# IMF Working Paper

Wealth Inequality and Private Savings:
The Case of Germany

by Mai Chi Dao

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**Abstract**

This paper explores the interaction between corporate ownership concentration and private savings, and by extension, the current account balance in Germany. As high corporate savings largely reflected capital income accruing to wealthy households and increasingly retained in closely-held firms, the buildup of external imbalances in Germany has been accompanied by widening top income inequality, rising private savings and compressed consumption rates. Rising corporate profits in an environment of high business wealth concentration account for 90 percent of the rise in the private savings rate and a third of the increase in the German current account surplus over 1999–2016.
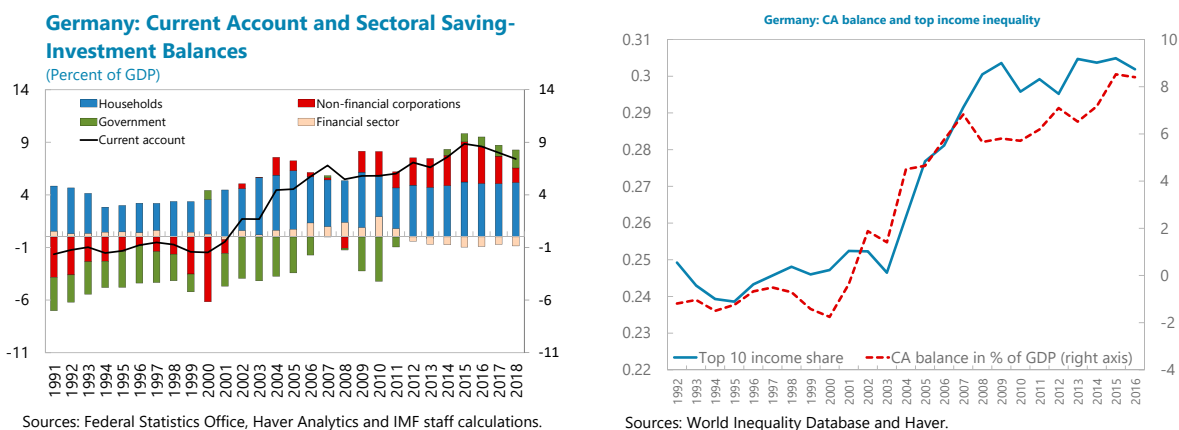
# 1 Introduction

The German current account surplus - the difference between national saving and investment - is, at US$ 291 billion as of 2018, the worlds largest. As a share of the German economy, it grew from close to zero in 2001 to a peak of almost 9 percent in 2015, with much of the increase over the last decade driven by rising savings by firms (Figure 1, left panel). This enormous surplus of national saving in excess of investment has captured much attention in policy debates, with different views on its drivers and implications.

It is well-known that Germany is the world's leading exporter of high value-added manufacturing goods and, following the Euro adoption, has steadily increased its current account surplus and net foreign asset position. Being a leader in industrial goods exports since the early 20th century, Germany was in a unique position to reap benefits from China's (and other emerging markets') integration into the world trading system and Eastern Europes integration into the EU due to its technological advantage in industrial production, as well as its geographic advantage in developing global value chains. Even following the Global Financial Crisis, Germany was much better positioned relative to the rest of the euro area to benefit from a positive external demand shock from China - China's investment-heavy fiscal stimulus seems to have offset the drag from weaker demand in Europe. Household *disposable* income and domestic demand, however, did not increase in tandem with national income. Instead, Germany's aggregate saving rate and current account (CA) balance began to improve steadily starting in the early 2000s, reaching a peak of around 9 percent of GDP in 2015, and boosting the NIIP to around 70 percent of GDP at present.

A by far less-known fact is that this rising current account surplus has been strongly associated with widening top income inequality. In this paper, I show that Germany's success on global export markets needs to be viewed against the background of its high wealth inequality to shed light on the drivers behind the rise in private savings and accumulation of current account surpluses. It has been widely documented that over the last two decades, the German non-financial corporate (NFC)

Figure 1: The German current account evolution: 1991-2016



**Germany: Current Account and Sectoral Saving-Investment Balances**
(Percent of GDP)

Legend: Households, Non-financial corporations, Government, Financial sector, Current account

Sources: Federal Statistics Office, Haver Analytics and IMF staff calculations.

**Germany: CA balance and top income inequality**

Legend: Top 10 income share, CA balance in % of GDP (right axis)

Sources: World Inequality Database and Haver.

sector's gross and net saving rate has increased – while the relatively high household saving rate remained largely unchanged, boosting the private saving rate and CA surplus (Figure 1, left panel). This surge was initially driven by rising profits, on the back of wage restraint and falling labor shares, and since 2008, by lower dividend payout rates. In this paper, we show that the benefits of rising corporate savings and by extension, the current account surplus, were unevenly distributed: Growing corporate profits associated with globalization and wage restraint accrued mainly to households in the top of the wealth distribution, among which business ownership is concentrated. The interaction of pre-existing wealth inequality with rising corporate income therefore widened overall income inequality. Over 1992-2016, as the current account surplus increased by 9 percentage points of GDP, the top income share - the share of national income accruing to the top 10 percent highest income individuals - climbed by 6 percentage points, with the sharpest increase in both series occurring in the early-mid 2000s (Figure 1, right panel).[1] Finally, as the marginal propensity to consume typically declines when moving up the wealth and income distribution, such top-biased income growth is bound to raise savings and net worth of the richest households, further exacerbating wealth inequality over time.

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[1]The correlation between the CA and top income share over this period is 0.95.

Overall, I find that the export-driven income gains reflected in Germany's high current account surplus were not evenly shared. Instead, rising profits were either distributed as dividends to shareholders, who tend to be wealthy households, or increasingly retained in closely-held firms, which also tend to be owned by wealthy households. These wealthy households have a propensity to save a higher share of their income than poorer households. As a result, Germany has experienced widening top income inequality, rising private savings and compressed consumption rates. These inter-related trends have contributed to the significant rise in its current account surplus. In fact almost all of the increase in private saving rate since the start of the millennium, and a third of the increase in the current account can be explained by rising corporate profits and the high business wealth concentration.

This paper builds on a recent literature that documents the rise in corporate saving relative to investment in advanced economies, leading to a rise in the net lending position of the non-financial corporate sector (Dao and Maggi, 2018; Allen, 2019; Chen et al. 2017). This literature has documented the role of corporate savings for overall current account imbalances and explored factors driving this trend in excess saving. In a separate line of work, the evolution of income inequality in the United States prior to the Global Financial Crisis has been linked to its widening current account deficit (Kumhof et al., 2015), while a falling labor share has accompanied a growing current account surplus in Germany (Behringer and van Treeck, 2018). The emerging finding that income distribution may have a bearing on global imbalances has been gaining attention, but also the recognition that the underlying mechanisms differ widely across countries, as the contrasting examples of the US and Germany highlight. In this paper, I focus on the case of Germany, which currently runs the world's larges current account surplus, to disentangle the connection between corporate structure and firms' saving on the one hand, and their implications for overall income inequality and private saving on the other. I highlight the crucial role of corporate wealth inequality in this context, and thus relate to important insights from the literature on wealth accumulation and entrepreneurship (Quadrini, 1999; Cagetti and DeNardi, 2006). Peter (2019) shows how a combination of financial frictions

can give rise to high wealth inequality and a high share of privately held firms in Germany. Taking this insight further, I show that such underlying frictions can also affect aggregate private saving and external imbalances.

The paper is organized as follows: Section 2 introduces stylized facts regarding wealth and income inequality in Germany in a cross-country context. Section 3 discusses the implications of rising profits and corporate saving on overall disposable income and consumption. Section 4 establishes the empirical link between corporate saving and top income inequality, while section 5 draws the prediction for overall private saving stemming from this link. Section 6 concludes with avenues for future research and discusses the role of policy.

# 2 Wealth and Income Inequality: Stylized facts

Notwithstanding the large stock of net foreign assets accumulated through the process of running increasing current account surpluses since the early 2000s, the median level of household wealth in Germany is among the lowest in the Euro area. At a median of 61 thousand Euro, household net wealth in Germany is just above the level in Poland, below the level in Greece, Portugal, and well below the euro area median of 100 thousand per household (Figure 2).[2] This low level of wealth among the median household stands in stark contrast to the vast stock of national wealth measured at the aggregate level: financial net worth alone (excluding land, dwellings and other real assets) of the aggregate household balance sheet stood at over 4 Trillion Euro or 95 thousand Euro per household as of 2017, while total (financial and real) net worth is estimated to amount to 10 Trillion Euro, or over 235 thousand per household.[3] The high level of national wealth coupled with the low level of median household wealth jointly imply that most of the aggregate wealth is concentrated among a small segment of the population in the top of the distribution.

