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Stefan Bach, Charlotte Bartels, Theresa Neef

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Authors

Stefan Bach
Deutsche Institut für Wirtschaftsforschung (DIW Berlin)
E-mail: sbach@diw.de

Charlotte Bartels
Deutsche Institut für Wirtschaftsforschung (DIW Berlin), Centre for Economic Policy Research (CEPR), Center for Economic Studies (CESifo)
E-mail: cbartels@diw.de

Theresa Neef
Halle Institute for Economic Research (IWH) – Member of the Leibniz Association, Department of Structural Change and Productivity, and World Inequality Lab
E-mail: theresabernadett.neef@iwh-halle.de

Editor

Halle Institute for Economic Research (IWH) – Member of the Leibniz Association

Address: Kleine Maerkerstrasse 8
D-06108 Halle (Saale), Germany
Postal Address: P.O. Box 11 03 61
D-06017 Halle (Saale), Germany

Tel +49 345 7753 60
Fax +49 345 7753 820

www.iwh-halle.de

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Abstract

This paper analyzes the distribution and composition of pre-tax national income in Germany since 1992, combining personal income tax returns, household survey data, and national accounts. Inequality rose from the 1990s to the late 2000s due to falling labor incomes among the bottom 50% and rising incomes in the top 10%. This trend reversed after 2007 as labor incomes across the bottom 90% increased. The top 1% income share, dominated by business income, remained relatively stable between 1992 and 2019. A large share of Germany's top 1% earners are non-corporate business owners in labor-intensive professions. At least half of the business owners in P99-99.9 and a quarter in the top 0.1% operate firms in professional services – a pattern mirroring the United States. From 1992 to 2019, Germany's top 0.1% income concentration exceeded France's and matched U.S. levels until the late 2000s.

Keywords: capital income, income distribution, labor income, top incomes

JEL classification: D31, E01, H2, H5, J3

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1 Introduction

Who benefits from economic growth? This question engages public discourse and policy decisions across the globe. Understanding how economic prosperity is distributed requires examining not only who benefits, but how they do so. The key lies in how different groups earn their incomes either from labor or capital and how this varies from the lowest to the very top income earner.

This study is the first to pursue this question for Germany since 1992 by combining personal income tax returns, household survey data, and national accounts, following the Distributional National Accounts method established by Piketty et al. (2018). We estimate not only the distribution of pre-tax national income from the bottom to the top 0.01% but analyze in detail the income composition for different groups along the income distribution.

Our new analysis of Germany's national income distribution from 1992 to 2019 reveals four major findings:

First, inequality of pre-tax national income increased until the late 2000s, due to declining real labor incomes of the bottom 50% and continuously rising labor incomes of the upper middle class (P90-99). The trend reversal after 2007 was brought about by rising real labor incomes in the bottom 99%, while top 1% incomes remained relatively stable throughout the entire period. The share of national income earned by the top 10% returned to 35% after a temporary peak in 2007; the share of the middle 40% increased from 43 to 45%, and the share of the bottom 50% declined from 22 to 20% with a temporary low point of 17% in 2007. Second, German top earners are owners of non-corporate businesses resembling the anatomy of US top incomes. At least half of the business owners in P99-99.9 and a quarter of those in the top 0.1% operate firms in labor-intensive field like legal, tax, auditing, IT and management or consulting services, as well as engineers and healthcare. Third, at the very top of the distribution, Germany shows similarly concentrated incomes as the United States. However, the composition of incomes across the distribution differs markedly. In Germany, the division between labor and capital income is more pronounced, with substantial capital income primarily confined to the top percentile. In contrast, the entire top decile in the United States earns significant

shares from capital ownership. Fourth, German top 1% earners are substantially older than the rest of the adult population and have become older since 1992, which reflects Germany's aging population. The share of top earners below 50 has declined from 40% in 1992 to 30% in 2019 (P99-99.9).

This paper contributes to the existing literature in multiple ways: We add a high-quality study to the growing literature on Distributional National Accounts (Blanchet et al., 2024, from here on DINA).[1] The DINA method allows for international comparison of inequality levels and trends due the link of micro data with internationally harmonized national accounts concepts (United Nations et al., 2009, SNA 2008). Our study is one of few that combine personal income tax returns with micro-level survey data, creating a highly representative microdatabase for the adult population, where each income component is reconciled with its official national accounts equivalent (see for other high data quality series Piketty et al. (2018) for the U.S.; Garbinti et al. (2018); Bozio et al. (2024) for France; Bruil et al. (2024) for the Netherlands; Bukowski et al. (2023) for Poland).[2] With our novel series at hand, we compare and re-assess the inequality trends of previous studies for Germany, that only relied on a subset of this paper's data sources like Bach et al. (2009), Bartels (2019), Bartels and Metzing (2019), Blanchet et al. (2022) and Drechsel-Grau et al. (2022).

The question of how to allocate retained earnings has become central to the debate about the DINA methodology (see, e.g. Auten and Splinter, 2024). Two

[1](Piketty et al., 2018; Blanchet et al., 2024) have established this framework to measure the distribution of national income as defined by the System of National Accounts (SNA). There is also an effort led by OECD and the European Commission, which is called EG DNA. See Coli et al. (2022) for EG DNA results for Germany and other countries for the year 2015. DINA and EG DNA differ in two major ways: First, DINA series combine household surveys and income tax data to estimate percentile distributions with even smaller fractiles at the top, while EG DNA use only survey data to estimate quintile shares. Second, DINA distributes incomes of all sectors to private households, while EG DNA is limited to the household sector. See Bartels and Waldenström (2020) for more details on the differences between DINA and EG DNA.

[2]The majority of DINA series employ a simplified approach of top-correcting household surveys using income tax tabulations – as personal income tax returns are often not available - and then uprating the top-corrected survey income distribution in broad categories to match national accounts. Examples are, among others, Ederer et al. (2022) for Austria, Guzzardi et al. (2023) for Italy, Novokmet et al. (2018) for Russia, Piketty et al. (2019) for China, Chancel and Piketty (2019) for India, and, last but not least, Blanchet et al. (2022) for 28 European countries. Researchers are also extending the DINA method to Latin American (De Rosa et al., 2024) and African countries (Chancel et al., 2023).

recent studies link personal incomes to retained profits via ownership registries and find that retained profits increase disproportionately at the top of the distribution (Bruil et al., 2024; Del Carmen et al., 2024). Hence, we carefully assess the robustness of our series towards alternative allocations of retained earnings, which are possibly useful strategies for other countries as well.

By showing that a large share of Germany's top earners are non-corporate business owners in labor-intensive professions, we reveal a common pattern in the top income structure shared between two of the richest industrial countries. While this phenomenon has been studied for the United States (Smith et al., 2019; Kopczuk and Zwick, 2020; Smith et al., 2023), our findings are the first to highlight the relevance of labor-intensive non-corporate businesses for top incomes in a European country. We document that business income from non-corporate firms is even more critical for top earners in Germany than in the United States, in contrast to France, where top incomes stem almost exclusively from corporations. The distinction between labor and capital income for top business incomes is challenging, especially in the case of non-corporate businesses with active owners. Yet, this distinction is crucial for the estimaton of a country's labor share given the magnitude of top 1% incomes – German top 1% earners receive 13% of national income. The magnitude of and reasons for the decline of the labor share – in the United States and globally – remain subject to debate (Karabarbounis and Neiman, 2014; Autor et al., 2020; Smith et al., 2022). Additionally, the structure of businesses is relevant for tax revenues because owner-managers exhibit large responses to changes in personal tax rates in the form of short-term intertemporal income shifting (Miller et al., 2024).

