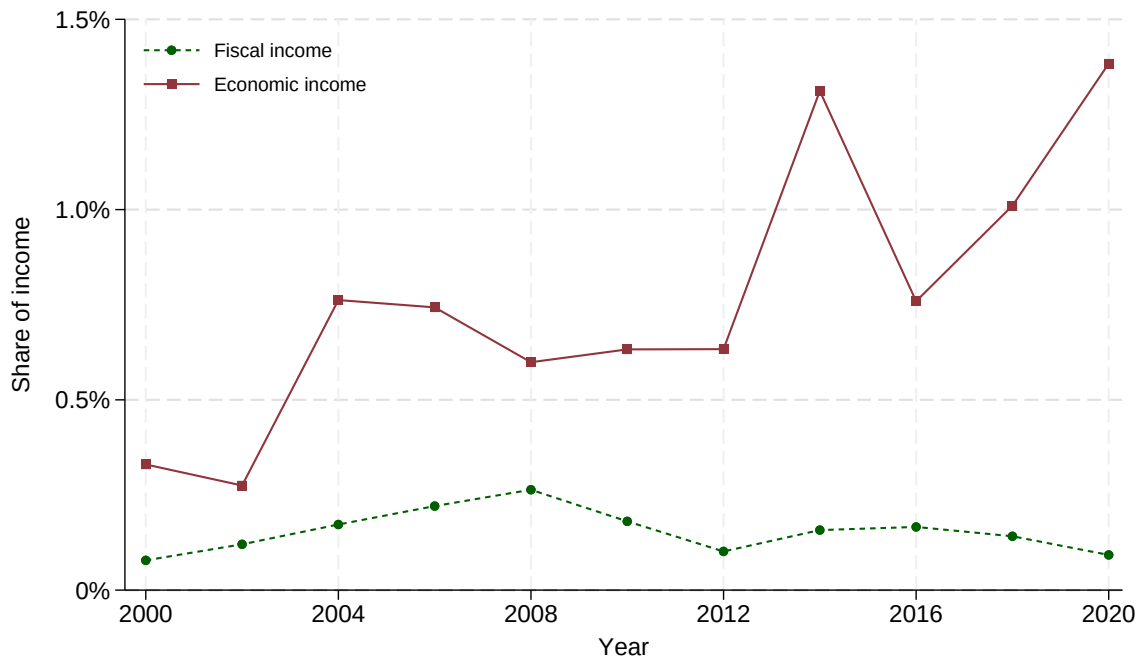
(d) Intermediate groups, Norway



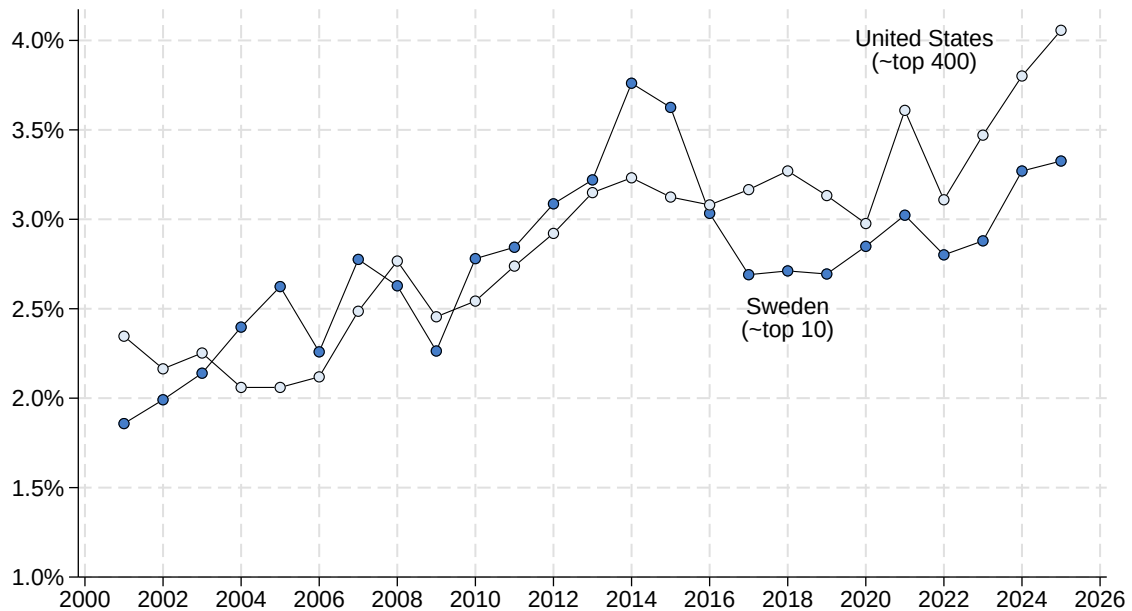
Notes: Panels (a) and (b): the top 1%'s share of income over time, computed separately for fiscal (taxable) income and economic (comprehensive) income; both panels also show fiscal income plus retained earnings in personal holding companies, an intermediate concept that captures only part of undistributed corporate income; for Sweden, economic income is additionally shown adjusted for pension fund income. Panels (c) and (d): the top 1%'s share of economic income decomposed into the P99–99.9, P99.9–99.99, and top 0.01% groups. Swedish series are shown through 2020 to match the Norwegian sample period.

Figure 10: Wealth and Income at the Very top in Sweden

(a) Income of the top 0.00045% by wealth

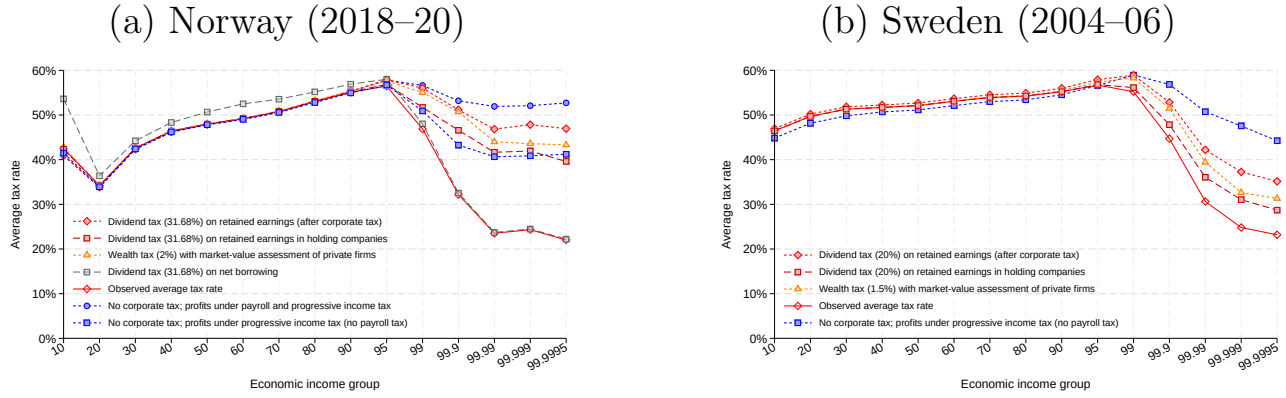


(b) Top 0.0002% wealth share



Notes: The top panel shows the income share of the top 0.00045% of the wealth distribution (resident individuals on the rich lists) over time. We show their share in fiscal income (dashed) and economic income (solid) separately. The bottom panel shows the evolution of the wealth owned by the top 0.0002% wealthiest households in Sweden and the US, relative to total household wealth. The top 0.0002% includes 10 households in Sweden and 384 in the US in 2025. Only resident households are included. US series are taken from Balkir et al. (2025). In Sweden, top 0.0002% wealth is computed by averaging end-of-year values from the *Forbes* real-time database since 2020 (and August 15, 2019 values for the year 2019). Before 2019, data are taken from the annual *Forbes* billionaires ranking, which typically reports estimates for February–March. When less than 0.0002% households are included in the *Forbes* list, the wealth of the missing top 0.0002% is imputed using standard Pareto-interpolation techniques. Total household wealth is the net worth of the household sector published by Statistics Sweden, estimated at mid-year by averaging year-end values.

Figure 11: Tax Reforms: Wealth Tax vs. Passthrough Income Tax



Notes: see text. Panel a: all series are micro effective tax rates, defined as each household's own taxes divided by comprehensive income, for 2018–2020 by economic-income percentile (i.e. not the apportioned national-accounts rates used in the all-in ATR figures). The figure overlays the observed rate and five counterfactuals: (i) no corporate income tax, with retained earnings and dividends instead subject to payroll tax and a simplified progressive income tax (see Appendix C), shown both with and without the 14.1% payroll tax; (ii) after-CIT retained earnings subject to the dividend tax (the dividend tax rate was 31.68% in 2020); (iii) the dividend tax applied to retained earnings in holding companies—directly or indirectly held firms that ever satisfy the U.S. holding-company definition for three consecutive years in our data; (iv) the wealth tax re-assessed with shares in private firms valued at estimated market value using the average of price-to-book, 1-year EV/Revenue, and 1-year iterative price-to-earnings multiples, with a 2% counterfactual rate in addition to the existing schedule in Norway. In Sweden, we employ the existing schedule during 2004–2006 with a top rate of 1.5%; and (v) the dividend tax applied to net borrowing. The scenarios are shown separately in Figures A14 and A15.

Appendix (for Online Publication)

A Market Valuation of Private Firms

A.1 Methodology

Price-to-earnings, enterprise-value to revenue, and price to book multiples are computed using data on listed firms in the four Nordic countries retrieved from Compustat via WRDS. We use annual accounting data and monthly share prices for 1999 through 2023, keeping companies that are both incorporated and headquartered in Norway, Sweden, Denmark, or Finland, with one observation per company and year. The market value of equity is measured at the end of the company’s accounting period, and all amounts are converted to Norwegian kroner. The price-to-book multiple divides the market value of equity by its book value, excluding companies with negative book equity. The enterprise-value to revenue multiple divides enterprise value, defined as the market value of equity plus long-term debt less cash holdings, by revenue summed over the most recent one, two, or three years; observations with nonpositive enterprise value are excluded. The price-to-earnings multiple divides the market value of equity by net income summed over the same windows, excluding windows with negative earnings. Within each year, each multiple is capped at its 99th percentile.

We compute median multiples at the two-digit NACE (industry) code and year level and apply these to the firms in our sample. Closely related industries with few listed companies, for example oil and gas extraction together with oil and gas services, are pooled before the median is taken. For industry-year cells where there are fewer than 10 observations in the Compustat data, we omit the multiples, and instead employ unconditional medians to the firms in these industry-year cells in our data.

The accounting figures of the firms in our sample come from consolidated accounting statements provided by Proff.no for firms that file consolidated accounts, and from historical Orbis data otherwise, converted to Norwegian kroner where filed in another currency. Each firm is assigned the two-digit industry recorded in the business register; a firm filing consolidated accounts is assigned the industry of the group’s main activity, so that a holding company at the head of an industrial group receives the group’s operating industry rather than a financial one. When applying the price-to-earnings multiple, we apply this to retained earnings in indirectly-held firms and to earnings (net income) in directly held firms to avoid valuing earnings that are distributed as dividends multiple times in an ownership chain.³⁸ Following the same logic,

³⁸In the K400 sample, we implement the restriction that, in the one-year earnings valuation, a company’s net income is capped at three times the largest absolute net income of the two preceding years whenever it exceeds both that level and 500 million kroner, so that a single exceptional year is not capitalized as if it were permanent. The two- and three-year valuations use unadjusted earnings, since summing over the window already dilutes such spikes.

we apply the price-to-book multiple to retained earnings in indirectly-held firms and to total equity in directly held firms. When applying the enterprise-value to revenue multiple, we subtract long-term debt and add financial assets to obtain an implied equity value. Firms with no revenue over the measurement window, mainly holding companies, are instead valued at their financial assets net of long-term debt.