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[2]This measure of net wealth does not encompass pension wealth, i.e. the present value of future pension entitlements from public and employer-provided pension schemes, which is estimated to be large in Germany (see Bönke et al. 2018).

[3]See OECD Sectoral Balance Sheets statistics and DIW Wochenbericht Nr. 49/2018

Figure 2: Level of median wealth in Thousand Euro (left) and top 1 percent wealth share (right)



Sources: HFCS Second wave.

Source: OECD.
1/ As of 2014 or latest available.
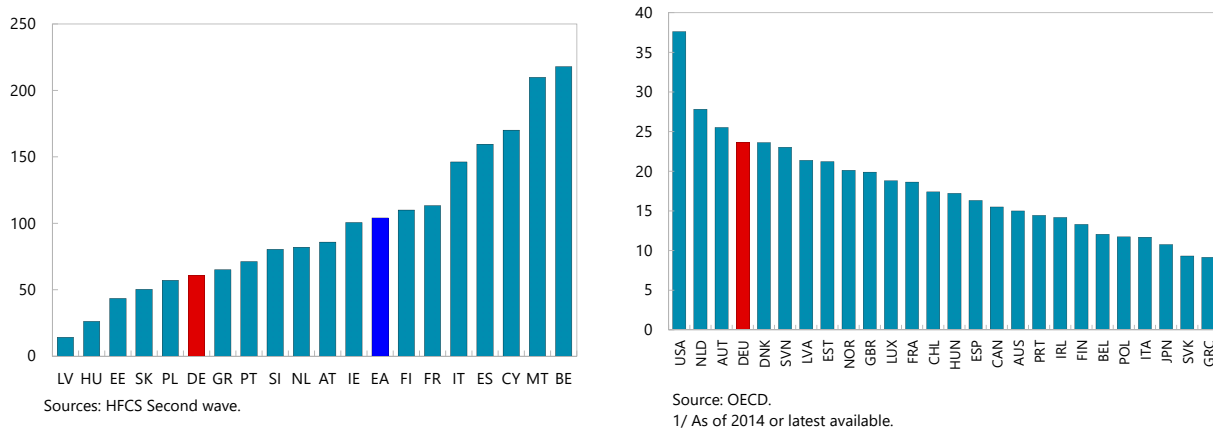
In international comparison, wealth inequality is indeed very high in Germany. Measured by the share of aggregate net wealth held by the top 1 percent wealthiest households, wealth inequality is high in most advanced economies. In Germany, it is among the highest in Europe, with the top 1 percent wealthiest households owning 24 percent of total national net wealth (Figure 2, right panel).[4] A similar picture emerges when ranking countries in terms of the net wealth Gini coefficient, the top 10 percent wealth share, or other relative wealth ratios instead.

Income inequality in Germany may be less severe than in some other major advanced economies (for example, it is less than in UK, US, Japan, Korea), but its increase in recent decades has been steep, both in gross and even disposable income terms, as redistribution has overall weakened at the same time as market incomes have diverged.[5] Importantly, the dynamics of post-reunification income inequality have been evolving over time. Over 1999 - 2005, it has been the falling income of the bottom of the distribution that widened inequality, as high unemployment and

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[4]Household surveys are known to under-sample the richest households. Supplementing such surveys with the so-called rich lists increases the top 1 percent wealth share in Germany to 33 percent, the highest in Europe, see Bach et al. (2018) and Vermeulen (2016).

[5]For an analysis of the evolution of wage and income inequality in Germany, highlight rising relative poverty risk, see the 2017 Selected Issues Paper Income distribution and labor market developments in Germany and more recently, DIW Wochenbericht 19/2019.

declining union power dramatically reduced earnings in the lower end of the distribution (see e.g. Dustmann et al. 2014). Starting in the mid-2000, however, the labor market strengthened and bottom incomes stabilized, resulting in a largely stable Gini coefficient. At the same time, however, top income inequality rose sharply as rising corporate profits and associated capital incomes disproportionately accrued to the wealthy (Figure 3). The last phase in the distribution dynamics, starting 2009, appears to be accompanied by stable or only moderately rising income inequality as measured by both metrics. However, this period also saw the sharpest rise in corporate retained earnings, which is not properly reflected in the income tax base and thus not completely captured by the measured top income share (see Bartels, 2019).[6] Properly attributing retained earnings as incomes of ultimate shareholders would likely increase the top income share and its co-movement with the current account even further, particularly after 2009.

Ultimately, wealth and income inequality are closely linked. As income/savings is a key source for wealth accumulation (Zucman, 2019), rapidly widening income inequality, particularly when driven by capital income as it has been the case in Germany, is both a driver of wealth inequality as well as its outcome. While time-series for wealth inequality are less readily available for long periods of time, studies employing German micro data show that wealth inequality in Germany has increased since the early 2000s (Frick and Grabka, 2009; Bundesbank, 2016), with high levels of inertia in the top and bottom of the distribution.[7]

## 2.1 Drivers of high wealth inequality

**Home ownership rate** Private home ownership, typically the most important channel to build household wealth, is very low in among German households (Figure 4, left panel). Traditional reliance on generally well-functioning rental markets with strong tenant protection has contributed toward a low home ownership rate, in fact
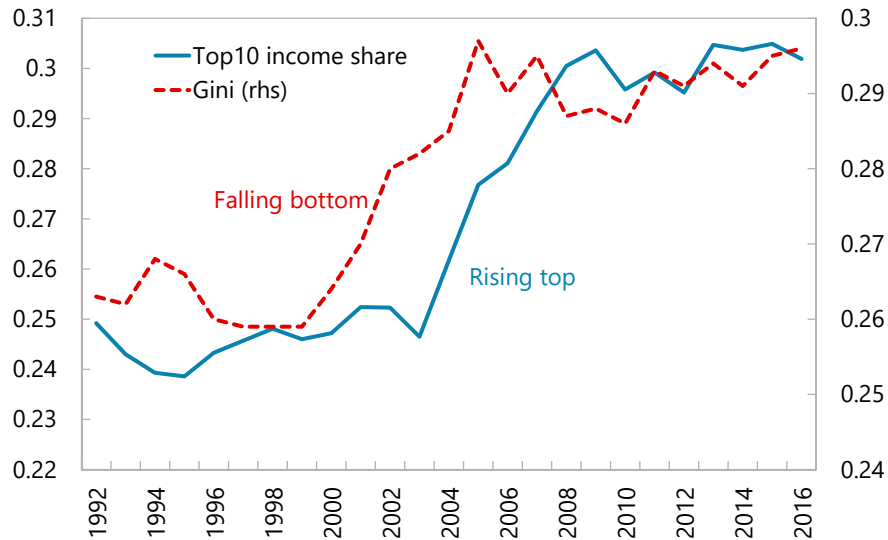
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[6]It is also not visible in the Gini coefficient which relies on household survey and typically under-samples rich households and capital incomes.

[7]Between 2010 and 2017, the interquartile range of net wealth in Germany increased by 30 percent (Bundesbank Monthly Report April 2019).