Our findings also document implications of aging populations for the distribution of national income.[3] In Germany today, 23% of the population is older than 65 years compared to 18% in the United States. We show that top earners, particularly non-corporate business owners, are older in Germany than in the United States. Almost 40% of non-corporate business owners are aged 50 to 59 and about 35% are older than 60 years in Germany compared to about 35% and 28%, respectively, in the United States. The age of business owners has been shown to affect economic

[3]This speaks to the literature on the effects of aging populations on inequality since Deaton and Paxson (1997). See, e.g., Dolls et al. (2019) for a recent study for Europe.

decisions: For example, older business owners are more likely to retain profits within the firm (Miller et al., 2024).

The remainder of this article is organized as follows. Section 2 introduces our data sources, income concepts and methodology. A particular focus lies on the allocation of national income components that are missing from one or both of our microdata sources, such as retained earnings. Section 3 presents our results for the distribution of pre-tax national income in Germany from 1992 to 2019. We decompose national income by income source for different groups along the income distribution and age groups and study the robustness of our series to different assumptions about the allocation of retained earnings. Section 4 zooms into the origin of top incomes asking if German top incomes are primarily the result of human capital income accruing to entrepreneurs or of financial capital income accruing to investors. Section 5 compares the German series to the distribution of pre-tax national income in France and the United States. Section 6 concludes. This paper is accompanied by a Data Appendix that documents the details of the German national accounts, income tax returns and survey data, our methodological procedures, assumptions and robustness checks.

2 Income concepts, data sources, and method

We combine individual tax return data, household survey data and national accounts to estimate the distribution of pre-tax national income from the bottom to the very top. Our analysis is based on the Distributional National Accounts method developed by Piketty et al. (2018) for the United States and generalized for implementation in other countries by Blanchet et al. (2024). The aim is to provide estimates for the distribution of national income that are harmonized over time and across countries. Yet, country-specific income data landscapes and economic structures require country-specific adjustments and modifications which we detail in this section and the extensive Online Data Appendix.

We first introduce the relevant income concepts and data sources for our analysis, then proceed to detailing how we combine different micro and macro data

sources to build an individual income database representative of the entire adult population in Germany.

2.1 Income Concept

This paper focuses on pre-tax national income. Pre-tax national income is gross market or factor income after the operation of the social insurance system, but before the operation of the tax-transfer system. Factor income comprises all forms of labor and capital income, including wages and salaries, self-employment and business incomes, dividends and interest as well as incomes from renting and leasing including owner-occupied housing rents. Under the assumption that all business and government incomes eventually flow to individuals, retained earnings of firms as well as government income are allocated to individuals as part of factor incomes. Given that pensioners (about 20% of Germany's population) often have minimal or no factor income, incorporating the social insurance system makes DINA estimates robust to demographic factors. Replacement incomes of the German social insurance systems such as old-age pensions, unemployment benefits (*Arbeitslosengeld I*) and sickness benefits (*Krankengeld*) are added and paid social insurance contributions subtracted. In aggregate, pre-tax national income equates to net national income.

2.2 Data sources

Germany is one of the few countries offering access to both the universe of personal income tax (PIT) returns and high-quality household survey data. We combine information of personal income tax (PIT) returns with SOEP survey data and then align our microdata base (PIT+SOEP) with national accounts. The combination of non-filers observed in SOEP survey data and tax-filers observed in PIT returns provide us with a dataset covering the entire income distribution from bottom to top.[4]

[4]PIT returns are the best possible coverage of top income earners. Household surveys often misrepresent top incomes, particularly underestimating the incomes of the top 1% (Bartels and Metzing, 2019).

PIT returns record incomes of the tax-filing population and are available through the federal statistical office on a triannual basis since 1992 (RDC of the Federal Statistical Office and Statistical Offices of the Federal States, DOI: 10.21242/73111.-(1992 - 2019).00.00.2.1.0). We use the stratified 10% sample with large oversampling at the top. The dataset provides detailed information on taxable income components of about 44 million tax units (2019). Tax units can be singles or jointly filing spouses. For joint tax filers, we equally split income between spouses to create individual incomes.

SOEP survey data record incomes of both the tax-filing and the non-filing population. We use the SOEP to supplement the PIT income distribution. More precisely, we identify tax units that are likely non-filers using microsimulation. SOEP is a representative annual survey of about 20.000 German households since 1984 recording information on socio-demographics, education, labor market status and detailed individual and household income sources (Goebel et al., 2019; Schröder et al., 2020). Additionally, SOEP provides distributional information on non-taxable components of national income, such as imputed rent, dividend and interest income below the savings allowanceâmissing from PIT returnsâand details on private insurance wealth.

National accounts in Germany are constructed by the federal statistical office following the European System of National Accounts. German National accounts detail labor, entrepreneurial and capital income aggregates by sector. However, capital income is computed as a residual in German national accounts by deducting employment income (D1), intermediate consumption, depreciation and net production taxes from output (P1) of the production account (Statistisches Bundesamt, 2016). The federal statistical office uses additional data sources, but not micro tax data, to assign respective shares of this residual to business incomes from sole proprietors and partnerships, interest and dividends from corporations. We are the first to compare and align a microdata base (PIT+SOEP) with the German national income components.

2.3 Estimating the distribution of national income with German data

Our main data source, personal income tax micro data, sheds light on the distribution of fiscal incomes and their components. In this section, we lay out how we, first, transform fiscal incomes into personal market incomes, and, second align these with national accounts.

In Germany, about 20% do not file tax returns in 2016.[5] The group of non-filers includes the unemployed, transfer recipients, pensioners with low pensions, and wage earners with no income other than wages.[6] In the first step, we supplement PIT data with non-filer observations we have identified in SOEP survey data. For this, we build on the algorithms developed by Bach et al. (2009) to construct tax units in the SOEP data and, then, identify non-filers based on their taxable income and income types.[7] After restricting our dataset to the adult population 20+, our micro dataset of personal income tax returns and SOEP survey data covers a population of about 67 million individuals and 60-63% of national income (see Appendix Figure A.3).

The second step is to align income components in our combined microdata (PIT+SOEP) with national accounts aggregates. This step requires detailed knowledge of the income tax legislation over time and the national accounts components. For example, the majority of German firms are pass-through entities whose profits appear as partnership or sole proprietorship incomes in personal income tax returns. Yet, some pass-through types are counted as quasi-corporations in national accounts and, hence, their income appears as corporate income in national accounts. Misalignments can arise due to tax exemptions, underreporting and retaining profits in the firms, which we discuss seperately for labor and capital incomes in the following. Table A.1 summarizes our alignment procedures.