Each valuation requires a positive base: firms with negative book equity, a negative earnings window, or a nonpositive implied equity value are left unvalued under the approach in question, and no value from another approach is substituted. Where three years of accounting history are not available, the three-year versions use the longest available window. Values obtained from consolidated statements are scaled by one minus the share of minority interests in the group, so that only the part belonging to the parent’s shareholders is attributed to the owners. Listed firms are excluded from the multiples valuation and are valued at observed market prices. In parts of the analysis we summarize the three approaches by taking, for each firm, the average of the valuations based on one-year fundamentals.

Differences between Norway and Sweden. In Norway the shareholder register records corporate as well as personal shareholders, so individuals hold firms both directly and through chains of intermediate companies, and the adjustments for indirectly held firms described above apply. In Sweden, we rely on direct ownership links between persons and firms (Section 3.2). The valuation is thus correspondingly simpler: the price-to-earnings multiple is applied to net income and the price-to-book multiple to the sum of paid-in capital and retained earnings for every firm. No dividend adjustment is needed, because a firm further down an ownership chain is never valued separately, so profits distributed upward cannot be counted twice. Accounting figures come from the Serrano database, using consolidated group statements whenever available and parent statements otherwise; in the enterprise-value conversion, cash includes short-term investments and long-term liabilities include provisions. Both countries use the same median multiples from listed Nordic companies, matched by industry and year.

A.2 Comparing Multiples-Implied Wealth to the Kapital 400 Rankings

Each year the Norwegian business magazine Kapital publishes the Kapital 400, a ranking of the 400 largest Norwegian fortunes with an estimate of each fortune’s market value. The estimates are the magazine’s own and aim to capture total net wealth, including unlisted businesses, listed shares, real estate, and assets held abroad. A fortune is typically attributed to a family and listed under a single family head. We use the rankings for 2012 through 2023 and ask how the wealth implied by our multiples valuations compares with the magazine’s estimates.

We identify each ranked family in the Norwegian shareholder register, which records the

shareholders of every Norwegian limited company each year. Family heads are matched on name and birth year. We then add family members: those named by Kapital, and relatives identified in the register through fixed screening rules based on shared surnames, plausible birth years, and substantial co-ownership of the family’s companies. Individuals with no observed taxable wealth in the public tax lists are dropped as unlikely residents; since the lists cover the 100 largest taxable fortunes in each municipality, resident members of the Kapital 400 should in principle always appear in them.

For each family and year we compute ultimate ownership shares in Norwegian companies by multiplying stakes along chains of intermediate companies and summing across chains and family members. Two adjustments prevent double counting. First, when a company in a chain files consolidated accounts, we value the family’s stake at that company and assign no separate value to its majority-owned subsidiaries, whose activity the consolidated statements already include. Associated companies, in which the group holds between 20 and 50 percent, are not consolidated: the consolidated statements carry only the owner’s share of their profits and a corresponding book-value entry, which the earnings and book equity valuations pick up, while consolidated revenue excludes them entirely. In the revenue-based valuation we therefore value associated companies separately, at the family’s ultimate ownership share, provided every ownership link on the path to them is at least 20 percent. Stakes below 20 percent remain in the group’s securities holdings, which enter at book value in the conversion of enterprise value to equity value, so valuing them separately would count them twice. Second, stakes in listed companies are valued at observed market prices rather than with multiples, and the contribution of a listed company to its group’s consolidated accounts is removed before the group is valued.

Unlisted companies are valued as described above, using the price-to-book multiple, the enterprise-value to revenue multiple, and the price-to-earnings multiple, the latter two measured over one and over three years. Multiples-implied family wealth is the sum across companies of the family’s ultimate ownership share times the implied equity value, plus the market value of listed holdings. Appendix Figure A17 compares it with the Kapital estimates year by year and separately for each multiple: panel (a) reports the median ratio of implied to Kapital wealth across families, and panel (b) the ratio of aggregate implied wealth to aggregate Kapital wealth. As a reference, both panels also show taxable wealth, obtained by summing family members’ taxable wealth from the tax lists, relative to Kapital wealth.

B Evidence from Matched Billionaires Lists

Following Balkir et al. (2025), we estimate the effective tax rates paid by the wealthiest households by matching “rich lists” to the corresponding households’ administrative data, including their share of their businesses’s retained earnings and corporate taxes.

Data in Sweden. In Sweden, we use annual rankings compiled by the magazine *Veckans Affärer* (VA) between 1998 and 2016, and *Forbes* magazine data between 2017 and 2020. These lists vary in size: *Veckans Affärer* focuses on “krona billionaires” (roughly households with more than \$100 million in wealth), while *Forbes* focuses on dollar billionaires. Only resident households are included in our analysis: billionaires who live outside of Sweden are disregarded. We consider the largest fractile of the population that we can consistently capture over the full 2000–2020 period, namely the top 0.00045% of the resident household distribution (22 households in 2020). At the end of the period, this corresponds to the population of resident dollar billionaires. At the beginning of the period, this corresponds to households with wealth above around \$300 million. For simplicity we will call the top 0.00045% “billionaires.”

Data in Norway. We proceed similarly in Norway, using the *Kapital 400* rankings compiled annually by the business magazine *Kapital*, which estimate the market wealth of the wealthiest Norwegian families and attribute it at the family level (see Appendix A.2). We focus on the top 100 ranked families in each year over 2012–2023, a narrower set than the full rankings used for the valuation comparison in Appendix A.2; the NOK-billionaire rank cutoff was 140 in 2012 and 362 in 2020. To measure the taxes these families pay, we use the public tax lists that Norway publishes at the municipal level. The lists cover the 100 largest taxable fortunes in each municipality and report, for each person, assessed taxable wealth, taxable income, and total taxes paid; they are available from 2012 onward. Because coverage extends to the 100 largest taxpayers in every municipality, the lists should in principle contain every individual who appears in the national ranking. The matching of families to the shareholder register and the tax lists, the family roster, the residency screen, and the computation of ultimate ownership shares are described in Appendix A.2; firm accounts are those described in Appendix A.

We construct an effective tax rate for each family in each year by combining three taxes. The first two are personal. From the tax lists we observe total personal taxes, which we separate into a wealth tax component, obtained by applying the statutory wealth tax schedule of the year to assessed taxable wealth, and a personal income tax component, defined as the remainder. The third tax is corporate: we assign to each family the corporate income taxes paid by the firms it owns, weighting each firm’s tax bill by the family’s ultimate ownership share. To match this broader notion of taxes with a correspondingly broad notion of income, we define the family’s income as its personal taxable income plus its allocated share of retained earnings and corporate taxes. The effective tax rate is then

$$\text{ETR} = \frac{\text{personal income tax} + \text{wealth tax} + \text{corporate income tax}}{\text{taxable income} + \text{allocated retained earnings and corporate taxes}},$$

reported in panel (c) of Appendix Figure A12 by year, decomposed into its three components. Panel (d) expresses the same three taxes as a share of estimated market wealth rather than

of income, which sidesteps the volatility of realized profits at the top. For the income-based rate we drop the small number of family-years with a negative denominator, which arise when a family absorbs a large one-time business loss and which would otherwise distort the average rate.

Results. Appendix Figure A12 reveals a number of striking findings. First, the effective tax rates of billionaires has declined over time. This is true whether we look at taxes paid as a fraction of pre-tax national income or as a fraction of wealth. In Sweden the all-in tax rate falls from about 30% of pre-tax income in the early 2000s to above 15% in 2020, due both to the decline of personal taxes (fall in the personal income tax, abolition of the wealth tax) and the decline in the effective corporate tax rate at the top. In 2020, the top 0.00045% paid the equivalent of 1% of their wealth in total taxes, of which 0.2% in personal taxes and 0.8% in corporate taxes. These results are in line with those obtained in other European countries, but Sweden appears to be the country where tax regressivity at the top is the most marked, due to the generally high level of taxation (with rates above 50% for the upper middle class) and particularly low effective tax rates for billionaires.

In Norway, the trends are flatter as the effective income tax rate was already very low before the introduction of the dividend tax in 2006.

C Progressive Income Tax Counterfactual

This appendix describes the construction of the counterfactual in which the corporate income tax is abolished and corporate profits are instead subject to the payroll tax and a simplified progressive income tax. This counterfactual appears in panel (b) of Figure 11 and separately in Appendix Figure A14.

We construct the counterfactual on Norwegian data for 2018–2020 at the level of economic-income percentile bins. Households are ranked by economic income within each year and assigned to percentile bins: deciles up to the 90th percentile, and finer bins above (90–95, 95–99, 99–99.9, and so on). Within each bin p , we sum each variable across households by year and average the sums over the three years. All quantities below are these bin-level averages.

The observed rate ATR_p is the micro effective tax rate of Figure 11, panel (b): the taxes attributable to the bin’s households—personal income taxes, the wealth tax, the corporate income tax allocated through direct and indirect ownership, and apportioned payroll taxes, value-added taxes (net of VAT paid out of transfer income), property taxes, and inheritance taxes—divided by comprehensive income. Denote by I_p comprehensive income, by Y_p taxable income (total income reported on the personal tax return less tax-free transfers), by R_p allocated retained earnings, by C_p the allocated corporate income tax, by D_p dividends received, and by N_p the number of individuals in the bin’s households.

The simplified progressive schedule applies, per individual, the tax on ordinary income (“alminnelig inntekt”) above the personal allowance (“personfradrag”) plus the bracket tax (“trinnskatt”):

$$T(y) \equiv \tau \max(y - a, 0) + \sum_{k=1}^4 (\tau_k - \tau_{k-1}) \max(y - b_k, 0), \quad \tau_0 \equiv 0,$$

where τ is the ordinary-income tax rate, a the personal allowance, and τ_k the marginal bracket-tax rate above threshold b_k .³⁹ The schedule abstracts from social security contributions and from deductions other than the personal allowance; as explained below, these simplifications do not affect the counterfactual at observed income levels.

The counterfactual rate is

$$\text{ATR}_p^{\text{cf}} = \text{ATR}_p + \frac{N_p \left[T\left(\frac{Y_p + R_p + C_p}{N_p}\right) - T\left(\frac{Y_p}{N_p}\right) \right] - C_p + 0.141 \times (D_p + R_p)}{I_p}.$$

The first term in the numerator is the additional progressive income tax generated by adding retained earnings and the allocated corporate income tax to the taxable income base, with the schedule evaluated at the bin’s per-individual income. Since $R_p + C_p$ equals allocated pre-tax profits less dividends, and dividends are already included in Y_p , the counterfactual base includes corporate profits at their pre-tax value without double-counting distributed profits. The second term removes the corporate income tax the households bear in the observed system. The third term applies the standard 14.1% employer payroll-tax rate to dividends and retained earnings.

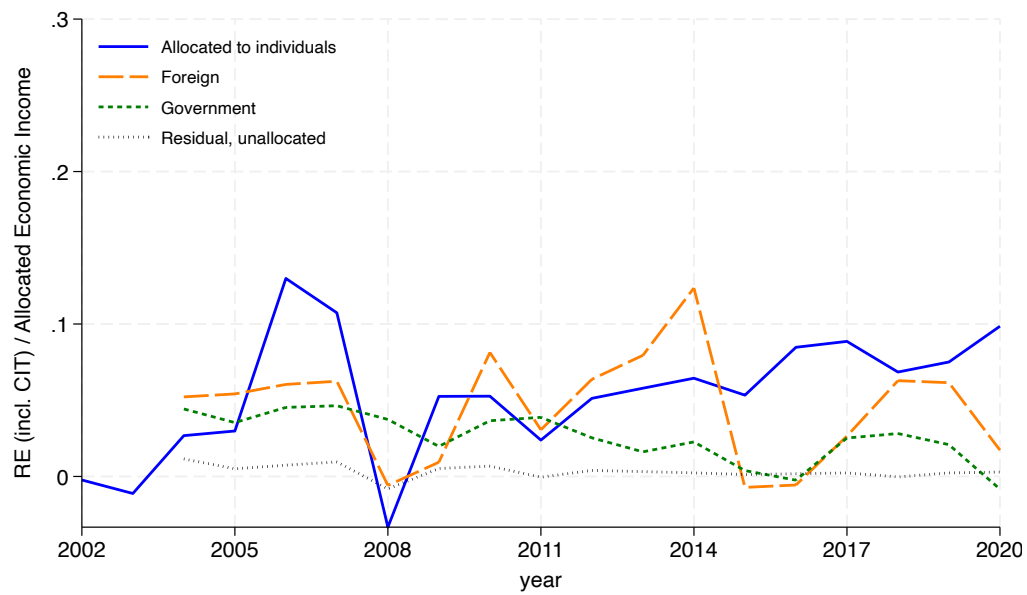
Because the simplified schedule enters only through the difference $T((Y_p + R_p + C_p)/N_p) - T(Y_p/N_p)$, the counterfactual coincides with the observed rate whenever no corporate income is added, and the observed rate itself is the benchmark against which the counterfactual is compared. This construction is equivalent to choosing a bin-specific personal allowance such that the simplified schedule reproduces exactly the personal income taxes the bin’s households actually paid; we verify that the implied allowance lies below per-individual income in every bin, so the equivalence is exact. Summing over all bins, the additional revenue raised is $\sum_p I_p (\text{ATR}_p^{\text{cf}} - \text{ATR}_p)$; Appendix Figure A14 reports this as a share of the taxes households actually paid, $\sum_p I_p \text{ATR}_p$.