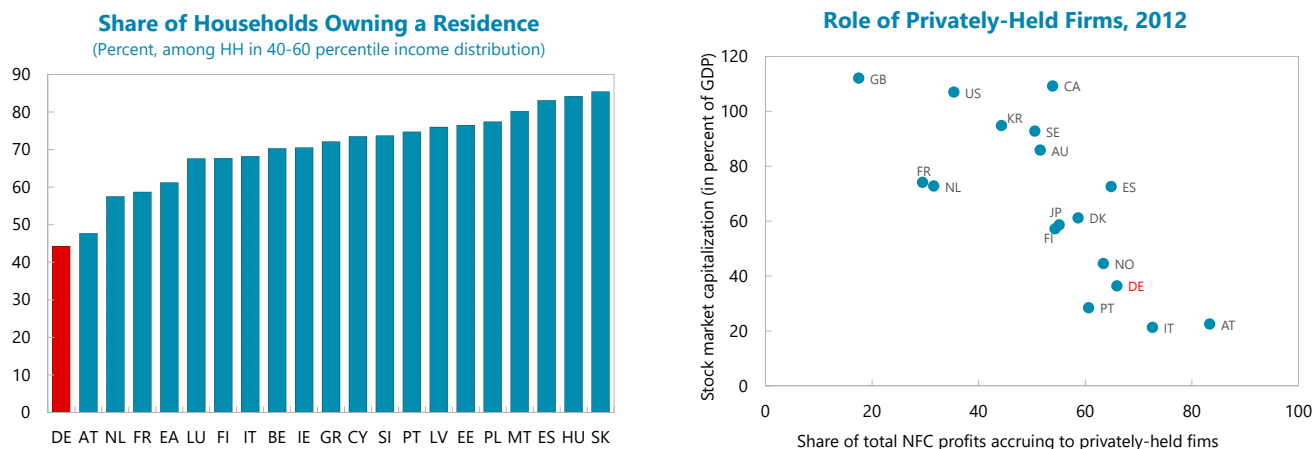Figure 3: Disposable income inequality in Germany



Sources: WID database, OECD.
Note: Top 10 income share measures the share of total after-tax income accruing to the top 10 percent of population as derived from income tax data.

the lowest among Euro area countries. Consistent with the observed degree of wealth inequality, the home ownership rate is particularly low among households in the low-middle segment of the income distribution, while it does not vary much across countries among high-income households. The recent trend in appreciating house prices has therefore not benefited the broader population, while higher rents (particularly in major cities) have exerted increasing strains on housing affordability particularly among lower-income households. Dustmann et al. (2018) show that trend developments affecting relative housing expenditures (declining mortgage interest rate amid rising rentals and residential mobility among the young) have exacerbated income inequality.

In addition to low home ownership rates, German households also lack access to the German corporate equity stock as most of the corporate net worth is concentrated in privately-held firms. Unlike other advanced economies with a large industrial base, the bulk of corporate assets and profits (around 60 percent) in Germany are

Figure 4: Factors underlying wealth inequality



**Share of Households Owning a Residence**
(Percent, among HH in 40-60 percentile income distribution)

**Role of Privately-Held Firms, 2012**

Source: HFCS 2nd wave, OECD National Accounts, Thomson Reuters, Bloomberg, Federal Reserve Bank of St. Louis.

generated by firms in private ownership, consistent with a very low stock market capitalization relative to the size of the economy (Figure 4, right panel). Many Mittelstand firms remain in private, often family-controlled ownership, even when they expand internationally and grow into large multinationals. And even among the remaining 40 percent of firms that are publicly-listed, an astounding 65 percent of them are also controlled by a family – either directly through at least 20 percent of stock ownership or through cross-holdings in a multiple control chain of interlinked entities. The largest controlling shareholder (in most cases an individual, family or endowment) holds an average of 54.5 percent of voting rights within a German publicly listed firms, compared with 2025 percent in the UK and 31 percent in Sweden (Faccio and Lang, 2002).[8] Economic historians studying the patterns of German corporate ownership conclude that families are central to the ownership of many firms, but equity ownership is unusual among the population at large (Fohlin, 2005, p. 236).

Private business wealth, meanwhile, is also highly concentrated in Germany and in general, accounts for much of the variation in wealth inequality across countries. The 10 percent wealthiest households in Germany own around 60 percent of the aggregate

[8] These shares are computed among publicly listed firms where the largest controlling owner has at least 5 percent of voting rights.

net wealth in the economy, and 40 percent of this wealth is in the form of private business ownership (Figure 5). Indeed, the single most important source of wealth in the top of the distribution is accounted for by business wealth in Germany (Grabka and Westermeier, 2014). Apart from private business wealth, the concentration of other forms of wealth in Germany (bank deposits, private pension saving, real assets etc.), though still high, does not stand out as much relative to other countries in the euro area. The role of private business wealth for overall wealth inequality in Germany is due to two facts: first, private business wealth accounts for a large share (25 percent) of overall national wealth, and second, it is highly concentrated among the top (95 percent of it is owned by top 10 percent wealthiest households). An immediate implication of such high concentration of business ownership is that the persistent rise in corporate profits underlying the increase in corporate saving and current account surplus since the early 2000s mostly accrued to the wealthiest households in the form of dividends or appreciating equity valuation, boosting top income and wealth shares. At the same time, households in the lower segments of the wealth distribution lost out due to the wage restraint that, over a long period, enabled the rise in corporate profits.

Finally, policy is also likely to play an important role. Taxation of property in Germany is low compared to other OECD countries, contributing to the persistence of high wealth inequality. Revenues from property taxes in Germany (comprising real property, inheritance and other property taxes), at only 1 percent of GDP, are very low compared to peers (Figure 6). Moreover, it has been on a declining path, reflecting reductions in marginal tax rates in the 1990s, and most notably following the inheritance tax reform of 2009, which greatly increased the exemption of inheritance wealth through intra-family business transmission (see Hines et al. 2016). At the same time, the size of the average inheritance flow has been growing steadily, from 4 percent in 1980 to over 10 percent of national income annually in 2010, and almost entirely reflects the increase in inheritance and inter-vivos transfers of wealthy families (see Piketty, 2016). The inheritance tax regime primarily benefits the wealthiest, who can claim exemption of corporate assets, while average families face much higher burdens,

Figure 5

## Top 10 Wealth Share - Decomposition
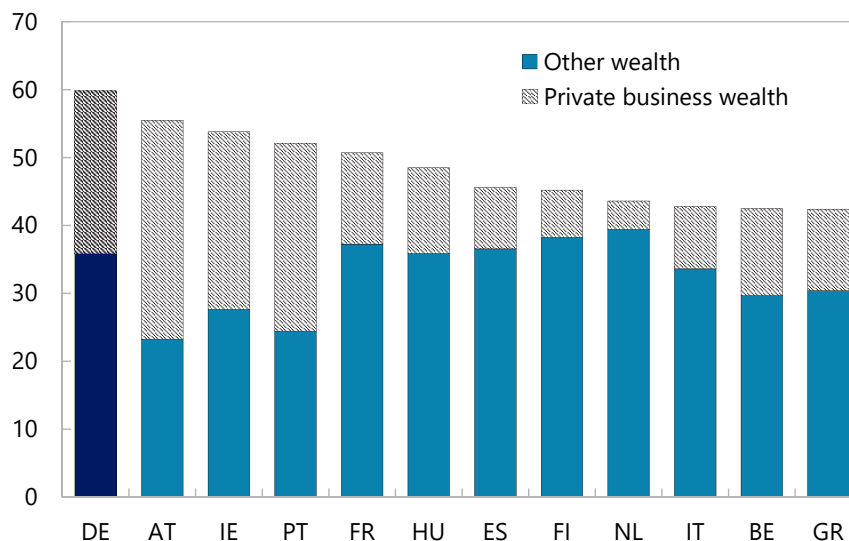


Source: HFCS 2nd wave

given relatively low personal exemptions and substantial marginal rates it is therefore a regressive tax. Taxes on real property meanwhile, at only 0.4 percent of GDP, are particularly low in international comparison, due to the widening gap between tax- and market valuations. The last encompassing updates of property values occurred in 1935 and 1964 (only West Germany). This under-valuation of real estate properties also benefits disproportionately the wealthy given their much higher home ownership rate and the recent house price appreciation.

# 3 Implications for household disposable income and consumption

The mirror image to rising NFC gross saving underpinning the rise in current account surplus (Figure 1) has been a decline in household disposable income and consumption as a share of GDP (Figure 7). The rate of NFC gross saving (that is, retained earnings as a share of gross output or value added) has been on the rise since