[5] This share is about 30% in the 1990s.

[6] Payroll taxes are withheld at source by the employer so that income tax declaration is optional for employees. Hauck and Wallossek (2024) document adverse distributional effects of excess withholding so that non-filers – often low-income earners – often pay too much income tax in Germany.

[7] Bach et al. (2009) combined individual income tax returns with SOEP household survey data to obtain gross and net income distribution series for Germany 1992-2005.

2.3.1 Labor income

Labor income in tax returns is lower than national accounts aggregates due to three reasons. First, employers' social insurance contributions are not part of labor market income. We simulate them by applying the prevailing contribution rates to the observed labor incomes. Second, pensions are taxable to different degrees depending on the year of retirement. In PIT returns, we observe the taxable share of social insurance, occupational and private pensions. We recover the full amount by applying the prevailing taxable share. Last, CEO compensation is visible as employment income in tax returns but part of the distributed income of corporations (D42, S14) in national accounts. We resolve this conceptual mismatch by moving the aggregate of CEO compensation from the latter to the former at the national accounts level.[8]

2.3.2 Capital income

Capital income in PIT returns is lower than national accounts aggregates due to three reasons. First, certain components, such as imputed rents of homeowners, dividend and interest income under the saver's allowance, are tax-exempt. We predict these components in our combined microdata (PIT+SOEP) information using logit and OLS regressions based on the SOEP survey data, which record all of the above. Second, retained earnings and returns to private health, life, and pension insurance policies are part of capital income in the national accounts, but do not show up as income in PIT data.

We impute private insurance income (i.e., returns to private insurance policies) drawing on the incidence and value of private insurance wealth across the income distribution recorded in the wealth samples of SOEP survey data (2002, 2007, 2012, 2017). We distribute private insurance income according to the distribution of insurance wealth.

[8]In 2001, the German fiscal court set a ceiling for CEO compensation by sector to mitigate hidden profit distribution. To estimate the total of CEO compensations (the national accounts aggregate, D423, S14, is not provided by the statistical office), we use these ceilings and multiply the sector-weighted average of CEO compensation with the number of limited liability companies (*GmbHs*) in each year. We estimate that CEO compensations amount to about 43 billion Euro in 1992 and 105 billion Euro in 2013.

The question of how to distribute retained earnings has become central to the debate about the DINA methodology by Blanchet et al. (2024) (see, e.g. Auten and Splinter, 2024). The incidence of retained earnings is a challenge in settings where corporate shares are indirectly held through investment funds or different corporate layers. For example, German partnerships or sole proprietorships often hold shares in corporations so that the retained profits – if distributed – will appear as profit of a partnership or sole proprietorships.[9] Two recent studies for the Netherlands and Honduras have linked personal incomes to retained profits via ownership registries. Both studies have shown that retained profits increased disproportionately when moving to the top of the distribution so that the proportional method proposed by Blanchet et al. (2024) underestimated income concentration (Bruil et al., 2024; Del Carmen et al., 2024). In our benchmark estimates, we distribute the national account aggregate of retained earnings proportional to received dividends from corporations and profits from partnerships.

We briefly sketch Germany's business structure to explain our decision on how to distribute retained earnings. Throughout this paper, we distinguish between corporate (limited liability and public companies) and non-corporate (partnerships and sole proprietorships) businesses. Corporations distribute dividends and can retain earnings. Partnerships and sole proprietorships are pass-through entities, i.e., profits are distributed and taxed at the personal tax rate of the shareholder.[10] Appendix Figure A.2 illustrates that dividends are received either directly from a corporation or indirectly as profits from a non-corporate business that holds shares in a corporation. These indirectly held corporations can either distribute profits - which will appear as part of business income in German income tax returns – or retain earnings. Unlike in the United States and most other countries, German partnerships can also retain earnings. For example, the *GmbH & Co KG* can retain profits

[9]We observe the dividends received indirectly via partnerships and sole proprietorships in the PIT data.

[10]Because of their limited liability element, national accounts classify partnerships like *KG* and *OHG* as *quasi-corporations* and include their incomes in the corporate sector of German national accounts. Note that PIT returns count high-stake investments in corporations (ownership share of at least 1%, *wesentliche Beteiligung* as business income. We are currently working with the statistical office how to identify these investments.

since the general partner (with unlimited liability) is a limited liability corporation (*GmbH*) and, thus, not a pass-through entity.[11]

In our benchmark scenario, we distribute retained earnings to all shareholders of partnerships because we cannot differentiate between different types of partnerships in PIT returns. Given the quantitative relevance of how retained earnings are assumed to be distributed, we devote an entire subsection of Section 3.3 to the robustness of our series towards varying assumptions. Recent studies indicate increasing concentration of retained earnings at the very top. Hence, our benchmark assumption is likely to be a lower bound to income concentration.

2.3.3 Alignment

Even after aligning micro-level incomes with national accounts concepts as closely as possible, gaps remain for some components.[12] Appendix Figures A.4 and A.5 show the micro-to-macro ratios for the components of pretax income. While labor income aligns well, imputed rent and rental income are systematically lower in national accounts than in our microdata (PIT+SOEP). These gaps are due to conceptual differences between the System of National Accounts (United Nations et al., 2009) and personal market incomes. We align micro and national accounts data by proportionally adjusting to observed income in our microdata (PIT+SOEP), keeping the observed distribution unchanged.

[11] Appendix Figure A.1 illustrates the particular construction of the *GmbH & Co KG*. The limited partnership (*Kommanditgesellschaft - KG*) has a general partner who is fully liable and a limited partner who is only liable for his capital contribution. In case of the *GmbH & Co KG*, the general partner is a previously established limited liability corporation (*GmbH*), which is usually held by the owners, who are also limited partners. As a partnership, i.e., a pass-through entity like the limited partnership (*Kommanditgesellschaft - KG*), profits are considered as non-corporate business income which is subject to personal income tax.

[12] Bach et al. (2009) also find significant discrepancies between their microdata-based aggregates and national accounts.

3 Distribution of national income Germany, 1992-2019

In this section, we present our main results on the distribution of pre-tax national income in Germany from 1992 to 2019. Table 1 reports the income thresholds, average incomes and income shares of five groups in the income distribution for 2019. Average income of adult population (20+, 67 million individuals) was about 44,000 Euro. The bottom 50% earned about 18,000 Euro, i.e., less than half of average income of the full population. Their income share was about 20% of national income. Moving to the top of the income distribution reveals a very skewed income distribution. Within the top 1%, incomes are almost equally split between the lower 0.9% (P99-99.9) and the top 0.1%, whose income shares are 7.2% and 5.7%, respectively. Within the top 0.1%, the same pattern emerges between the lower 0.09% (P99.9-99.99) and the top 0.01%, whose income shares are 3.1% and 2.6%, respectively. The top 0.01% comprises a group of around 6,700 individuals, whose income amounts to at least 4 million Euro and who earned, on average, nearly 12 million Euro in 2019.

Figure 1 presents the pre-tax national income shares between 1992 and 2019 for the bottom 50%, middle 40% (P50-90) and top 10% as well as the top 1% (about 670,500 individuals in 2019), 0.1% (about 67,000 ind.), and 0.01% (about 6,700 ind.).