D Appendix Figures

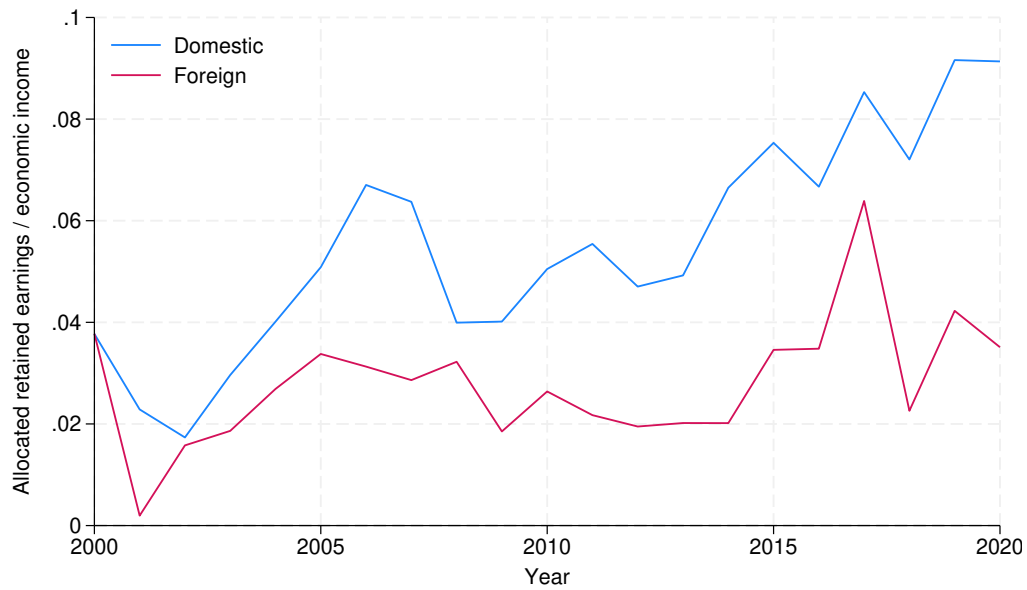
³⁹The statutory parameters are, for 2018: $\tau = 23\%$, $a = \text{NOK } 54,750$, thresholds of NOK 169,000, 237,900, 598,050, and 962,050 with marginal rates of 1.4%, 3.3%, 12.4%, and 15.4%; for 2019: $\tau = 22\%$, $a = \text{NOK } 56,550$, thresholds of NOK 174,500, 245,650, 617,500, and 964,800 with rates of 1.9%, 4.2%, 13.2%, and 16.2%; for 2020: $\tau = 22\%$, $a = \text{NOK } 51,300$, thresholds of NOK 180,800, 254,500, 639,750, and 999,550 with the same rates as in 2019. Because the bin-level income data are 2018–2020 averages, we use the corresponding three-year averages of these parameters.

Figure A1: Unallocated Retained Earnings

(a) Norway



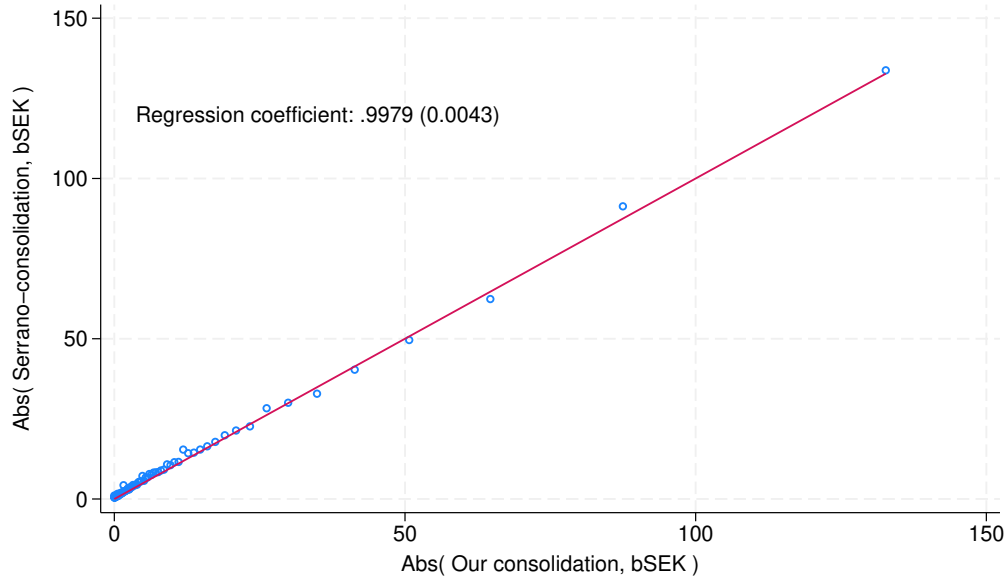
(b) Sweden



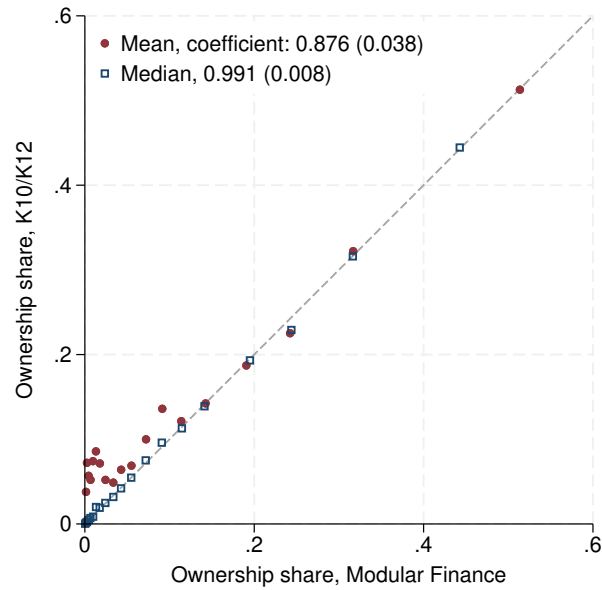
Notes: see text.