Figure 6: Property tax revenues (percent of GDP)
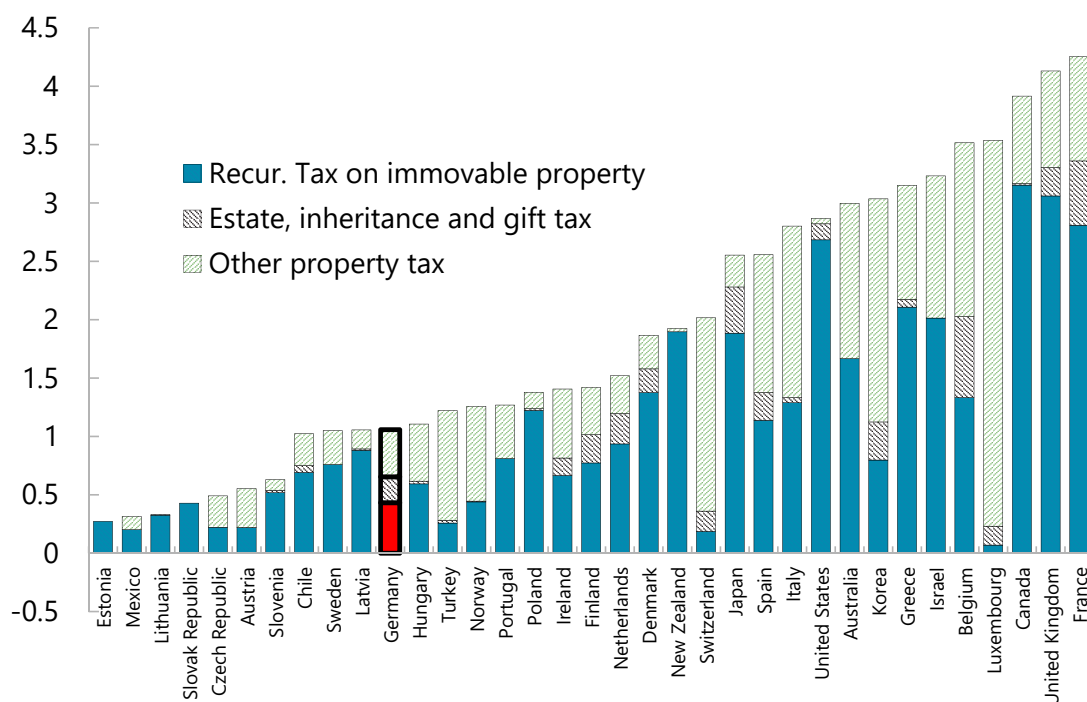


Source: OECD.

the early 2000s. Prior work has documented that this increase has been driven by rising profits of German corporations and more recently, declining dividend payout rates (Dao and Maggi, 2018). Higher profitability, in turn, has been supported by wage restraint/lower labor income shares and declining interest payments on debt, spurring exports and profits of German firms but reducing household disposable incomes (in percent of GDP). The strong labor market performance after the mid-2000 contributed to the recovering labor income share starting in 2008, through higher employment and more recently, higher wage growth. At the same time, the decline in unemployment and retrenchment of the welfare state following the Hartz IV reforms contributed toward reducing disposable income through lower net benefits since 2005, offsetting the modest gains in labor incomes on aggregate. All these forces combined have led the household disposable income to GDP ratio to decline by around 6 percentage points over 2005-2017.

Figure 7: Contribution to Cumulative Change in Household Disposable Income to GDP ratio (cumulative since 1991, in percentage points)
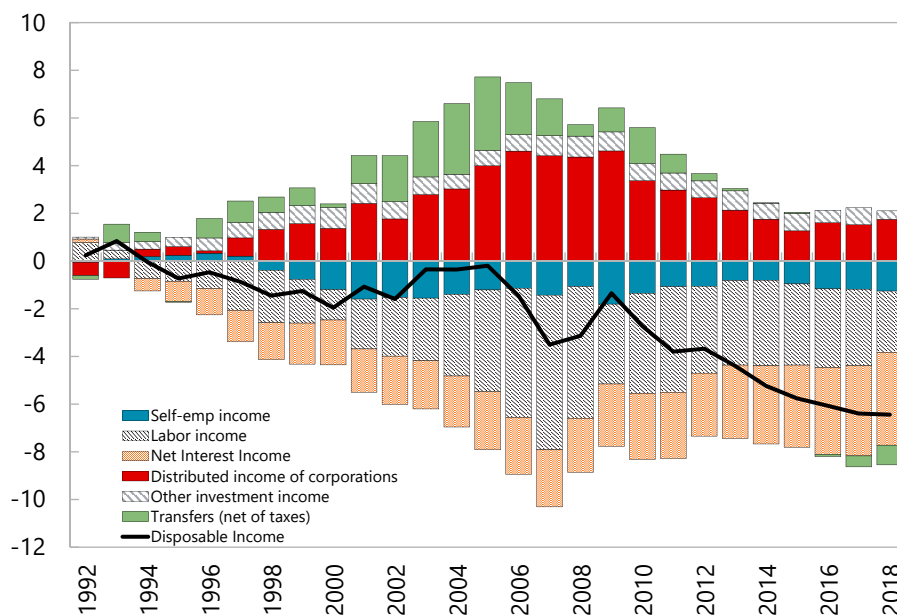


Sources: Destatis, and IMF staff calculations.

The corporate tax reform in 2001 and 2008, which favored retained earnings relative to dividend distribution and new equity issuance likely reduced the payout share, while declining interest rates (which steepened particularly after the GFC) have been eroding household interest income. The 2008 German corporate tax reform substantially reduced the tax burden on retained earnings, while slightly increasing the effective tax rate on dividends, especially for unincorporated businesses, resulting in a strong incentive for firms to retain instead of distributing their profits. However, as corporations are owned primarily by wealthy households with very high propensity to save, the shift from dividend distribution to retained earnings triggered by tax incentives merely represents a shift from household to corporate saving among the wealthy. At the same time, interest rates on household deposits declined by 2 - 4 percentage points, depending on maturity, between end-2008 and 2018. A much higher share of total assets of lower-middle income German households is held as financial assets compared to other countries in the Euro area (44 percent in Germany compared to

13.5 percent elsewhere in the Euro area), and around half of those assets are in the form of sight deposits and saving accounts that are subject to declining interest rates (see HFCS 2nd wave).

The decline in disposable income share was not evenly distributed. Lower- and median income households bore most of the decline in disposable income share, which, given their high propensity to consume, led to a concomitant decline in the aggregate consumption to GDP ratio. The steepest decline in household disposable income to GDP occurred starting in 2005, with transfer retrenchment and interest income reduction contributing the most, while dividend (and other property income) ratio only started to decline in 2010 and stabilized in 2015. As lower- and middle-income households are more reliant on transfers and interest incomes than higher income ones (who own more housing and equity assets), we expect the decline in household disposable income to be disproportionately borne by lower income groups. Figure 8 confirms that the disposable income decline is highly concentrated among the bottom half of the income distribution. In fact, lower income households experienced not only a relative, but also an absolute erosion or stagnation of their real purchasing power. Figure 8 shows that widening income inequality and erosion of purchasing power in the lower deciles of the distribution is a long-standing trend that started in the early 2000, when the current account started rising.[9] Survey data show that lower/median income households tend to have a propensity to consume close to one (see Börsch-Supan et al. 2006). The shift in income distribution toward the top (where propensity to consume is low) away from the median/bottom (where propensity to consume is high) explains why the aggregate consumption rate has declined in tandem with the disposable income ratio, contributing to the current account surplus, as documented above.

[9]Large-scale immigration after 2010 also played a significant role for the dynamics of bottom incomes in most recent years (see DIW Wochenbericht 19/2019).

Figure 8

**Real Disposable Household Income**

(Percent, cumulative change since 2000)



Sources: DIW SOEP.
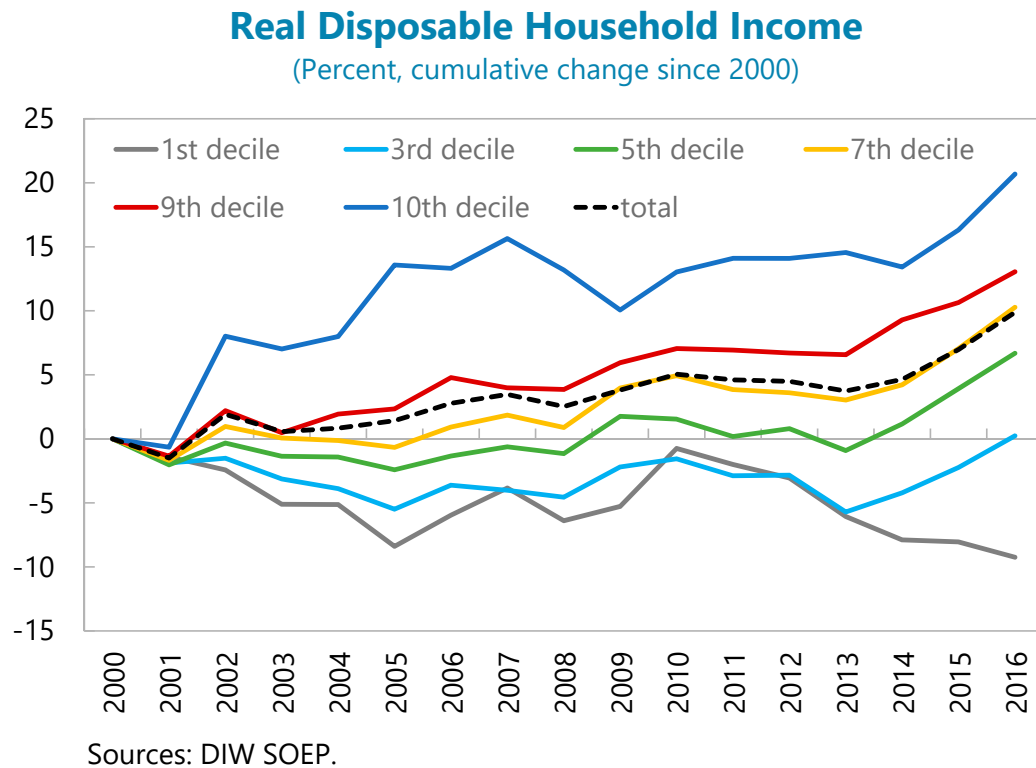
# 4 NFC gross saving and income inequality