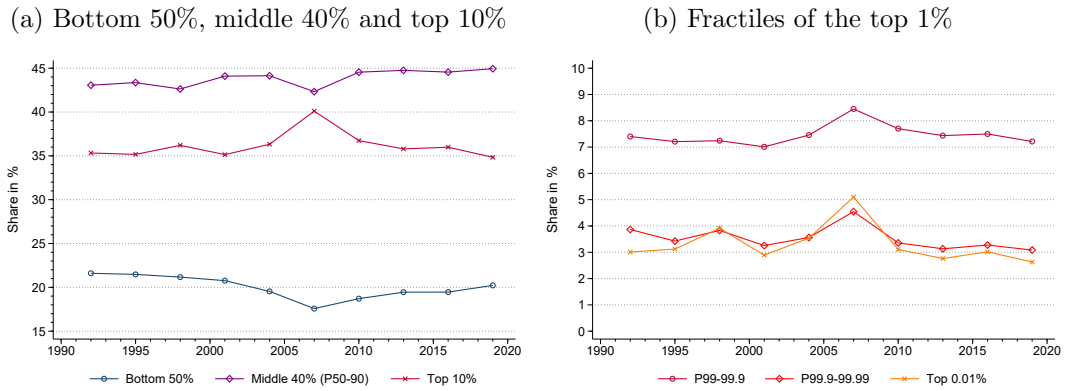
The bottom 50% income share in Germany declined from 22% in 1992 to about 17% in 2007 and increased to 20% in 2019 (Figure 12a). Previous studies like Bartels (2019); Drechsel-Grau et al. (2022) have also documented a decline of the bottom

Table 1: Pre-tax national income by income group, 2019

Income Group	Number of adults	Income Threshold	Average Income	Income Share
Full population	67,058,408		43,988€	100%
Bottom 50%	33,529,337		17,791€	20.22%
Middle 40%	26,823,435	33,372€	49,425€	44.94%
P90-99	6,035,052	77,283€	107,066€	21.91%
P99-99.9	603,526	214,119€	352,573€	7.21%
P99.9-99.99	60,351	860,443€	1,508,009€	3.09%
Top 0.01%	6,707	3,927,538€	11,567,306€	2.63%

Note: Population aged 20+. Pre-tax national income in current prices.

Figure 1: Distribution of pre-tax national income, 1992-2019



Note: Population aged 20+. Pre-tax national income.

50% income share until 2007, but have not found a rebound effect thereafter. While our DINA approach based on pre-tax national income takes the entire population into account including marginally employed, unemployed and pensioners with their respective insurance incomes, Drechsel-Grau et al. (2022) focus on social security-liable individuals between 25 and 55 years old and exclude individuals with zero market income. We further discuss explanations for differences to previous series in Appendix Section B. In the next section, we investigate further the drivers of the observed evolution by decomposing pre-tax national income into its components.

3.1 Breakdown by income source

Decomposing pre-tax national income by income source offers insights into heterogeneous income growth dynamics. Figure 2 presents the evolution of pre-tax national income per capita from 1992 to 2019. Pre-tax national income per capita increased from about 33,000 Euro in 1992 to about 42,000 Euro in 2019 (in prices of 2015).

Wages and salaries (including social insurance benefits net of contributions) almost stagnated in real terms at around 20,000 Euro between 1992 and 2007, increasing only after 2007 to reach approx. 25,000 Euro in 2019. In 2019, about 60% of pre-tax national income stem from gross wages and net social insurance benefits. Partnership income contributes almost 4% and sole proprietorship income about 5% to pre-tax national income. Compared to countries like France and the United States (see Section 5), dividends and interest income play a minor role in Germany.

Dividends represent less than 2% of pre-tax national income throughout the period. Germany has relatively few publicly traded companies and a low aggregate market capitalization.[13] Declining interest rates have depressed interest income so that the share of net interest income, i.e., received interest after deducting mortgage interest payments, went down from 2.3% to 0.3% between 1992 and 2019.

Since the early 2000s, retained earnings became increasingly relevant in Germany. Retained earnings attributed to households ranged from 3% of pre-tax national income in 1992 to 6.6% in 2007, before stabilizing at around 4.5% in the 2010s.[14] Figure 2 illustrates that retained earnings peaked in 2007, coinciding with Germany's current account surplus hitting its peak.[15] Corporate savings have risen globally in recent decades (Chen et al., 2017), emerging as a key driver of current account surpluses. Klug et al. (2022) attribute the joint dynamics of excess corporate saving and Germany's current account surplus primarily to labor supply, world demand, and financial friction shocks.

The rather smooth increase of pre-tax national income per capita hides substantial heterogeneity in income dynamics across the income distribution. Figures 3 and 4 display average pre-tax national income and its composition for different groups along the income distribution.

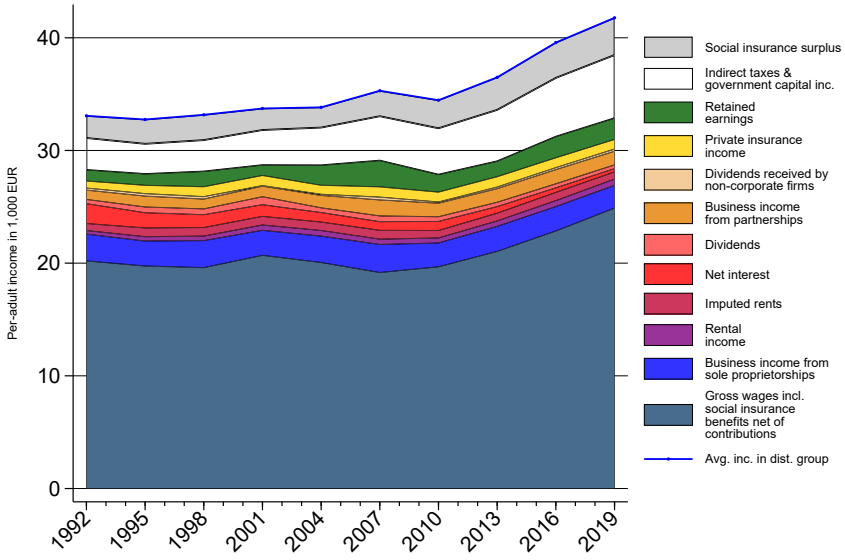
Figure 3 provides the income composition of the bottom 50% (left-hand graph) and the middle 40% (P50-90, right-hand graph). For the bottom 90%, incomes largely consist of gross wages and salaries (between 67 and 77% of overall per-adult income for the bottom 50% and between 65% and 72% for the middle 40%). Between 1992 and 2007, the income dynamics were, however, remarkably different for the two groups: Pre-tax national income of the bottom 50% dropped from about 14,300

[13]According to DB Research (2024), Germany ranks last among the large European markets, with only 5 firms per million inhabitants. In contrast, Nordic and Baltic countries host 41 publicly traded companies per million people, followed by Switzerland and the UK. This translates to a low market capitalization in terms of GDP in Germany of 50% compared to 100% in the UK and more than 200% in Switzerland.