Figure A2: Methodological Checks, Sweden

(a) Validation of ownership shares

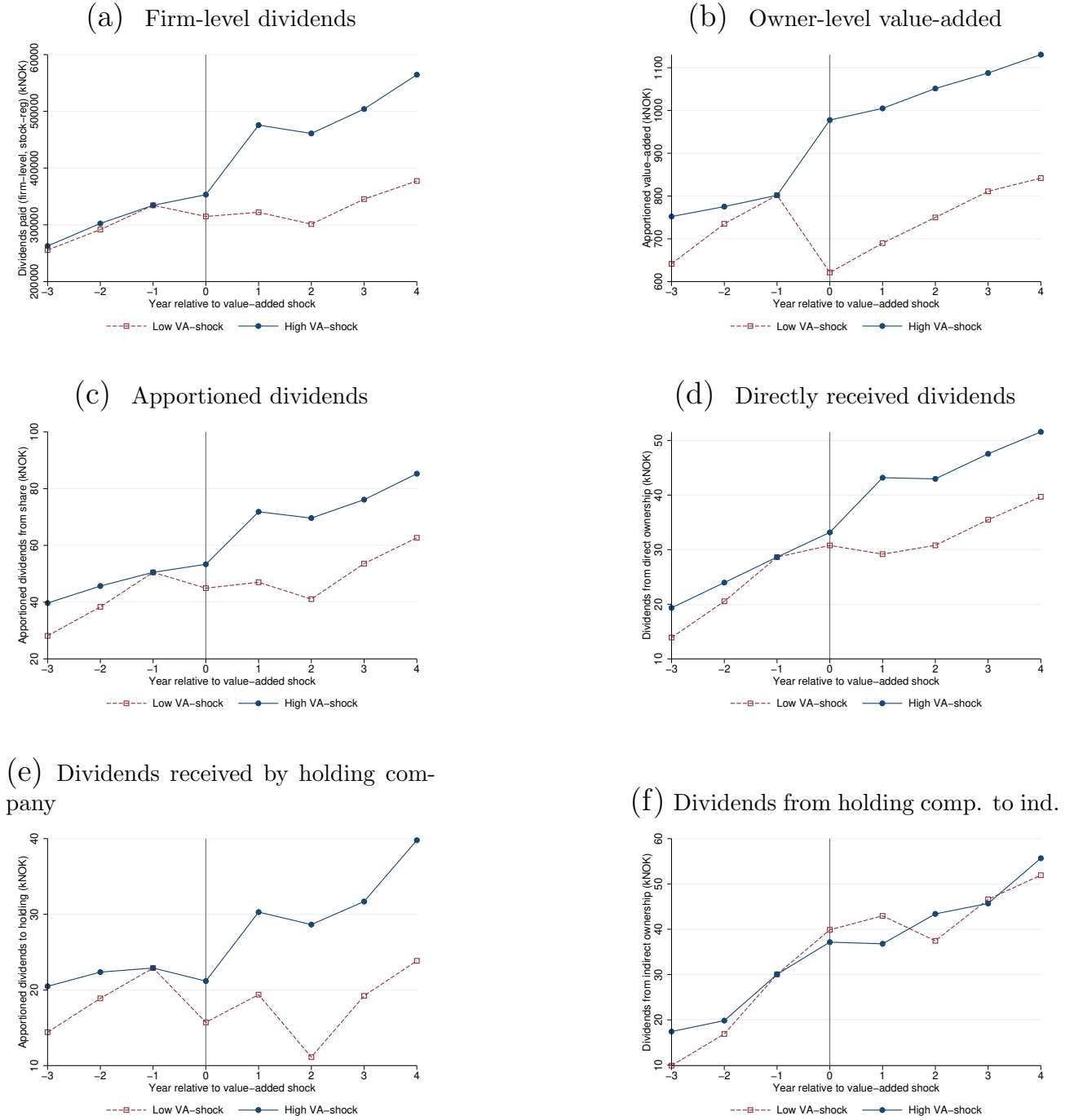


(b) Consolidation of net profits



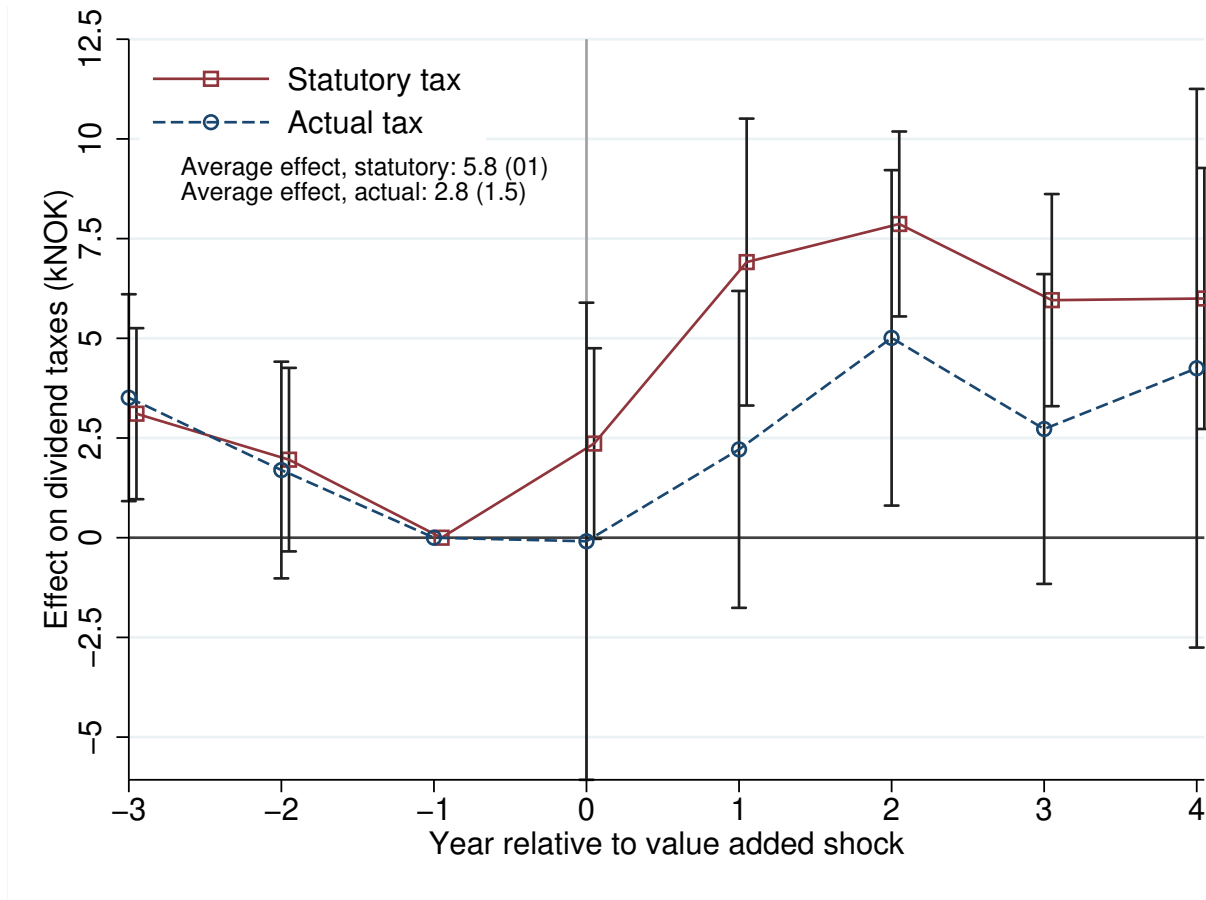
Notes: The top panel shows the correlation between observed firm ownership shares in Sweden using the methodology described in Section 3.2 (y-axis) and external, independent data on ownership, retrieved from the private company Modular Finance (x-axis). The bottom panel shows the correlation between the consolidated profits in our firm-level Serrano data and our consolidation of profits using firm-by-firm ownership links and apportioning downstream profits to parent companies.

Figure A3: Value Added Shocks: Research Design



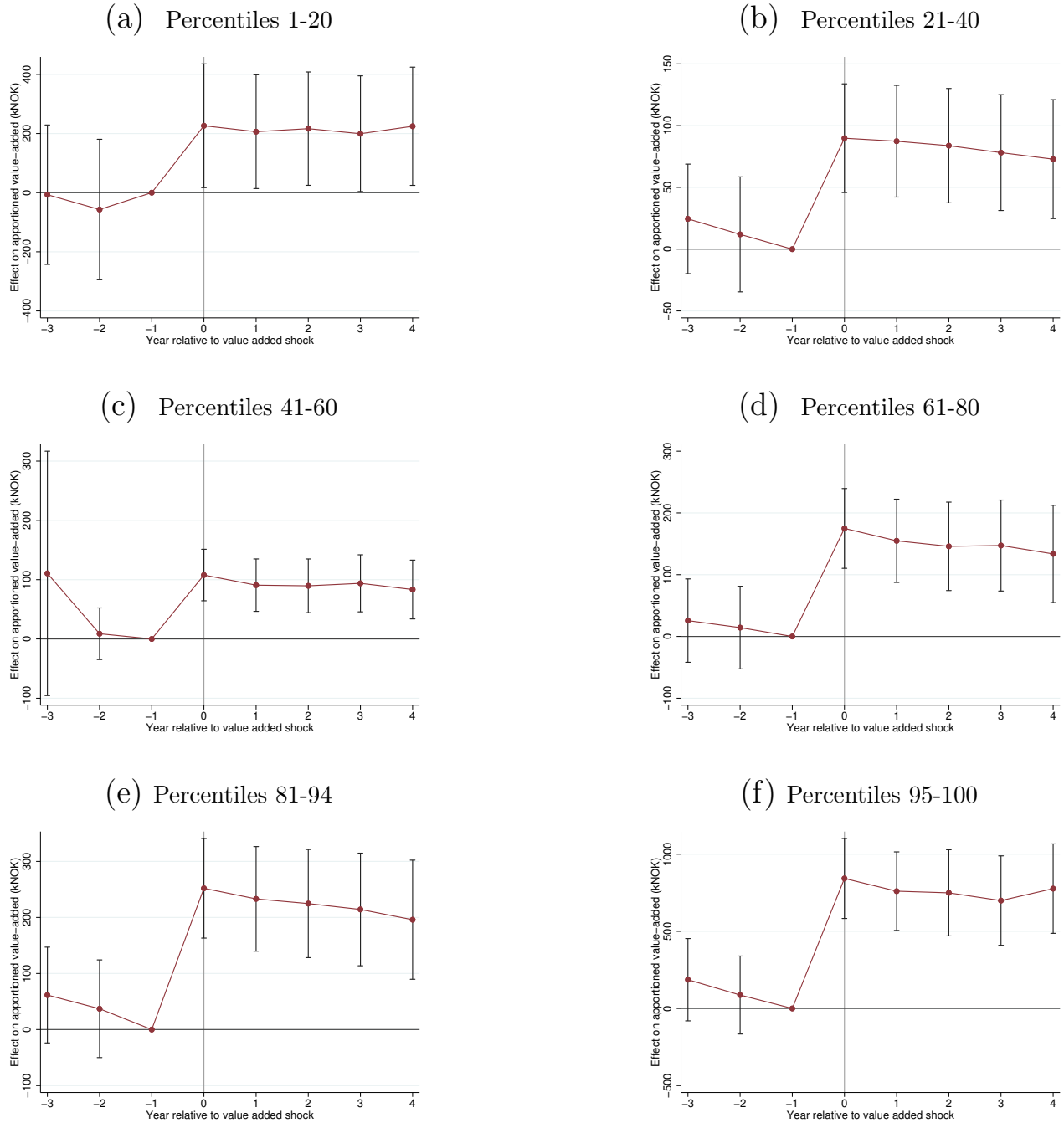
Notes: This figure illustrates the research design. The premise is to divide firms into treatment and comparison units by shocks to value added, as in Lamadon et al. (2022). We split firms by the median change in log value added, within year. For each firm, we randomly select one event year and impose a balanced panel in event time covering three pre- and four post-event years. Panel (a) displays the raw time series of total dividends paid out by these firms. The remaining panels restrict attention to owners of these firms. Panel (b) shows value added, apportioned by ownership shares, measured at the owner-by-firm level. An owner may appear multiple times if they own shares in several firms that are part of our analysis sample. Panel (c) shows apportioned dividends, using both directly and indirectly held shares. Panel (d) displays dividends received directly from the operating company, panel (e) the apportioned dividends received by the holding company, and panel (f) the dividends received by the owner from the holding company. In each panel, the low-shock series is shifted by a constant so that the two groups coincide in event year -1 .

Figure A4: Value Added Shocks: Tax Implications



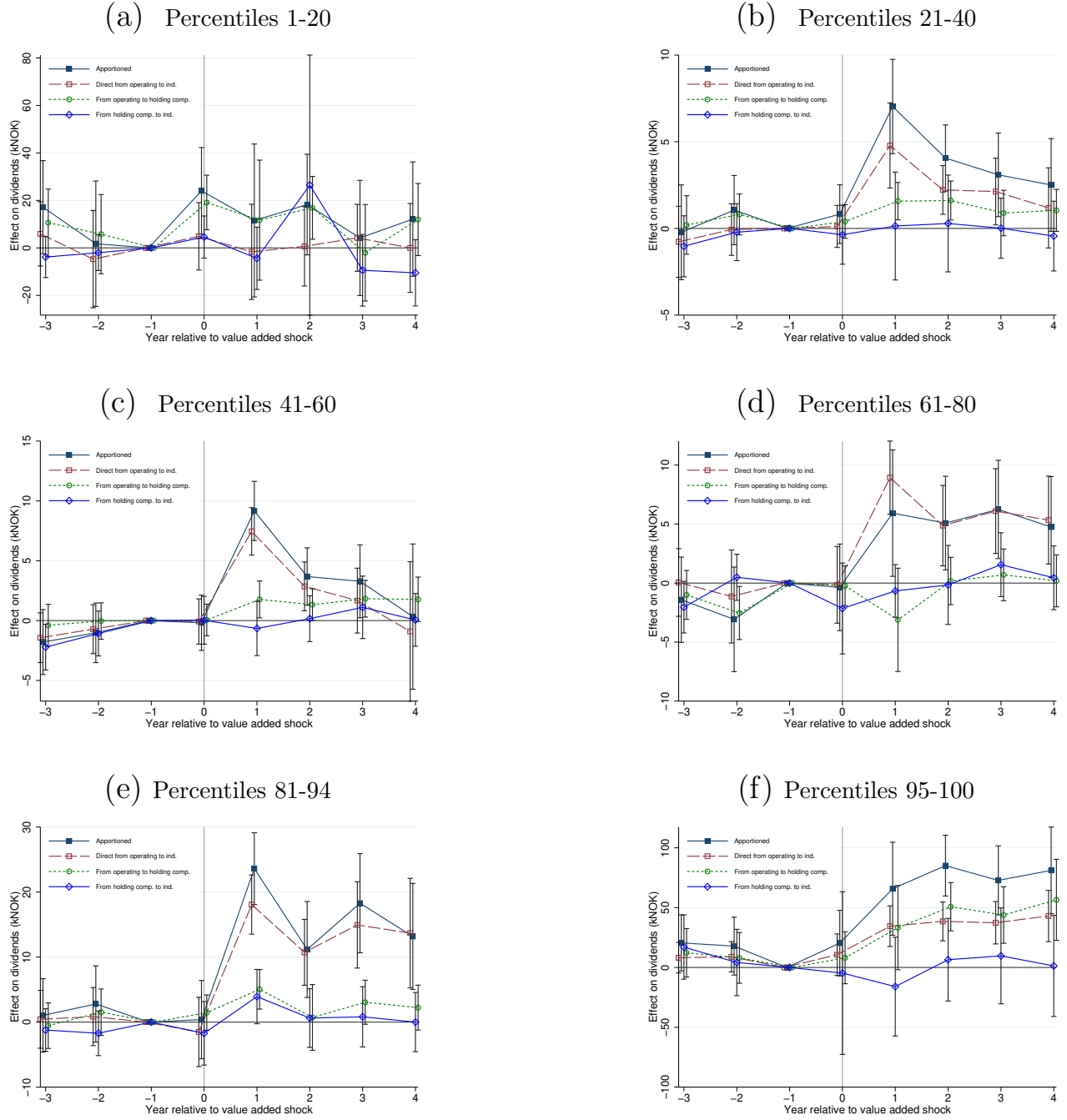
Notes: This figure shows the effect of the value-added shock on dividend tax payments. The solid maroon series shows the effect on the statutory, full-passthrough dividend tax, obtained by applying the statutory dividend tax rate in each year to apportioned dividends; it is the tax that would be due if all apportioned dividends were distributed to individual owners and reported on their tax returns. The dashed navy series applies the same rates to the dividends actually observed on individual tax returns. The reported coefficients are average treatment effects over the post-event period, with standard errors in parentheses. Monetary values are expressed in thousands of Norwegian kroner. The regressions include event-time fixed effects, shock-year fixed effects, an indicator for high versus low value-added shocks, and an indicator for whether ownership is direct or indirect. The figure displays 95% confidence intervals based on robust standard errors.