## 4.1 Testing the relationship between NFC saving and income inequality.

Corporate ownership (and capital ownership in general) is highly skewed everywhere, but particularly so in Germany, where large industrial companies are often family-owned, and housing ownership is not widespread among the general population. Consequently, the increase in corporate profitability and retained earnings has boosted incomes and asset prices of the richest households, while the average and lower income households have been experiencing the opposite trend in their relative incomes, due to lower wage growth and lower interest incomes (Figures 7). The rise in NFC profits

underlying its saving rate has, therefore, likely contributed to increasing income inequality in Germany. We proceed with testing this prediction.

To test the general mechanism with macro-level data, we need to go beyond the German case. Instead, we need to show that the relationship between (profit-driven) rise in NFC saving and rising income inequality over the medium-long term, enabled by skewed wealth distribution, holds across a panel of advanced economies over the last two decades. To this end, we estimate the following regression equation:

$$IncInequ_{ct} = \alpha + \gamma_c + \beta NFCGS_{ct} + \delta_t + \varepsilon_{ct}, \tag{1}$$

to test whether, within a given country, higher NFC gross saving rates are associated with higher income inequality over time as hypothesized (i.e. $\beta > 0$). We collect sectoral national account data to compute the NFC saving rate (in percent of GDP) and gather income inequality indices from the World Inequality Database (WID), obtaining an unbalanced panel of 27 countries (both advanced and emerging) broadly from 1995-2015. Results are summarized in columns 12 of Table 1. Consistent with our hypothesis, an increase in the NFC saving rate is associated with an increase in income inequality, with the relevant coefficient estimates being statistically and economically significant: a 1 percentage point increase in NFC saving rate is associated with 0.3-0.4 ppt increase in the share of income going toward the top 10 percent highest-income individuals. The strong empirical relationship between corporate saving and income inequality also holds in long-run changes. Regressing 5, 7, and 10-year changes in the top 10 percent income share on the corresponding change in corporate saving rate in each country yields similar estimates (column 3-6 of Table 1).[10] Figure 9 below illustrates the strong positive correlation across the sample by plotting the overlapping 10-year change in both variables against each other. Statistically, the variation in corporate saving over time can explain 20 percent of the long-run change in income inequality in the sample.

As argued above, NFC profits interact strongly with wealth inequality in widen-

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[10]That is, we estimate the equation in long changes instead of levels: $\Delta IncInequ_{ct} = \alpha + \beta \Delta NFCGS_{ct} + \delta_t + \varepsilon_{ct}$.

Table 1: Corporate saving and top income shares

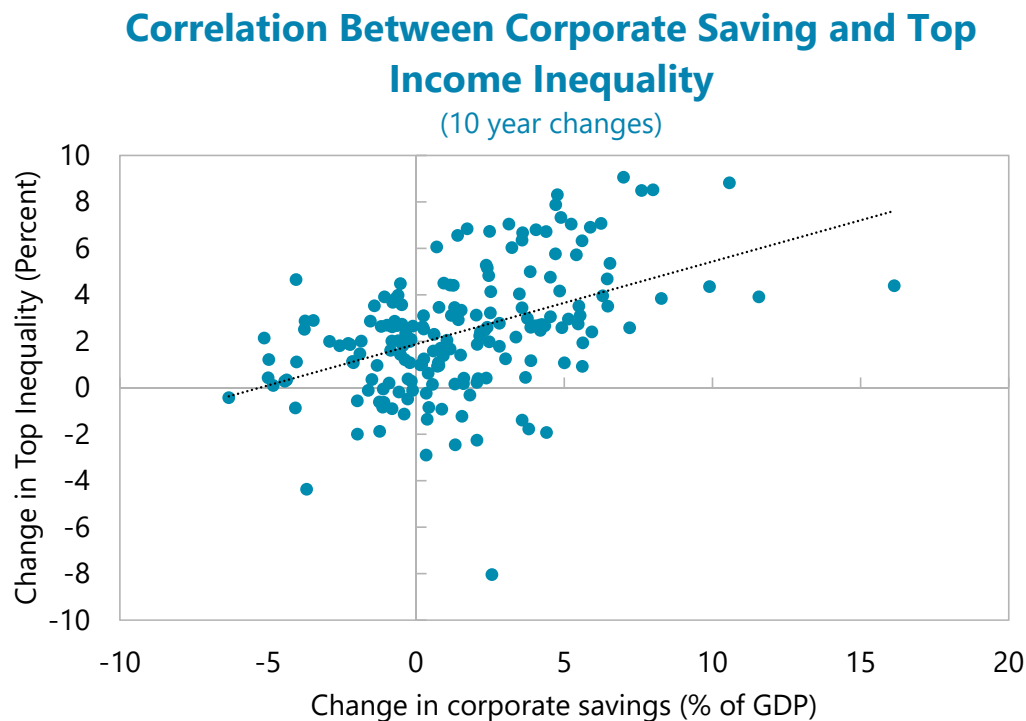| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Dependent variable: Top income share (10 percent) | | | | | |
| | Level | | 5-year change | | 7-year change | 10-year change |
| NFC gross saving rate | 0.422*** | 0.254*** | 0.167*** | 0.115* | 0.207*** | 0.281* |
| | (4.28) | (4.15) | (5.34) | (1.67) | (2.72) | (1.80) |
| Country FE | Y | Y | N | N | N | N |
| Time FE | N | Y | N | Y | Y | Y |
| Constant | 0.294*** | 0.287*** | 0.00759** | 0.00797** | 0.0111*** | 0.0171* |
| | (23.18) | (30.70) | (2.35) | (2.23) | (3.13) | (1.82) |
| N | 447 | 447 | 311 | 72 | 43 | 28 |
| R2 | 0.225 | 0.548 | 0.214 | 0.181 | 0.254 | 0.594 |

Sources: OECD National Accounts, WID, IMF staff calculations. T-statistics based on robust standard errors in parentheses.

ing the income distribution. We unpack the above correlation further to test if the underlying pattern conforms to our predictions. If unequal wealth distribution allows higher corporate profits to disproportionately benefit high-income households who own the corporations, then a given increase in profits should give rise to a stronger increase in income inequality if wealth concentration is higher, particularly if variation in wealth inequality across countries reflects to a large extent variation in business ownership inequality.