[14]This share only includes retained earnings that we attribute to the household sector. We split the aggregate of retained earnings (before tax, B5n, S11+S12) into a share attributed to households and another attributed to the government (included in government capital income) based on the aggregate ratio of equity and investment fund shares held by each sector (see Data Appendix).

[15]Goldbach et al. (2024) estimate that Germany's current account and, thereby, retained earnings are overestimated by about 5% because the share of retained earnings belonging to international small-scale portfolio investors is treated as domestic savings in current accounts.

Figure 2: Pre-tax national income per adult by income source



Note: Population aged 20+. Pre-tax national income per capita in 1,000 Euro (2015 prices). Pre-tax national income comprises all market incomes after deducting social insurance contributions and adding social insurance benefits (pensions & unemployment benefits). Private insurance income comprises returns on private insurance policies.

to about 12,400 Euro, while pre-tax national income of the middle 40% slightly increased from 35,600 Euro to 37,400 Euro. The bottom 50%'s income decline stems from a sharp drop in real wages at the lower end of the wage distribution since the 1990s, a trend widely documented in the literature (see, e.g., Dustmann et al., 2009; Card et al., 2013; Dustmann et al., 2014).[16] The years 2007 and 2008 marked a turning point after which low wages resumed to grow. Brüll and Gathmann (2020) stress the introduction of sector-specific minimum wages as drivers of wage growth in the lower tail of wage distribution. Minimum wages were first introduced in small industries in the late 1990s. However, only after 2007 did large sectors-such as temporary agency work, building cleaning, and care and nursing-adopt minimum wages. The most significant change came in 2015 with the national minimum wage,

[16]Dustmann et al. (2009) find that between 1995 and 2004, de-unionization can account for 28% of the rise in inequality at the lower end of the wage distribution. Dustmann et al. (2014) discuss the decentralization of wage setting process, declining union coverage and the credible threat to relocate production to low-wage countries in Eastern Europe. Card et al. (2013) find that the increasing dispersion of West German wages has arisen from a combination of rising heterogeneity between workers, rising dispersion in the wage premiums at different establishments, and increasing assortativeness in the assignment of workers to plants. Additionally, Drechsel-Grau et al. (2022) point at rising unemployment spells at the bottom of the wage distribution as an explanation for declining income until 2007.

which was set at 8.50 Euro per hour in 2015 and subsequently raised to 9.19 Euro by 2019.

Figure 4 depicts the income composition of the top decile – split into the lower 9% of the top decile (P90-99, left-hand graph) and the top 1% (right-hand graph). The income composition of the lower 9% of the top decile closely mirrors that of the bottom 90%, with labor income dominating. Yet, two differences to the evolution in the bottom 90% are noteworthy: First, wages and salaries of the P90-99 continuously expanded, even between 1992 and 2007, when wages of the middle 40% stagnated. Second, a larger share of pre-tax national income stems from non-labor incomes, mainly business incomes from sole proprietorships and interest, and, to a smaller extent, partnership incomes and dividends. Between 1992 and 2019, real average income per adult of the lower 9% expanded from approx. 77,400 Euro to 101,700 Euro (in 2015 prices).

The top percentile's income composition is profoundly different from the bottom 99%. In 2019, gross wages and social insurance benefits net of contributions represent less than 25% of this group's average income. 18% of top incomes stems from closely held partnerships, dividends add 6% and sole proprietorships another 9%. Retained earnings, which we distribute to both partnerships and corporations (see Section 2.3.2), contribute 26%. The share of sole proprietorship income has decreased from about 19% in the early 1990s to 9% in 2019, while the share of partnership income has increased. A similar decline is visible in net interest income from 12% in 1992 to less than 1% of this group's income in 2019.

Top incomes in Germany remained relatively stable between 1992 and 2019, particularly from non-corporate businesses (partnerships & sole proprietorships). This pattern might reflect high persistence rates of individuals in top income fractiles, which are found to be higher than in Canada, France, and the United States (Jenderny, 2015; Drechsel-Grau et al., 2022).[17] The top percentile's income peak in 2007 coincided with strong global and German economic growth (both around 4% in 2006-2007) and Germany's current account surplus peak, boosting corporate

[17] A picture of persistence also emerges when looking at the value of family firms by their founding year. The most valuable German firms today were founded during rapid industrialization between 1850-1914 (Appendix Figure A.6).

savings Klug et al. (2022). Additionally, a 2008-2009 business tax reform likely inflated 2007 partnership incomes. This reform reduced corporate dividend taxes but increased partnership income taxes (see Appendix Table A.3), likely prompting income shifting to 2007 before the 2008 tax increase. As Miller et al. (2024) show for the UK, owner-managers exhibit large responses to changes in personal tax rates in the form of short-term intertemporal income shifting.

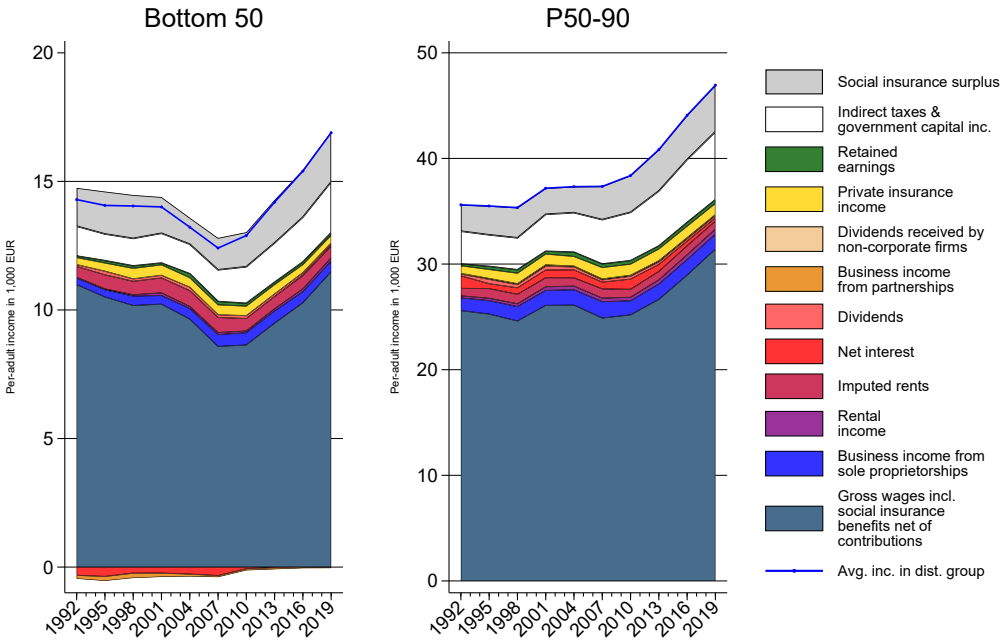
The importance of partnerships for Germany's top income earners reflects Germany's particular business structure. Even among Germany's largest firms, almost 30% are non-corporate businesses, mostly partnerships, and 55% corporations (40% limited liability companies and 15% public companies, see Appendix Figure A.12).[18]

At the very top of the German income distribution (top 0.1%), about 50% of pre-tax national income stems from partnerships (incl. their retained earnings) (see Appendix Figure A.9). While business income from pass-through structures like partnerships is also the primary source of income for top incomes in the United States, French top incomes predominantly stem from dividends from corporations (Garbinti et al., 2018; Smith et al., 2019; Kopczuk and Zwick, 2020; Smith et al., 2022). We will further discuss these differences and potential implications for income concentration in Section 5.