Figure A5: Value Added Shocks: First Stage by Income



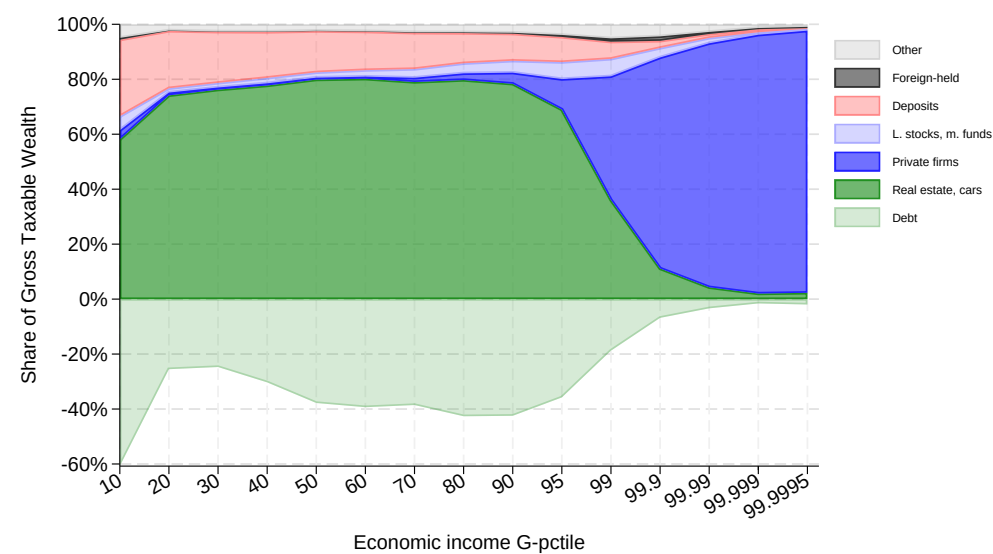
Notes: This figure illustrates the first stage, i.e., the effect of the value-added shock on apporportioned value added, separately for six income groups, defined in event year -1 using comprehensive income. The groups contain the following number of owners: 13,822, 12,213, 15,726, 14,461, 11,863, 25,824. Monetary values are expressed in thousands of Norwegian kroner. All regressions include event-time fixed effects, shock-year fixed effects, an indicator for high versus low value-added shocks, and an indicator for whether ownership is direct or indirect. The figures display 95% confidence intervals based on robust standard errors.

Figure A6: Value Added Shocks: Effect on Dividends by Income



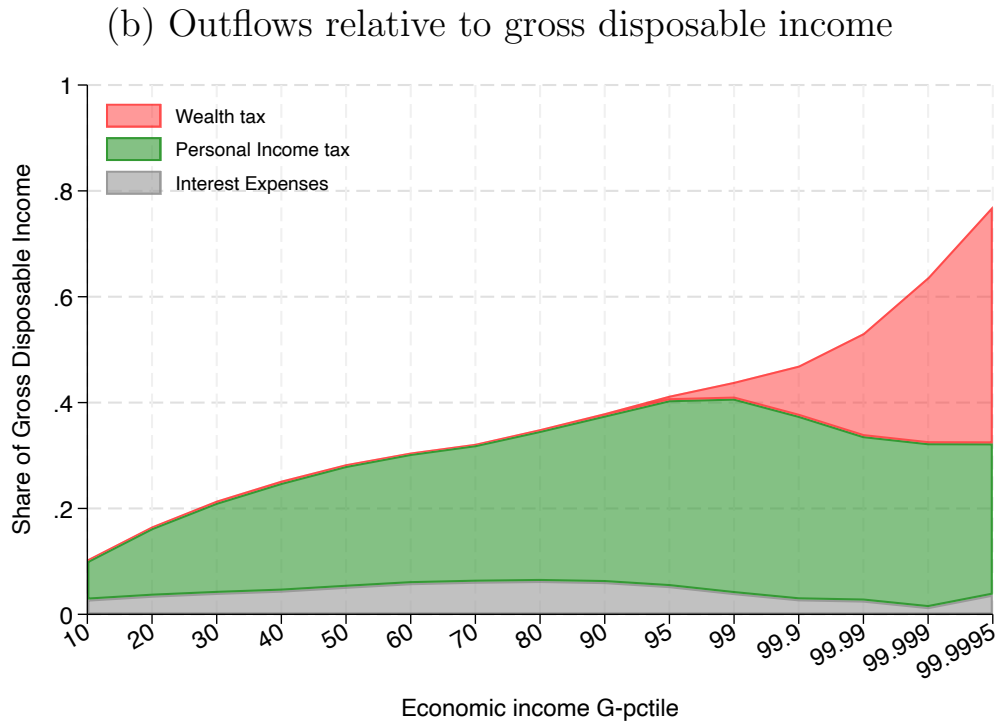
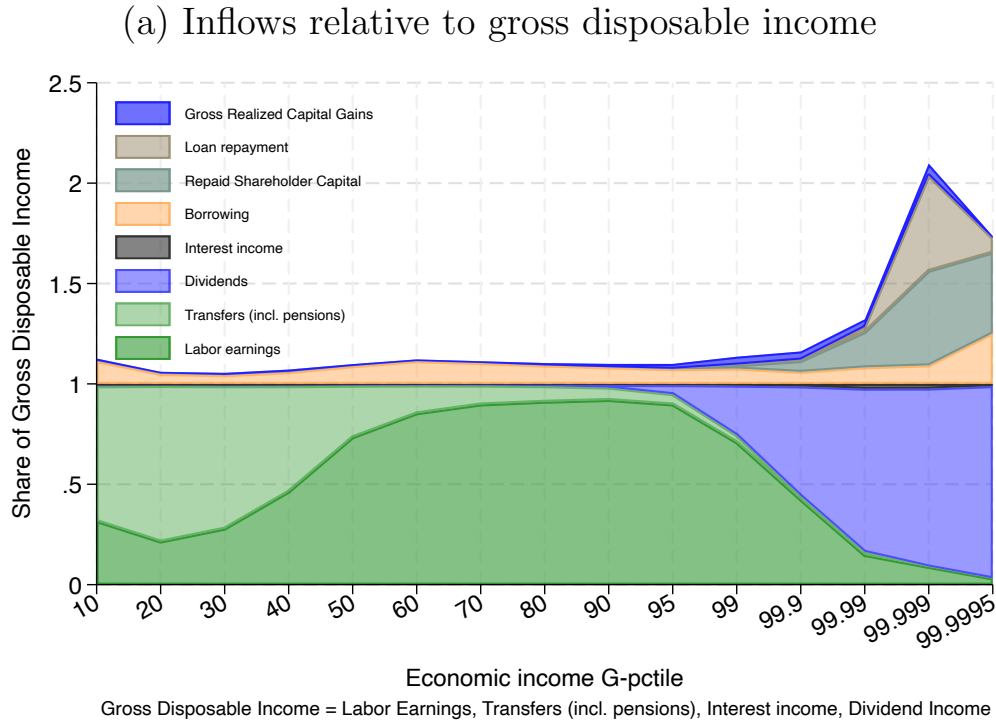
Notes: This figure shows the effect of the value-added shock on dividends, separately by income group, defined in event year -1 using comprehensive income. *Apportioned dividends* denote ownership shares multiplied by total firm-level dividend payments. The *Direct* series captures dividends paid directly from the operating firm to the individual owner. The green circle series captures dividends paid from the operating firm to the intermediary, apportioned by the individual's ownership share in that holding company. The blue diamond series captures dividends subsequently paid from the holding company to the individual owner. Monetary values are expressed in thousands of Norwegian kroner. All regressions include event-time fixed effects, shock-year fixed effects, an indicator for high versus low value-added shocks, and an indicator for whether ownership is direct or indirect. The figures display 95% confidence intervals based on robust standard errors. Panel (d) of Figure 3 builds on these estimates: for each income group, it shows the effect on dividends received by the individual over the post-period divided by the effect on apportioned dividends over the post-period.

Figure A7: Composition of Taxable Wealth in Norway



Notes: see text.

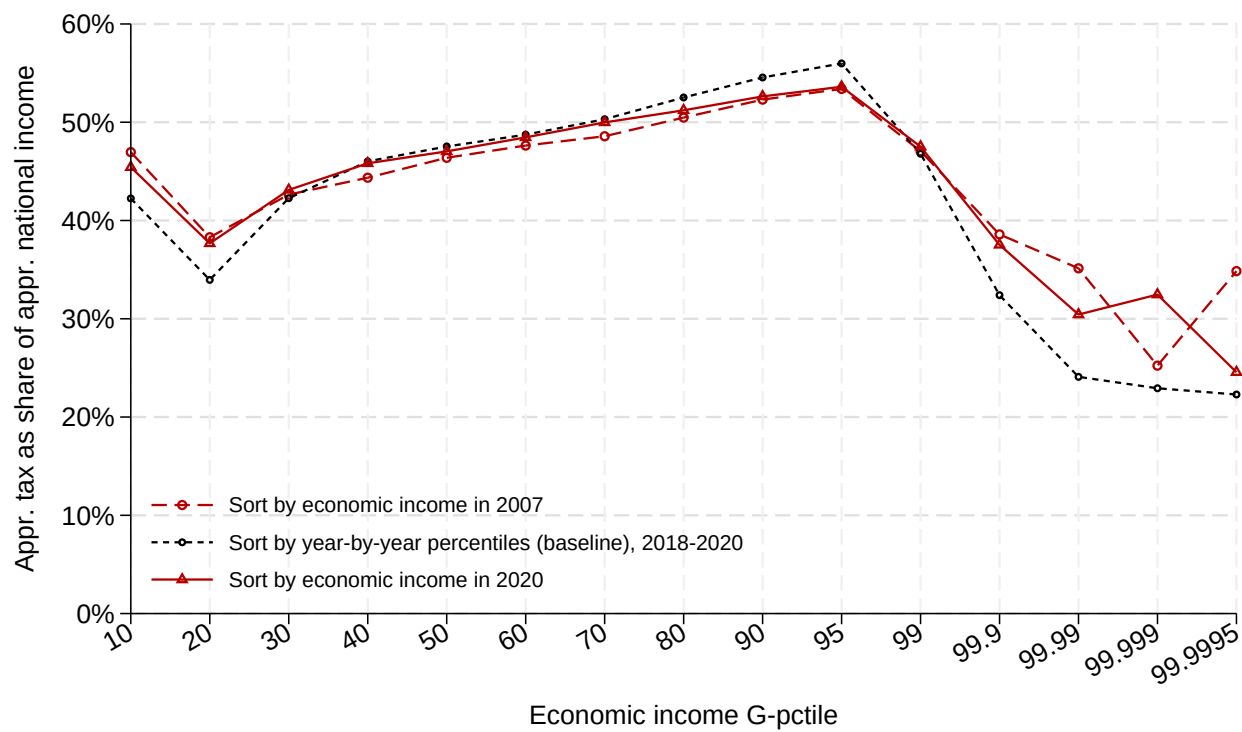
Figure A8: Incomes, Taxes, and Flows Relative to Disposable Income