Figure 10 suggests that this corporate profits indeed interact strongly in widening the income distribution. While the overall correlation between five-year non-overlapping changes in top 10 percent income inequality and corresponding changes in aggregate NFC profits (measured by NFC net income as a share of GDP) across countries, it is exclusively driven by countries with high (that is, above median) wealth inequality. We test this prediction more formally in the following regression:

$$\Delta IncInequ_{ct} = \alpha + \delta_t + \beta_1 \Delta NFCGOS_{ct}$$
$$+ \beta_2 \Delta NFCGOS_{ct} \times WealthInequ_c + \beta_3 WealthInequ_c + \varepsilon_{ct} \quad (2)$$

Figure 9

## Correlation Between Corporate Saving and Top Income Inequality
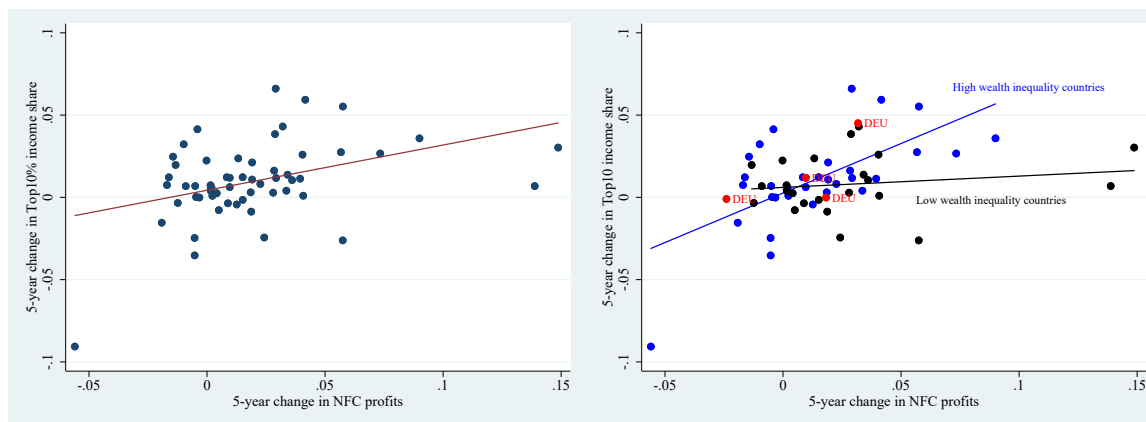### (10 year changes)



Sources: World Inequality Database, OECD National Accounts Statistics.

If this hypothesis is true, the coefficient on the interaction term between change in corporate profits ($\Delta NFCGOS_c t$) and the country-specific wealth inequality index (measured by the top 10 percent wealth share) should be positive. Results of this regression are summarized in Table 2.

The regression results are consistent with our hypothesis. Higher corporate profits are associated with lower income inequality only for countries with low wealth inequality (below the 40 percentile of the sample). For higher levels of wealth inequality (and Germany far exceeds this threshold), an increase in corporate profits is associated with higher income inequality over time, with the increase being larger if wealth inequality is higher.

We obtain similar results for the interaction between wealth inequality and corporate saving (instead of profits), consistent with the view that higher corporate saving (due to higher profits that are retained and boost long-term capital income) benefit

Figure 10: Unpacking the positive correlation between top income inequality and NFC profits



Sources: OECD National Accounts, WID. Each dot stands for one observation of non-overlapping 5-year change in NFC profits (measured by NFC net income in percent of GDP) and the contemporaneous 5-year change in top 10 percent income inequality in a country over 1995-2016.

the rich households and widen income inequality in an environment with high wealth inequality. The regression results imply that the rise in corporate saving, coupled with the degree of wealth inequality, can explain about half of the rise in top income inequality in Germany over the period 2000 - 2015.

# 5    From corporate savings to aggregate private savings

The empirical evidence so far has shown that widening income inequality in Germany, driven in large part by higher corporate profits, was associated with lower disposable incomes of households in the bottom deciles of the distribution and higher incomes of top wealth households (who own the corporations), both in absolute and relative terms (Figure 8). It is widely documented that the marginal propensity to consume declines with income and wealth (see e.g. Dynan et al. 2004 for the US, Arrondel et al. 2015 for France and Späth and Schmid 2018 for Germany). Survey data show that one third of German households do not save, while the wealthiest save a very

Table 2: Interaction with wealth inequality

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Dependent variable: Change in Income Inequality | | | | | | |
| | 5-year change | | | 10-year change | | | |
| $\Delta$ Profit | -0.639*** | -0.581** | -0.930* | -0.778** | -0.850*** | -5.714*** | |
| | (-3.43) | (-2.16) | (-1.74) | (-2.18) | (-2.64) | (-16.01) | |
| $\Delta$ Profit*Wealth Inequality | 0.012*** | 0.012** | 0.019* | 0.015** | 0.016*** | 0.109*** | |
| | (3.31) | (2.30) | (1.82) | (1.99) | (2.70) | (16.80) | |
| Wealth Inequality | 0.0002** | | | 0.0003* | | | |
| | (2.12) | | | (1.80) | | | |
| $\Delta$ NFC Saving | | | | | | | -2.554*** |
| | | | | | | | (-12.76) |
| $\Delta$ NFC Saving *Wealth Inequality | | | | | | | 0.049*** |
| | | | | | | | (14.44) |
| Country FE | N | Y | Y | N | Y | Y | Y |
| Time FE | Y | Y | Y | Y | Y | Y | Y |
| Constant | -0.001 | 0.001 | -0.001 | 0.010 | 0.013* | 0.028*** | 0.034*** |
| | (-0.13) | (0.15) | (-0.17) | (0.97) | (1.75) | (8.50) | (12.55) |
| N | 273 | 273 | 64 | 164 | 164 | 27 | 24 |
| R2 | 0.201 | 0.246 | 0.293 | 0.190 | 0.315 | 0.988 | 0.990 |

Sources: OECD Sectoral National Accounts, WID, IMF staff calculations.
Note: Income inequality measured by top 10% income share, wealth inequality by the top 10% wealth share. Columns 12 and 45 use overlapping 5 and 10-year changes. Columns 34 and 67 use non-overlapping changes. T-statistics based on robust standard errors in parentheses.

high share of their income (see Börsch-Supan et al. 2006). As households with high MPC (in fact, close to one) experience a decline in disposable income (in relation to GDP) and households with low MPC the opposite, the average consumption/GDP ratio is bound to decline, boosting the aggregate private saving rate.

## 5.1 Correlation between corporate and overall private savings: macro-level patterns

Firms may have a motive to accumulate saving for precautionary reasons, especially to finance investment in innovation and intangible capital (see Falato et al. 2013; Adler et al. 2018). This business-driven motive for corporate saving, however, should be independent of the degree of ownership concentration. If, however, there are also strong tax incentives for shareholders to retain savings within the firm rather than have them distributed, then we should see a stronger correlation between corporate and overall private saving when wealth distribution is more concentrated. Two reasons underlie this prediction. First, a higher ownership concentration implies a higher incidence of closely-held firms (as opposed to arms-length shareholder-manager relationships), where the saving/investment behavior of the firm at least partly reflects personal incentives (especially tax incentives) of the largest owners rather than pure profit maximization. Indeed an established feature of the German corporate governance system is the high concentration of control (Becht and Boehmer, 2001; Faccio and Lang, 2002). Corporate savings would then partly reflect disguised savings of wealthy households. Second, high wealth inequality also implies high concentration of aggregate private savings among the wealthy: using German household survey data, Späth and Schmid (2016) estimate that 54-65 percent of aggregate saving is carried out by the top 10 percent wealthiest households. Therefore, by simple composition effect, aggregate private saving rates are more strongly driven by household saving behavior at the top when wealth concentration is high. Putting both arguments together: as corporate savings reflect to a large extent household saving at the top and, at the same time, private saving is driven by top savings when wealth is concentrated and firms are closely-held, the positive correlation between private saving and corporate saving should be stronger when wealth inequality is higher. We test this prediction in the following by regressing the private saving rate on the corporate saving rate and its interaction with measures of wealth inequality:

$$
\begin{aligned}
\Delta PrivateSavings_{ct} \quad = \quad & \alpha + \delta_t + \beta_1 \Delta NFCGOS_{ct} \\
+ \quad & \beta_2 \Delta NFCGOS_{ct} \times WealthInequ_c \\
+ \quad & \beta_3 WealthInequ_c + \varepsilon_{ct} \qquad\qquad (3)
\end{aligned}
$$

Results in Table 3 strongly support the prediction that with higher wealth inequality, overall private saving rates are more closely linked with corporate savings, as the interaction term between NFC saving and wealth inequality (measured either by top 10% wealth share or net wealth Gini coefficient) is positive and strongly statistically significant. This result, in turn, supports the view that at least part of the change in corporate saving over time is indeed disguised household saving when wealth is highly concentrated.

Figure 11 illustrates the empirical correlation between changes in NFC savings and changes in overall private savings. As indicated by the positive coefficient on the interaction term between corporate saving and wealth inequality, the positive correlation between corporate and private saving is driven by countries with relatively high wealth inequality, while it is significantly weaker for other countries.

These regression results imply that the impact of wealth inequality in driving the evolution of private saving is economically large. The rise in corporate saving, coupled with the level of observed wealth inequality can explain around 90 percent of the rise in private saving in Germany over 1999-2016 and one-third of the rise in the overall CA.