Ownership of German top partnerships is concentrated. Among German partnerships with profits exceeding 2.5 million Euro in 2007 (around 6,500 partnerships), about two-thirds were owned by 2 to 4 shareholders (left-hand graph of Appendix Figure A.7). About 30% of the income of these top partnerships was distributed to 3 or 4 shareholders and another 30% to only 2 shareholders (right-hand graph of Appendix Figure A.7). This means that, for example, owning a partnership in Germany with up to 3 shareholders and earning more than 2.5 million Euro, immediately puts the owner into the top 0.1%, which started at about 860,000 Euro in 2019.

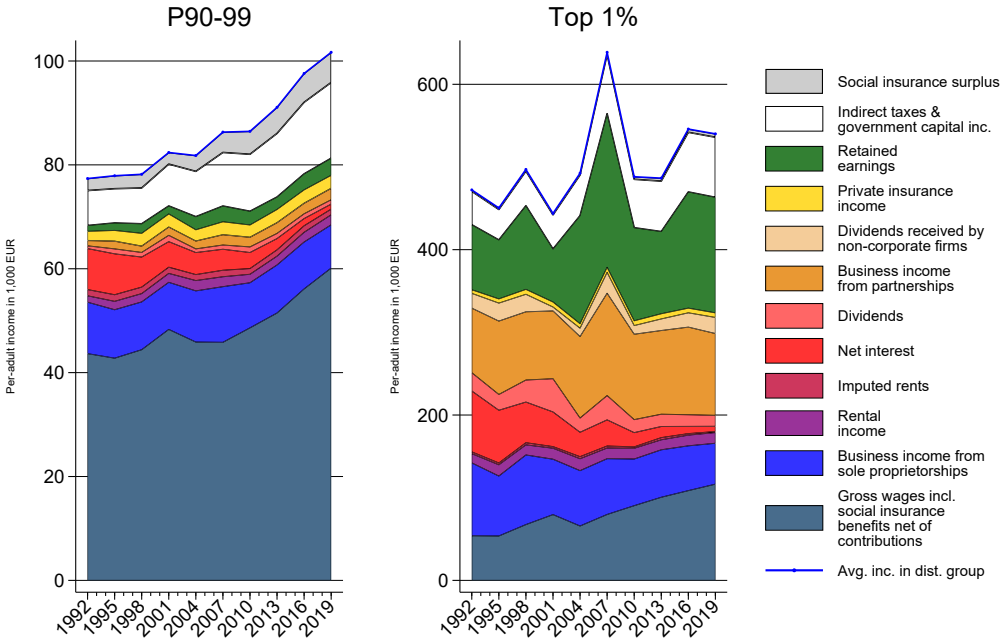
[18]This structure has been very stable over time, as shown in Appendix Figure A.12. At the top of the sales distribution, public companies generate a third of total sales although representing only 15% of the firms. Partnerships also feature importantly at the top of the sales distribution, generating more than 20% of total sales and representing about a third of the firms. Between 1992 and 2019, corporate forms (limited liability companies (*GmbH*) and public companies (*Aktiengesellschaften (AG)*)) have gained importance compared to non-corporate forms (partnerships, incl. *KG*, *OHG*, *GmbH & Co KG*, *GbR*) and sole proprietorships).

Figure 3: Pre-tax national income per adult by income source, Bottom 90%



Note: Population aged 20+. Pre-tax national income per adult in 1,000 Euro (2015 prices). Pre-tax national income comprises all market incomes after deducting social insurance contributions and adding social insurance benefits (pensions, sickness and unemployment benefits).

Figure 4: Pre-tax national income per adult by income source, Top 10%



Note: Population aged 20+. Pre-tax national income per adult in 1,000 Euro (2015 prices). Pre-tax national income comprises all market incomes after deducting social insurance contributions and adding social insurance benefits (pensions, sickness and unemployment benefits).

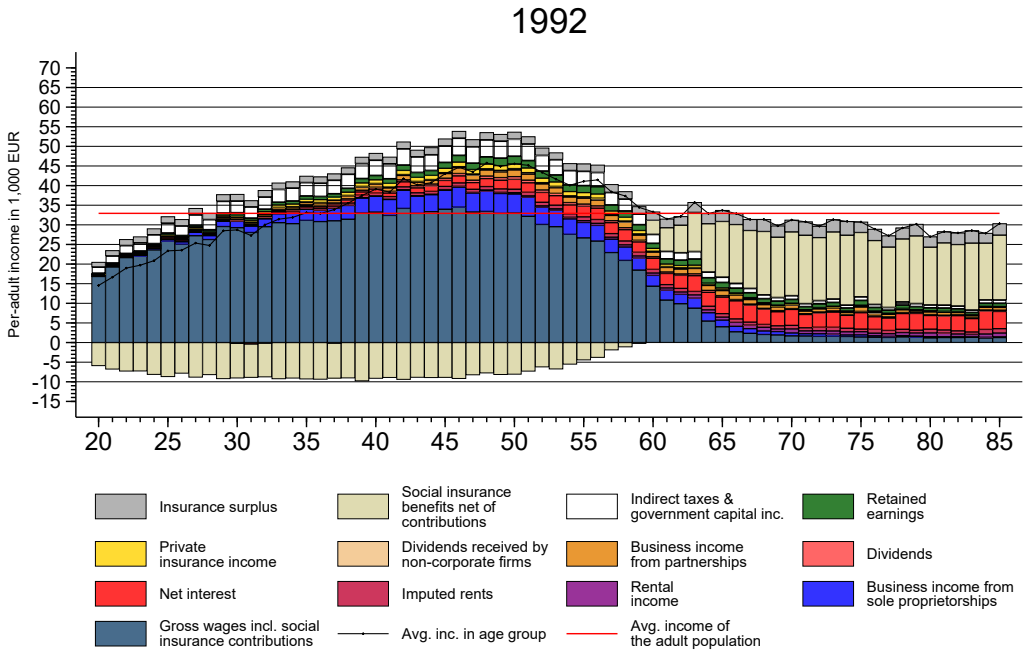
Several features of the German tax system historically incentivized the creation of partnerships over corporations.[19] Until today, the tax burden on partnership profits is slightly lower than on corporate profits, but tax reforms in 2008 and 2009 have almost eradicated the tax advantage. Appendix Table A.3 compares the tax burden on an exemplary profit of 100 Euro across the different tax regimes prevalent during our period of study for a partnership and a corporation. Taking into account all types of taxes like local business tax, corporate tax, income tax and solidarity surcharge, and assuming a distribution rate of 100%, the pre-tax profit of 100 Euro converts into 51.67 Euro post-tax profit if the firm is a corporation or 52.56 Euro if the firm is a partnership. Additionally, partnerships hold further advantages: The most prominent partnerships like *KG* and *GmbH & Co KG* feature a form of limited liability. While all limited liability firms must publish their balance sheets, limited partnerships like *KG* only have to disclose their balance sheets if no natural person is liable. Finally, partnerships are exempt from inheritance and gift taxation if the recipient's share exceeds 1%, while a tax-exempt transfer of corporate shares is restricted to recipients of shares exceeding 25%.