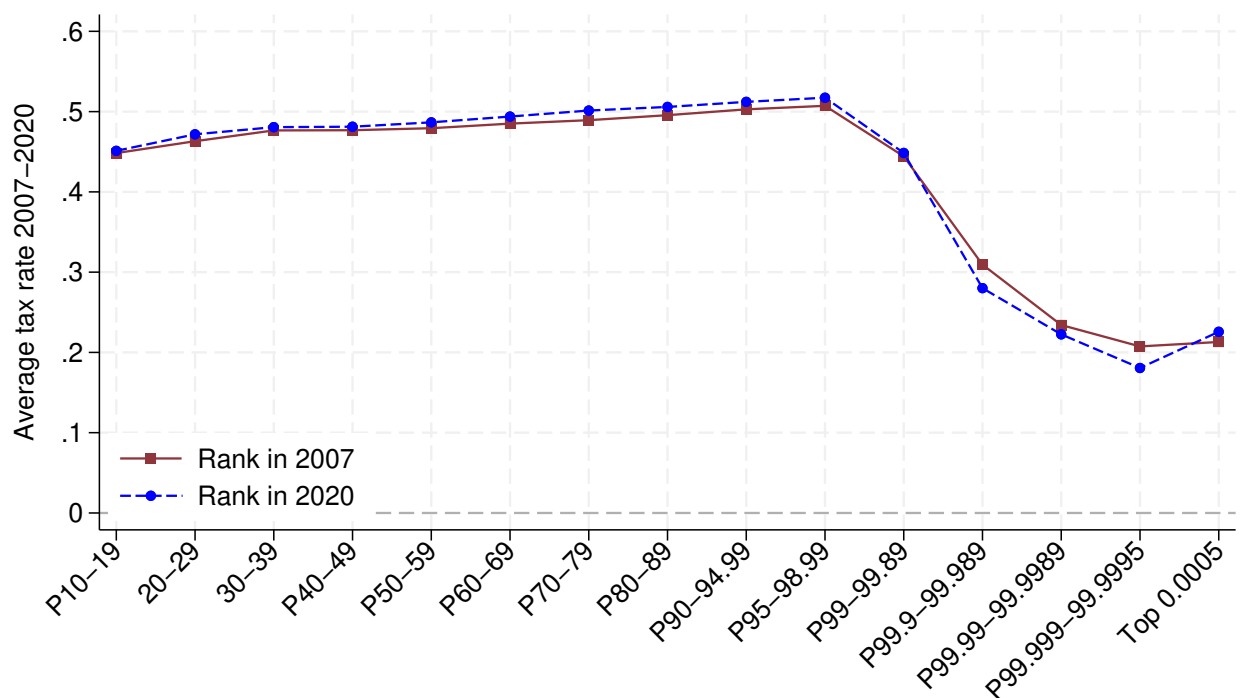
Notes: Both panels are 2018–2020 averages by economic-income percentile, expressed as shares of gross disposable income (GDI = labor earnings, transfers including pensions, interest income, and dividend income). Panel (a) shows the composition of inflows: labor earnings, transfers (incl. pensions), dividends, interest income, borrowing, repaid shareholder capital, outstanding loan repayment, and gross realized capital gains. Panel (b) shows outflows: interest expenses, personal income tax, and the wealth tax.

Figure A9: Effective Long-Run Tax Rates

(a) Norway

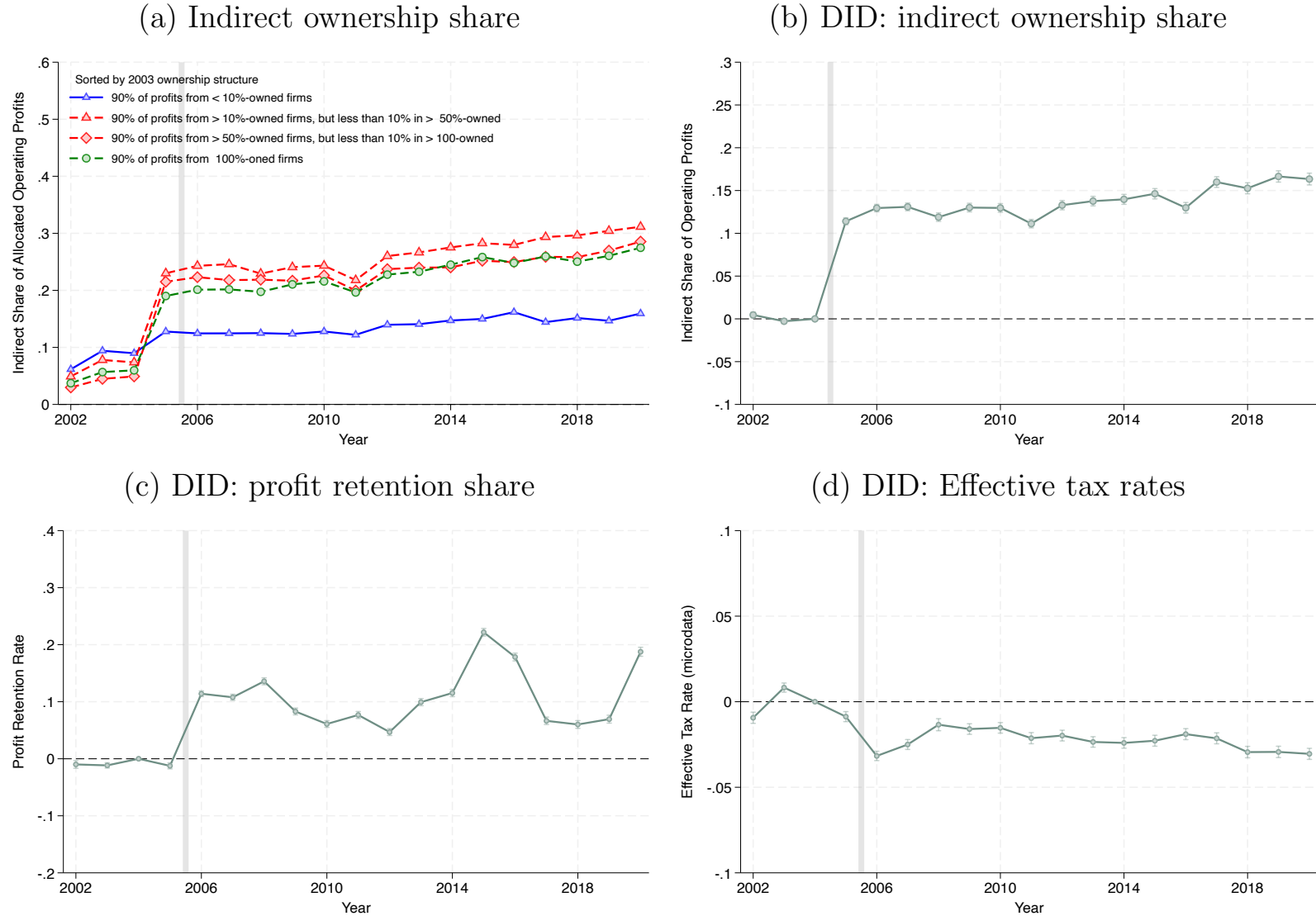


(b) Sweden



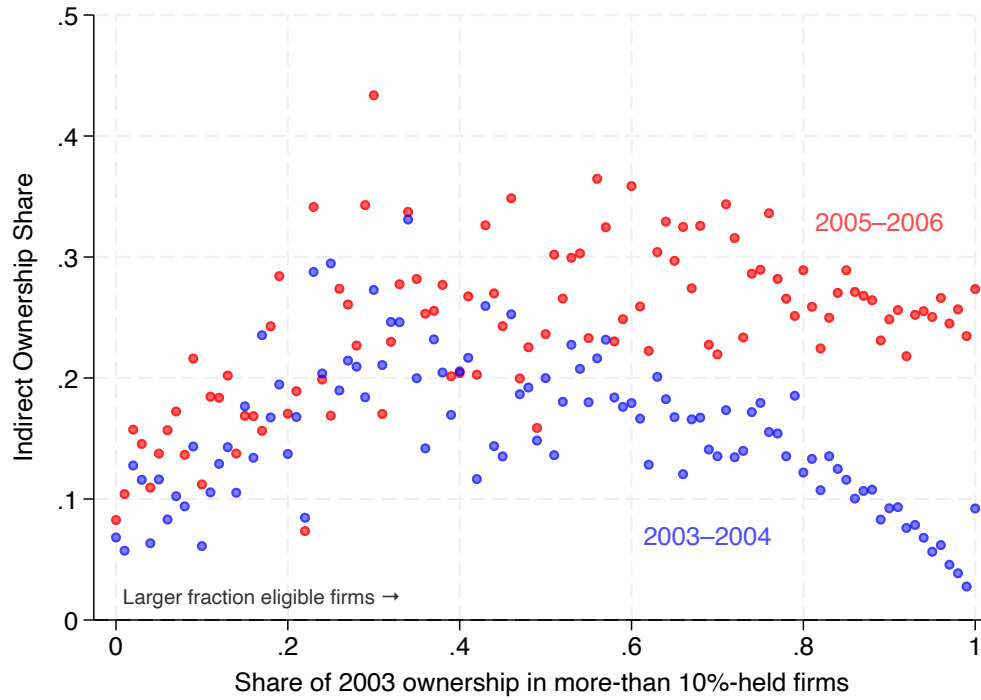
Notes: The figure computes average total taxes and average comprehensive income at the individual level over 2007-2020. We then plot the effective tax rates based on these averages based on (i) rank in 2007 and (ii) rank in 2020.

Figure A10: Norway 2006 Reform: Ownership Structure, Retention, and Tax Rates



Notes: We sort households into bins based on the source of their total allocated operating profits in 2003. Operating profits are defined at the firm level as pre-tax profits minus net non-interest financial income and are allocated to individuals via their iterated ownership shares. Panel (a) shows the indirect ownership share—the fraction of allocated operating profits coming from indirectly-held companies—by 2003 ownership structure. The blue group (triangles) have weakly more than 90% of their total allocated operating profits coming from firms in which they own strictly less than 10%. The red group (triangles) have strictly more than 90% of these profits coming from weakly more than 10%-owned firms but strictly less than 10% coming from strictly more-than-51%-owned firms. The red group with diamonds have strictly more than 90% of their profits coming from strictly more-than-50%-owned firms. The green group (circles) have strictly more than 90% of their profits coming from 100%-owned firms. Panels (b)–(d) show difference-in-differences estimates between (i) those who are allocated weakly more than 90% of their operating profits from firms in which they own strictly less than 10% of the shares and (ii) those who had strictly more than 90% of profits allocated from weakly-more-than-10%-owned firms, normalized to zero in 2004, for the indirect ownership share (panel b), retention rates (panel c), and average tax rates (panel d). Retention rates are measured at the household level as the ratio of allocated retained earnings to allocated retained earnings plus taxable dividend income. ATRs are computed as personal taxes plus apportioned payroll tax plus allocated corporate tax divided by economic income. The window for moving stocks into a new holding company was the second half of 2005, thus we expect reorganization responses to materialize in 2005—before the new dividend regime was effective—but ATRs to change only in 2006 onward.