## 5.2  Correlation between corporate and household saving: micro-level patterns

Complementing the macro results, micro data analysis further supports the finding that concentration of wealth and saving in the top of the distribution in Germany is strongly driven by closely-held firms. Table 4 summarizes results of median re-

Table 3: Corporate savings and aggregate private savings

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Dependent variable: 5-year change in private saving rate | | | | | |
| NFC Saving Change*Top wealth share | 0.0113*** | | | 0.0113*** | 0.0113*** | 0.0117*** |
| | (10.68) | | | (10.30) | (7.54) | (6.49) |
| Top wealth share | 0.0547** | | | 0.0430 | | |
| | (2.45) | | | (1.64) | | |
| NFC Saving Change*Gini coef. | | 0.920*** | | | | 0.907*** |
| | | (9.60) | | | | (6.48) |
| Gini coef. | | 7.390 | | | | |
| | | (1.55) | | | | |
| Time FE | Y | Y | Y | Y | Y | Y |
| Country FE | N | N | N | Y | Y | Y |
| N | 110 | 71 | 81 | 110 | 71 | 81 |
| r2 | 0.562 | 0.564 | 0.483 | 0.585 | 0.575 | 0.543 |

Sources: OECD Sectoral National Accounts, WID, IMF staff calculations.
Note: NFC Saving change are 5-year non-overlapping changes in the gross saving rate of the non-financial corporate sector; t-statistics based on robust standard errors in parentheses. Regression constant included but now shown.

gressions with the net wealth to income ratio as dependent variable. The regression specification follows Quadrini (1999), modeling the wealth-to-income ratio as a long-term targeted level of wealth, relative to income, pinned down cumulatively by the steady-state saving rate of the household. The central finding of Quadrini (1999) as well as much of the literature on entrepreneurship and saving is that entrepreneurial households have a stronger wealth accumulation incentive and thus, a higher wealth-income ratio than non-entrepreneurial households with the same income level.

The regressions are performed on alternating samples with and without Germany. Quintile dummies refer to household income quintiles which are calculated on pre-tax income at the country level. Business owner is a dummy variable for households which have a controlling stake in a private business, that is, draw net profits from an

Figure 11: Correlation between corporate and overall private saving: the role of wealth inequality
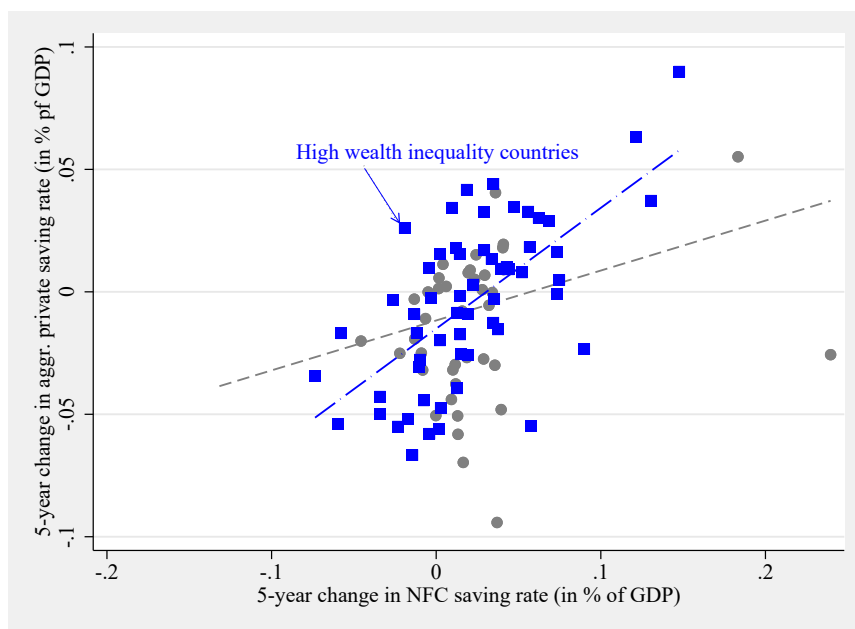


unincorporated enterprise, where household members "make the operational decisions affecting the enterprise, or delegate such decisions while retaining responsibility for the welfare of the enterprise". As the HFCS provides multiple imputed values to cover for item non-response via stochastic imputation, we follow the standard procedure to estimate model parameters from multiple imputed data and adjusts coefficients and standard errors for the variability between imputations.

The results in Table 4 reveal several interesting findings. First, higher income households in the Euro area have higher wealth-to-income ratio, consistent with their higher propensity to save documented in the literature (columns 1). Second, the wealth-income ratio increases more steeply across income quintiles in Germany than in other Euro area countries (column 2). Third, results in columns 3-4 indicate that, similar to the pattern elsewhere, households in the Euro area who own a business have a higher wealth level relative to income than non-business owning households. Fourth, the differential in wealth accumulation across business and non-business owning households is present across all income quintiles in other Euro area countries and is actually stronger for lower incomes, consistent with the notion of lower-income

Table 4: Wealth/Income profiles across income quintiles and business owner status

| | (1) DE | (2) EA excl. DE | (3) DE | (4) EA excl. DE | (5) DE | (6) EA excl. DE |
|---|---|---|---|---|---|---|
| | *Dependent variable: Net wealth/income ratio* | | | | | |
| Quintile 2 | 0.152 | 0.102 | 0.145 | .077 | .141 | -.036 |
| | [0.42] | [1.00] | [0.39] | [0.79] | [0.40] | [-0.36] |
| Quintile 3 | 0.979*** | 0.444*** | 0.942*** | .376*** | .970*** | .269*** |
| | [2.69] | [4.40] | [2.57] | [3.85] | [2.75] | [2.67] |
| Quintile 4 | 1.660*** | 0.825*** | 1.615*** | .689*** | 1.447*** | .694*** |
| | [4.71] | [8.26] | [4.54] | [7.11] | [4.21] | [6.85] |
| Quintile 5 | 2.824*** | 1.362*** | 2.551*** | 1.194*** | 2.573*** | 1.367*** |
| | [8.46] | [14.42] | [7.48] | [12.94] | [7.79] | [14.19] |
| | | | | | | |
| Age | -0.156*** | .057*** | -0.159*** | .028** | -.164*** | .020* |
| | [-3.81] | [4.93] | [-3.84] | [2.48] | [-4.19] | [1.77] |
| Age squared | 0.0023*** | 0.0007*** | .0024*** | .001*** | .002*** | .001*** |
| | [6.24] | [6.96] | [6.22] | [9.90] | [6.75] | [10.60] |
| Business owner | | | 1.345*** | 1.889*** | | |
| | | | [4.47] | [23.59] | | |
| Business owner x Q 2 | | | | | .558 | 4.553*** |
| | | | | | [0.56] | [18.29] |
| Business owner x Q 3 | | | | | .703 | 3.060*** |
| | | | | | [0.91] | [15.50] |
| Business owner x Q 4 | | | | | 3.417*** | 1.763*** |
| | | | | | [5.58] | [10.95] |
| Business owner x Q 5 | | | | | 1.230*** | .947*** |
| | | | | | [3.15] | [7.76] |
| N | 2350 | 40481 | 2350 | 40481 | 2350 | 40481 |
| sum_rdev | 5869.3 | 288426.1 | 5869.3 | 288426.1 | 5869.3 | 288426.1 |
| sum_adev | 5256.8 | 278849.5 | 5229.5 | 278019.9 | 5220.8 | 277921.9 |
| Pseudo R2 | 0.104 | 0.033 | 0.109 | 0.036 | 0.110 | 0.036 |

Notes: ***, **, * denote significance at the 1 %, 5% and 10% level respectively. T-statistics in brackets. Constant term is included but not reported.

entrepreneurs' stronger saving needs to overcome financial constraint. In Germany, the pattern is instead reversed: the wealth ratio differential is only statistically significant for households in the upper two quintiles, while business-owning households with lower incomes in Germany do not appear to save systematically more than non-business owning ones. This last result suggests that the saving motive for high-income business-owning households in Germany may be different than elsewhere.