3.2 Breakdown by age

Figures 5 and 6 display the distribution of pre-tax national income by age for the first and last year of our period, 1992 and 2019. Several findings are worth noting. First, we see a typical inverse u-shape of lifetime income that peaks between 40 and 50 and then declines after age 55. Second, sole proprietorship and partnership income gains importance in the late 30s. While average wages decline quickly after age 55, sole proprietorship and partnership income decline much slower and remain important even after the official retirement age.

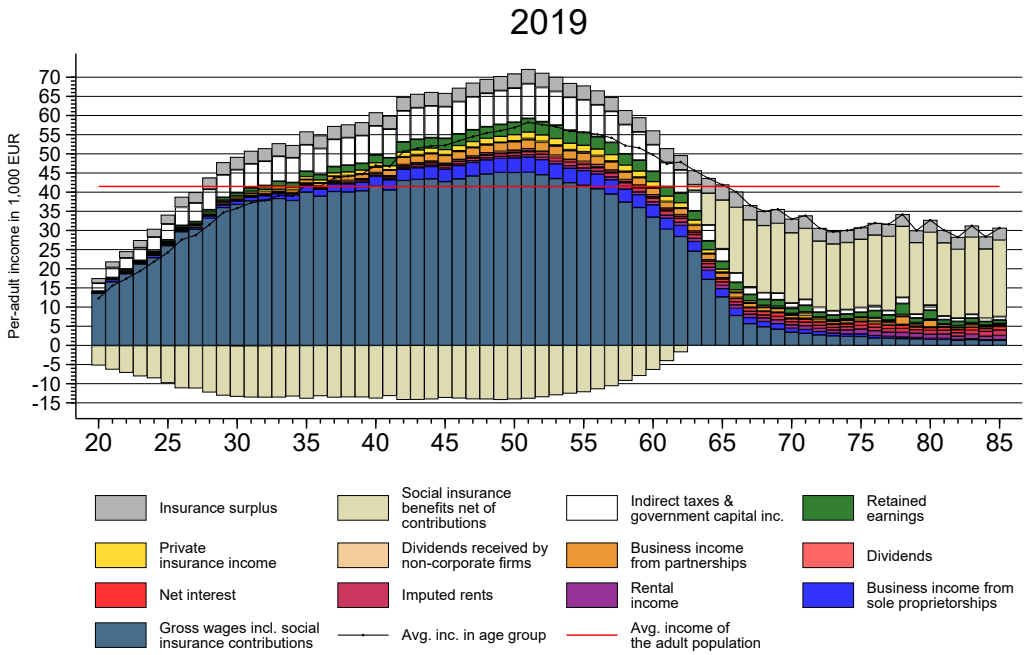
[19]The introduction of modern income taxation in Prussia in 1891 also introduced corporate taxation, which taxed corporate shareholders twice at the corporate and at the personal level. The landed elites in Prussia utilized the tax reform to consolidate their economic and political power against the new industrial elites (Mares and Queralt, 2020). Since 1934 the Nazi regime incentivized the conversion of corporations into partnerships through corporate tax reforms to fight the *anonymous capital* of corporations (Banken, 2018, p.406). As a consequence, the number of corporations fell by two-thirds between 1933 and 1939 (see Data Appendix Section 6 of Albers et al. (2022) for further elaborations). The large wealth levy from 1952 (*Lastenausgleich*) and post-war wealth and inheritance taxes in Germany assessed firms at book values, which lowered the tax base compared to listed firms being evaluated at market values.

Figure 5: Pre-tax national income per adult by age and income source, 1992



Note: Population aged 20+. Pre-tax national income per adult in 1,000 Euro (2015 prices). Pre-tax national income comprises all market incomes after deducting social insurance contributions and adding social insurance benefits (pensions, sickness and unemployment benefits). Private insurance income comprises returns on private insurance policies.

Figure 6: Pre-tax national income per adult by age and income source, 2019



Note: Population aged 20+. Pre-tax national income per adult in 1,000 Euro (2015 prices). Pre-tax national income comprises all market incomes after deducting social insurance contributions and adding social insurance benefits (pensions, sickness and unemployment benefits).

Third, from age 20 to 60, the average German is a net contributor to the social insurance system and, then, becomes a net recipient. Fourth, retiree income has moved further away from the average income (red line) between 1992 and 2019. Net interest income contributed a sizable portion of average retirement income in 1992 but is hardly visible in 2019.

3.3 Robustness towards alternative retained earnings distributions

Estimating DINA involves many assumptions with potentially large effects on levels and trends of income inequality. This subsection reviews the robustness of our series towards testable alternative assumptions. Retained earnings have been in the focus of recent studies like Alstadsæter et al. (2023); Bruil et al. (2024); Del Carmen et al. (2024) criticizing the recommendations of the DINA guidelines by Blanchet et al. (2024).

In our benchmark scenario, retained earnings are distributed proportionally to distributed profits received by shareholders of corporations and partnerships. While the proportional distribution follows the DINA guidelines by Blanchet et al. (2024), we deviate by also distributing retained earnings to shareholders of partnerships given that German tax law allows partnerships to retain earnings. Three studies have linked personal incomes to retained profits via ownership registries. Bruil et al. (2024) and Del Carmen et al. (2024) find for the Netherlands and Honduras, respectively, that retained earnings increased disproportionately when moving to the top of the distribution. This means that the proportional method proposed by Blanchet et al. (2024) underestimated income concentration. In their current versions, these studies do not provide enough detail for us to leverage in order to formulate a scenario how to disproportionately distribute retained earnings. Alstadsæter et al. (2023) find for Norway that distributed profits perform well as a proxy for retained earnings in boom years, but not in recessions.