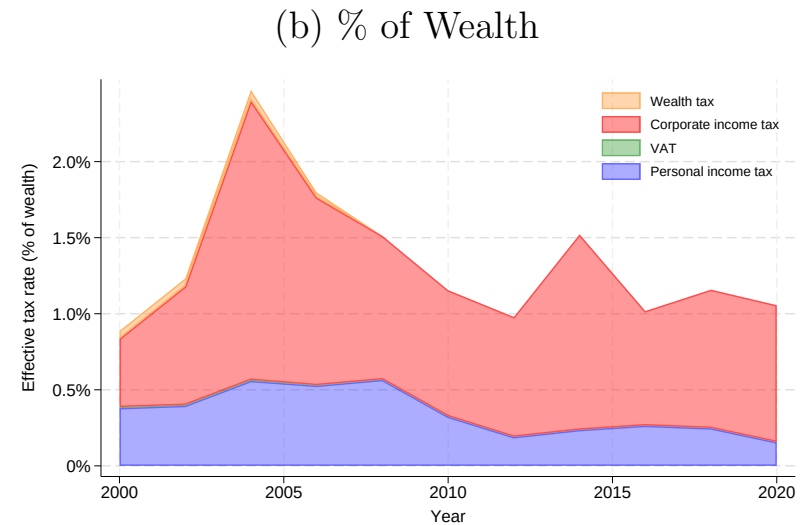
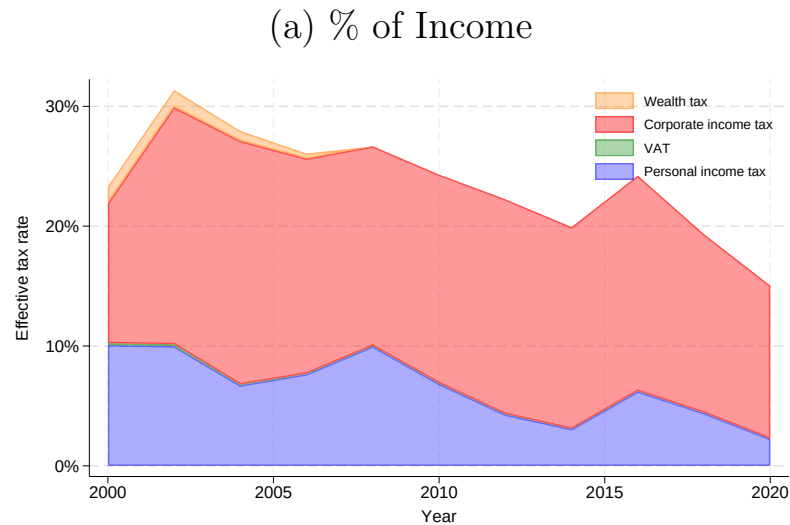
Figure A11: Norway 2006 Dividend Tax reform, Descriptives



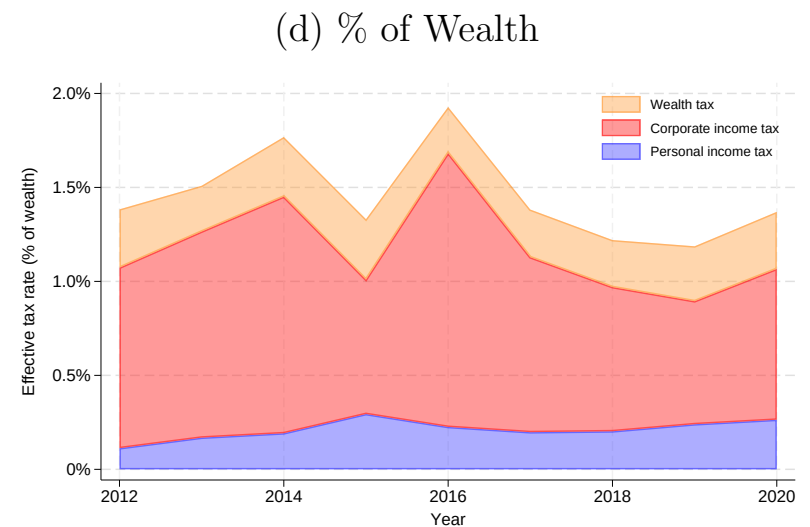
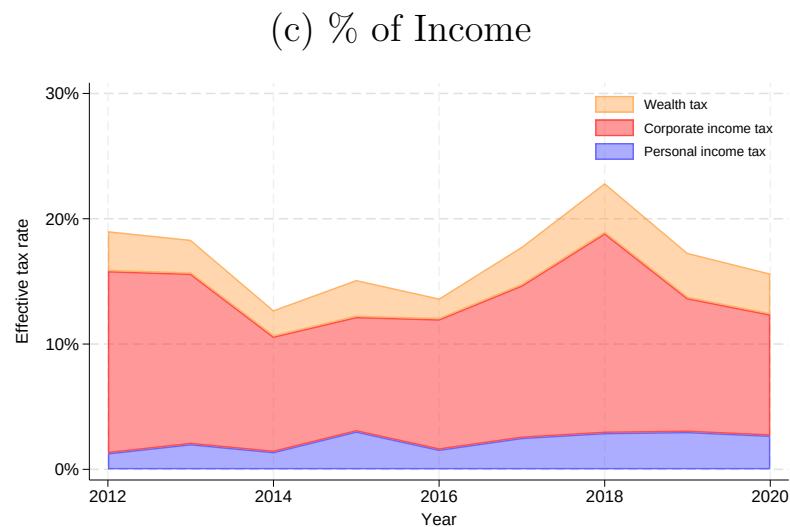
Notes: This figure considers the relationship between the degree of indirect ownership (y-axis) and the size of ownership shares (x-axis). The x-axis value is the household-level share of operating profits in 2003 allocated from firms in which an individual owns weakly more than 10% of the shares. Someone with a value of zero on the x-axis would have zero of their allocated operating profits from firms in which they own more than 10% of the shares. The blue circles consider the indirect shares during 2003-2004 (pre-reform and pre-adjustment window). The red circles consider indirect shares during 2005-2006. The adjustment window (could move > 10% shares into a holding company without realizing capital gains taxes) was the latter half of 2005.

Figure A12: Effective Tax Rates of Billionaires

Sweden (top 0.00045%), 2000–2020

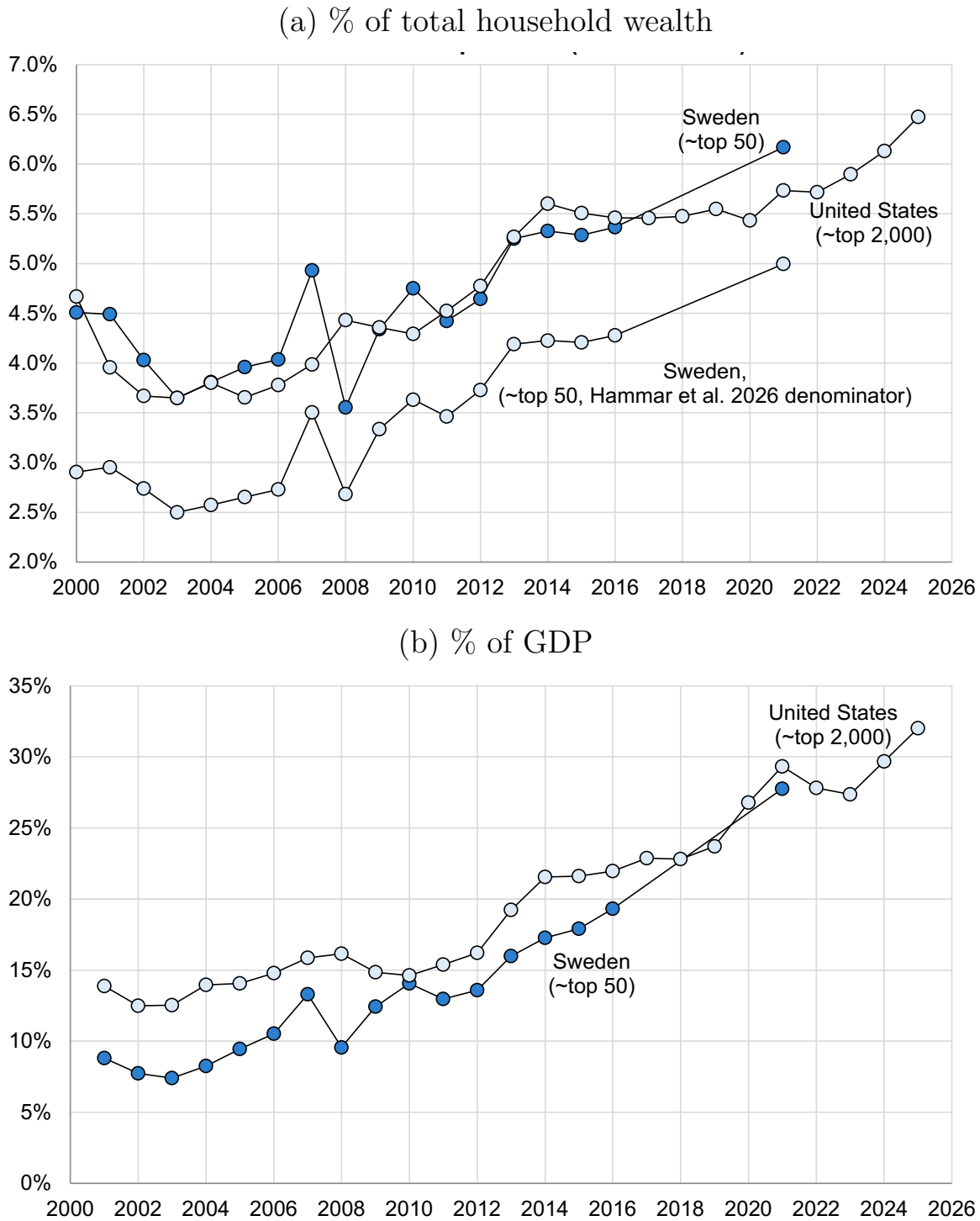


Norway (top 100 households), 2012–2020



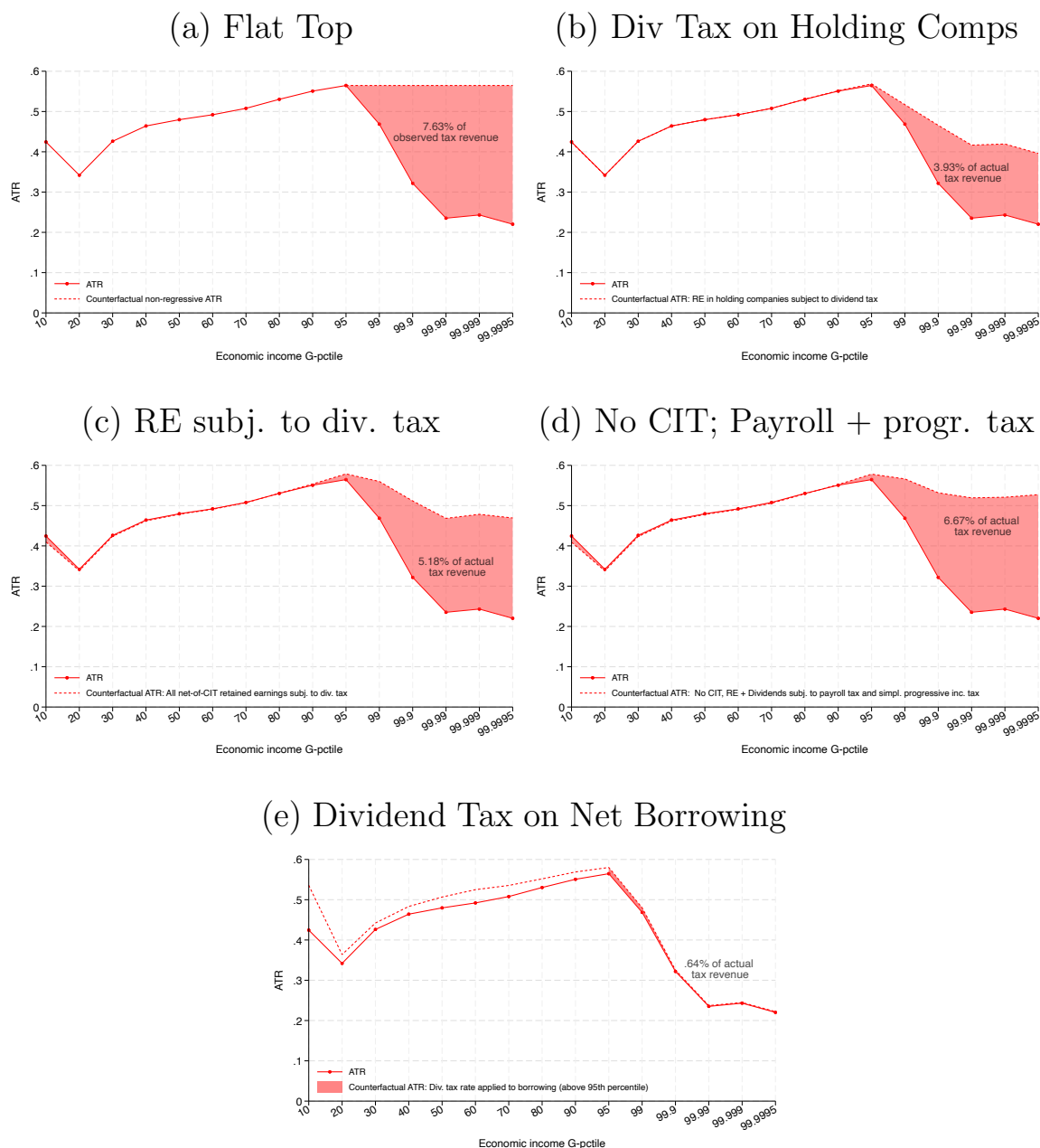
Notes: see text. **Norway:** We include the top-100 ranked families in the Kapital-400 lists. The NOK-billionaire rank cutoff in 2012 (2020) is 140 (362). For panel (c), we drop families with allocated income in the denominator (taxable income plus allocated retained earnings and corporate tax) below zero.