Using the micro-level regression results, Figure 12 plots the estimated profile of wealth to income ratio across income quintiles in Germany versus elsewhere in the Euro area, separately for business owners with controlling stakes in private businesses

Figure 12: Wealth to income ratios across the income distribution in the Euro area and Germany (ratios relative to lowest income quintile)
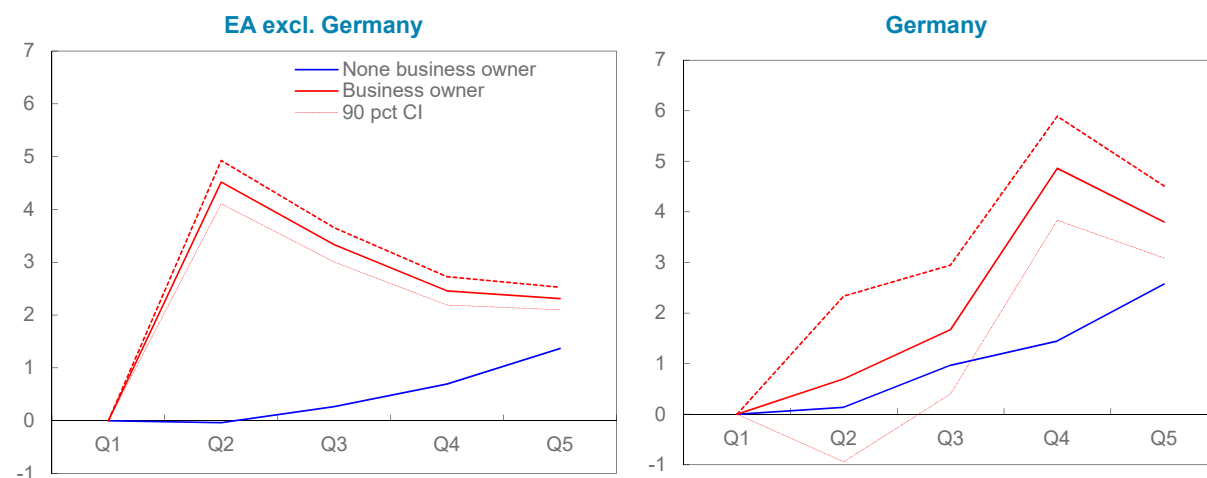


Sources: HFCF 2nd wave, and IMF staff calculations.

and the rest of the population. Differences in wealth/income ratios reflect (in steady state) differences in initial wealth endowments, income growth and most importantly, saving rates (Piketty and Zucman, 2014). Economic theory predicts that business owners will generally accumulate more wealth relative to incomes. However, the fastest accumulation occurs typically at lower levels of income, as entrepreneurs have less access to outside capital when revenues/incomes are relatively low (Quadrini, 1999), which is the pattern we observe elsewhere in the Euro area. In Germany, by contrast, the highest implied saving rates and saving differentials between business owners and non-owners occur toward the top of the income distribution. Therefore, not only is private saving highly concentrated in the top in Germany, it is particularly concentrated among rich business owners of closely-held firms where the boundaries between household and business savings are most prone to be blurred.

Finally, stepping back to the broader macro picture, while this paper has focused on the economic mechanism going from wealth inequality to higher private saving, it is clear that the relationship can not be a one-way street. Persistent, concentrated rise in private saving exacerbates wealth inequality over time. Wealth inequality itself widens with rising income inequality, especially if these income inequalities

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are sustained over a long period of time. As richer households have higher saving rates, top-biased income trends such as higher corporate profits naturally lead to higher saving rates by these households, which over time, lead to even more wealth accumulation at the top, exacerbating wealth inequality. In fact, the large body of literature on wealth inequality has shown that saving rates increasing in wealth is essential to match the tail of the empirical wealth distribution (see Benhabib and Bisin, 2018 for a survey of the literature). Taken together, our results imply that rising corporate and private saving rates, accruing to the top of the wealth distribution, are eventually associated with yet higher wealth inequality. The interaction between wealth inequality and private saving therefore goes both ways and is thus mutually reinforcing. Cross-country data on private saving evolution and wealth inequality bear this prediction out: In Figure 13, we find a strong positive correlation between long-term changes in private saving rates and the resulting level of wealth inequality (and a similar one using corporate saving rates). Variation in private saving evolution over the past 20 years explains over 23 percent the current cross-sectional variation in current wealth inequality across 27 countries in our sample.

# 6  Conclusion

What are the driving forces for Germany's rising private saving rates and its current account surplus over the last two decades? This paper argues that the structure of firm ownership and its distribution plays a key role for how the high corporate profits are mediated through the economy's flow of funds. The key takeaways can be summarized as follows:

- Trends in increasing corporate profits and gross savings have widened top in-
  come inequality, as corporations are typically owned by households in the top of
  the wealth distribution. The impact on income inequality is more pronounced
  in countries where the rise in profitability was a result of lower wage growth
  and labor income shares to start with, as was the case in Germany.

Figure 13: Correlation Between Long-run Change in Private Saving and Wealth Inequality
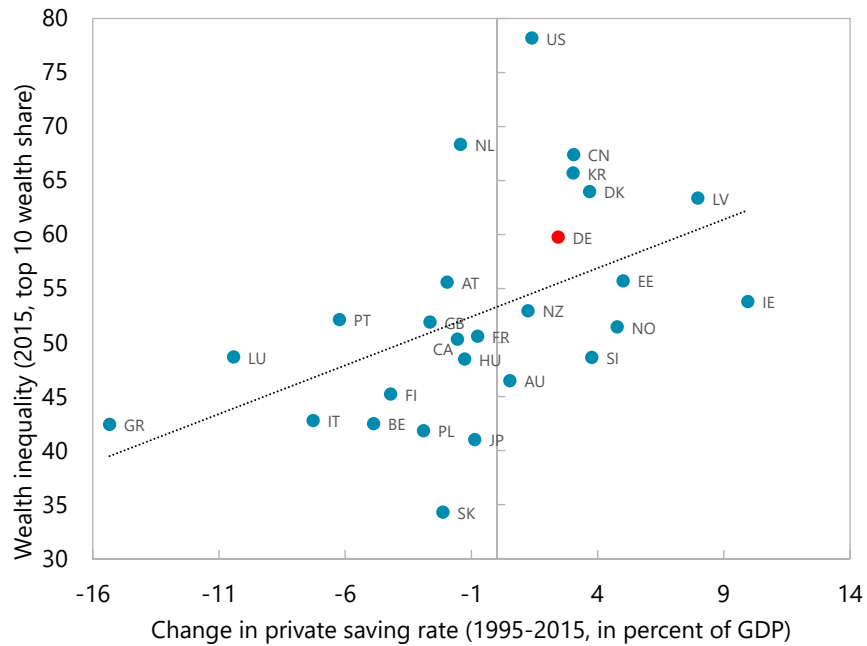


Sources: WID and OECD.

- The association between rising corporate profits and income inequality is stronger in countries with higher wealth inequality, where corporate ownership tends to be more concentrated among the wealthiest households.

- Richer households have higher propensity to save, so that higher corporate profits and savings (or any other top-biased income growth) are associated with increased aggregate private saving rates when corporate wealth is concentrated.

- The income-wealth inequality loops are self-reinforcing. Over time, top-biased income growth, reflected in rising private saving rates, results in even higher wealth inequality.

The analysis sheds light on the central role wealth inequality plays for macroeconomic adjustments and imbalances. Not only does wealth inequality affect the distribution of returns to capital and labor at the micro level, it is a powerful force shaping the macroeconomic adjustment to external shocks/secular trends, as illustrated with the

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case of German aggregate private saving (and by extension, current account balance) in response to rising corporate profitability.

While the paper focuses on the implications of wealth inequality for macroeconomic imbalances, it does not delve into the question of what are the fundamental determinants for German wealth inequality. That said, an important source for skewed wealth distribution is the low average rate of home and equity ownership in Germany. Household assets are therefore not diversified, with the bulk of savings by households below the top of the distribution stored in saving accounts bearing low (or even zero) deposit rates. While this may limit households financial vulnerabilities, the high risk/debt aversion and lack of portfolio diversification also hurts long-term prospects for wealth accumulation among large segments of the population. At the same time, privately-held and publicly-listed firm ownership is concentrated in the hands of wealthy families and institutional investors, a particular prevalent but less well-known feature of the German economy, and one that possibly reflects distortions in firm entry, financing conditions and tax incentives (see Franks and Mayer 2001; Peter, 2019).

Lastly, while this paper presents the general mechanism linking rising corporate profits with growing income inequality and private savings through the lens of the German experience, it is clear that the implications for other countries with different institutional characteristics would be equally interesting, and in some cases, potentially resulting in opposite outcomes. In fact, while rising profit shares/declining labor income shares and skewed wealth distribution have been documented for a majority of advanced economies over the last 15-20 years (Dao et al. 2020), the evolution of saving rates and current account balances have diverged strongly across these economies. A systematic analysis of the key country-specific factors interacting with the global trends in profit shares in shaping aggregate saving-investment imbalances is an important area for future research.

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