Figure A13: Wealth of the Top 0.001% in Sweden: Comparisons



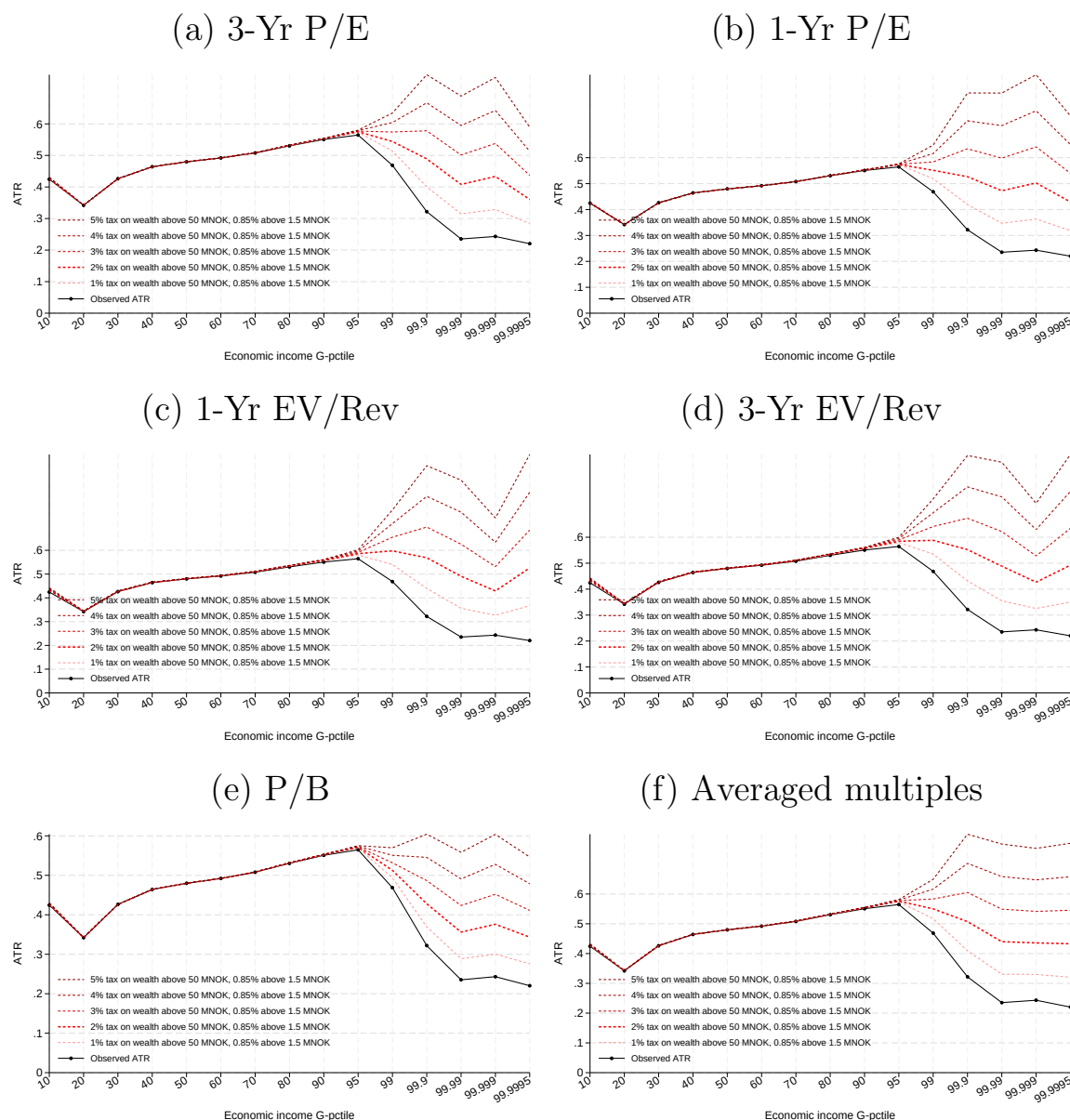
Notes: This figure shows the evolution of the wealth owned by the top 0.001% wealthiest households in Sweden and the US, relative to total household wealth (panel a) and to GDP (panel b). Only resident households are included. US series are taken from the real-time inequality database of Blanchet et al. (2026), <https://realtimeinequality.org>. In Sweden, top 0.001% wealth is computed by merging rich lists compiled by Veckans Affärer (until 2016) and Aftonbladet (in 2021) to administrative data and keeping only tax residents. Total household wealth is the net worth of the household sector published by Statistics Sweden, estimated at mid-year by averaging year-end values, or taken from Hammar et al. (2026).

Figure A14: Counterfactual Effective Tax Rates in Norway



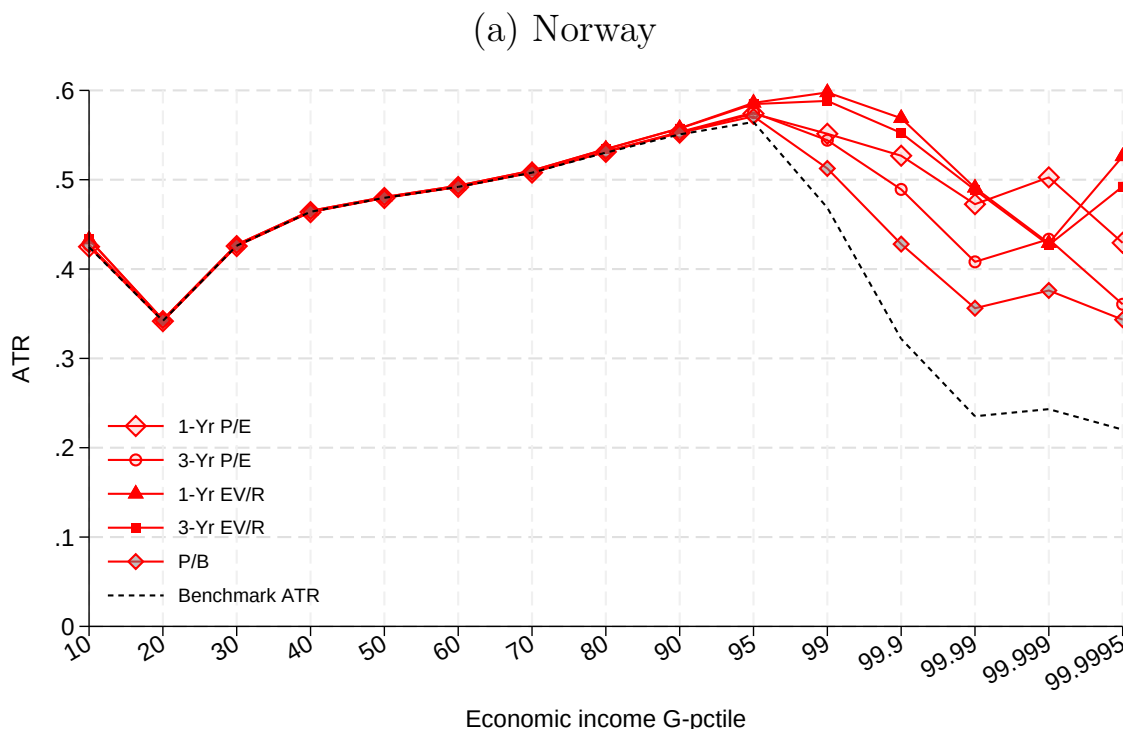
Notes: Purely mechanical. For the progressive income tax counterfactual, we apply a simplified progressive income tax (no special deductions for kids etc) to both the benchmark and the counterfactual in which profits are not subject to the CIT but is subject to payroll plus progressive income taxation. The wealth-tax counterfactuals are shown separately in Figures A15 and A16.

Figure A15: Counterfactual Effective Tax Rates in Norway: Wealth Tax Based on Market-Value Multiples



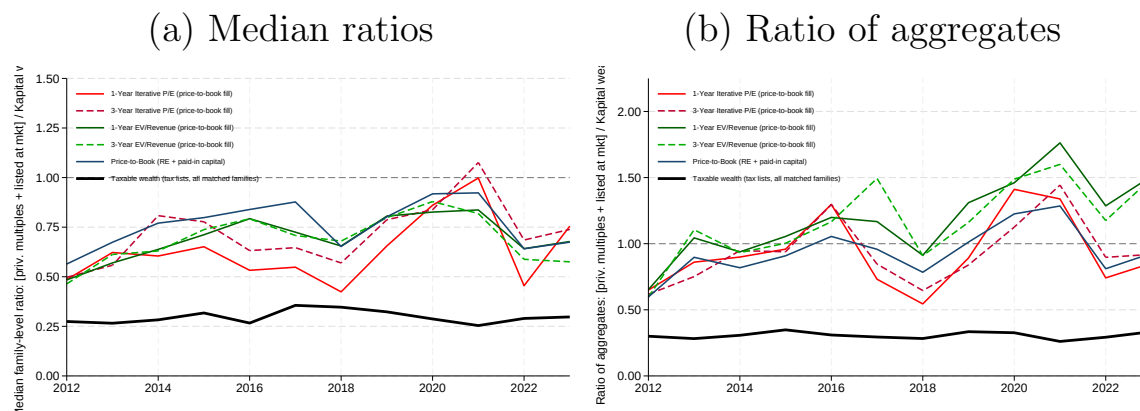
Notes: Micro effective tax rates (taxes divided by comprehensive income) by economic-income percentile, 2018–2020. Each panel re-assesses the wealth tax with shares in private firms valued at estimated market value using the indicated valuation method (price-to-book is applied to retained earnings and paid-in capital; it carries no year designation as it is based on stocks rather than flows) and removes the statutory valuation discounts on listed stocks and mutual funds. The dashed lines add top rates of 1% to 5% on net taxable wealth above 50 MNOK to a 0.85% rate above 1.5 MNOK; the 2% top rate—the more progressive benchmark schedule—is emphasized. The solid black line is the observed ATR. Panel (f) values private firms using the average of the price-to-book, 1-year EV/Revenue, and 1-year iterative price-to-earnings valuations. See Figure A16 for the valuation methods overlaid in a single graph.

Figure A16: Counterfactual Tax Rates: Different Wealth Assessment Methodologies



Notes: Micro effective tax rates (taxes divided by comprehensive income) by economic-income percentile, 2018–2020. Each red series re-assesses the wealth tax with shares in private firms valued at estimated market value rather than taxable value, using a different valuation method: 1- and 3-year iterative price-to-earnings multiples, 1- and 3-year EV/Revenue multiples, and price-to-book multiples (applied to retained earnings and paid-in capital; no year designation as book values are stocks rather than flows). Multiples are estimated from listed firms at the industry level and applied iteratively through ownership chains, so that holding companies are valued at the estimated market value of their underlying firms; firms with a market capitalization on a regulated exchange are valued at market value directly. All counterfactuals also remove the statutory valuation discounts on listed stocks and mutual funds, and apply a more progressive schedule that adds a 2% top rate on net taxable wealth above 50 MNOK to the schedule in place at the time. The dashed black line is the observed benchmark ATR.

Figure A17: Wealth of the Richest: Multiples-Implied Valuations vs. the Kapital 400 Rankings



Notes: These figures contrast multiples-implied valuations of wealth with estimated wealth in the Kapital 400 rankings. Panel (a) provides median ratios of our estimates with the K400 estimates. Panel (b) provides the ratio of aggregate valuations. All matched resident families in the rankings are included; non-residents are excluded. (The billionaire effective-tax-rate analysis in Figure A12 instead uses the top 100 ranked families; see Appendix B.) See Appendix A.2 for details.