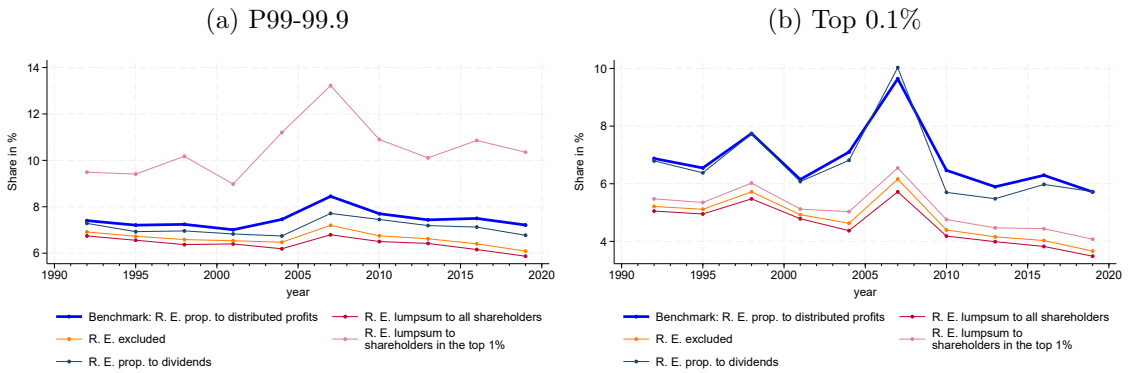
Figure 7 presents the evolution of the top percentile's income share from 1992 to 2019 (split into the group P99-99.9 and Top 0.1%) when varying the assumptions

how retained earnings are distributed. We compute alternative scenarios inspired by those of Alstadsæter et al. (2023):[20] (1) We discard retained earnings, i.e., we compute the top 1% income share excluding retained earnings from both the numerator and the denominator. Contrasting this scenario with the benchmark scenario reveals the cyclicality of retaining earnings. (2) We distribute retained earnings lumpsum to all shareholders of partnerships or corporations. (3) We distribute retained earnings lumpsum to all shareholders of partnerships or corporations in the top 1%. (4) We distribute retained earnings only to shareholders of corporations, i.e., recipients of dividend income, which is closer to the strategy of Piketty et al. (2018) for the United States and Garbinti et al. (2018) for France.

Several findings are noteworthy: First, distributing retained earnings lumpsum to shareholders of the top 1% reduces the top 0.1% by about 2%-points and increases the P99-99.9 share by 2 to 4 percentage points. However, this scenario does not seem likely given the findings for the Netherlands and Honduras that retained earnings are even more concentrated than distributed profits. Second, excluding retained earnings reveals lower income concentration (reducing the top 0.1% by about 2%-points) and some cyclicality of retaining earnings, particularly in the boom years 2004 and 2007, where retained earnings peaked. Third, distributing retained earnings proportionally to dividends only as Piketty et al. (2018) for the United States and Garbinti et al. (2018) for France produces very similar shares compared to our benchmark scenario. This means that the distribution of dividends is similar to the distribution of partnership profits. We conclude that our benchmark scenario likely constitutes an upper bound in the absence of knowledge about a potentially increasing role of retained earnings when moving to the top of the German income distribution.

[20] See Alstadsæter et al. (2023, figure 11).

Figure 7: Pre-tax national income shares varying the distributional assumptions for retained earnings



Note: Population aged 20+. Pre-tax national income. For income shares of the bottom 99%, see Appendix Figures A.8.

4 Top incomes: financial vs. human capital

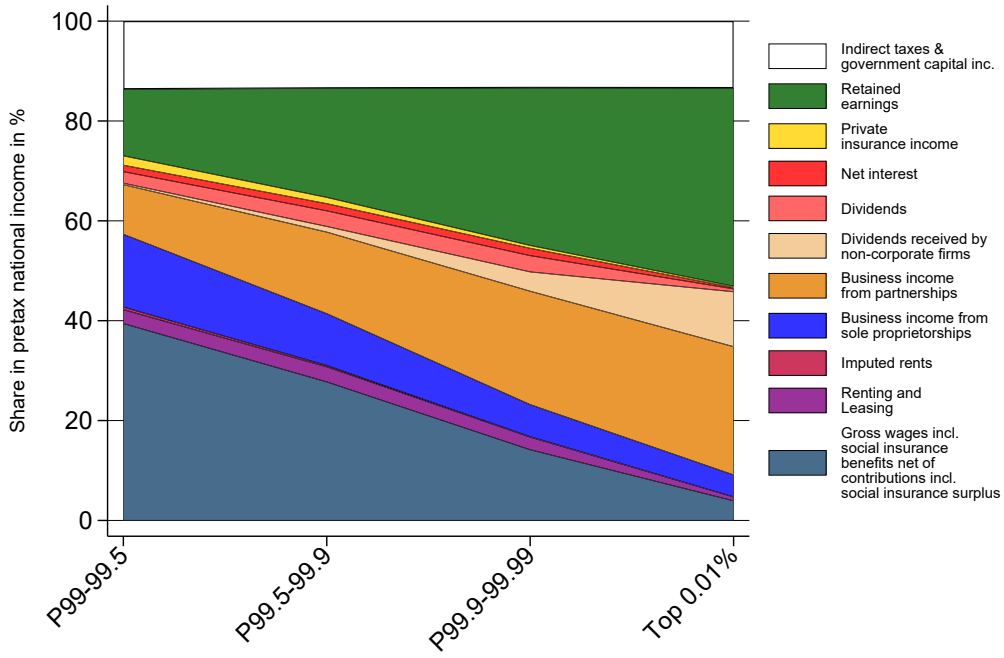
So far, our results have revealed that German top incomes predominantly stem from non-corporate businesses like partnerships and sole proprietorships. In contrast, dividend incomes from corporations play a minor role (see, e.g., Figures 4 and A.9). This pattern holds across the top percentile and becomes even more pronounced at the very top, as Figure 8 shows. Moving from the lower threshold of the top percentile to the top 0.01%, wages and sole proprietorship income loose importance at the expense of a rising share of partnership income and retained earnings in partnerships and corporations. Profits from partnerships represent 30% of income for the top 0.01%. While dividends received by individual tax payers remain marginal, dividends received via non-corporate firms (partnerships or sole proprietorships) become sizable at the very top, representing 10% of overall income.[21]

We now ask, in the spirit of Smith et al. (2019), if these top incomes from non-corporate business income like partnerships and sole proprietorships are primarily the result of human capital income accruing to entrepreneurs or of financial capital income accruing to investors.[22] While researchers are – up to this date – not allowed

[21]The relevance of dividends received via non-corporate businesses suggests that these non-corporate businesses serve as holding companies for several firms as illustrated in Appendix Figure A.2 (left-hand panel). 1.5% of the firms owned by the top 0.1% are categorized as holding companies (Table A.5).

[22]Sources of human capital income include all inalienable factors embodied in business owners, including labor supply, networks, reputation, and rent-extraction ability, according to Smith et al. (2019).

Figure 8: Pre-tax national income by income source and fractile of the top 1%, 2019



Note: Population aged 20+. Top 1% of the pre-tax national income distribution. The top 1% consists of about 670,500 individuals. Same graph for 1995 in Appendix Figure A.10.

to link German PIT returns to firm data, we do observe the sector of the partnership or sole proprietorship (not of corporations distributing dividends) and the tax filer's age in PIT returns.[23] Hence, we can compare Smith et al. (2019)'s study on the structure of top incomes in the United States with findings for Germany, the largest economy in Europe, to shed light on key differences and similarities between the two countries.

In Germany as well as the United States, typical firms owned top 1% are firms in professional services (e.g., legal, tax, IT and management consultants; lawyers; auditors; architects; engineers) or health services (e.g., physicians; dentists) (see Appendix Table A.5). In Germany, at least half (a quarter) of the firms owned by the German top 1-0.1% (top 0.1%) are firms in labor-intensive professional services like legal, tax, auditing, IT and management consultants, engineers or physicians – a pattern also documented for the United States. As we move to the top 0.1%

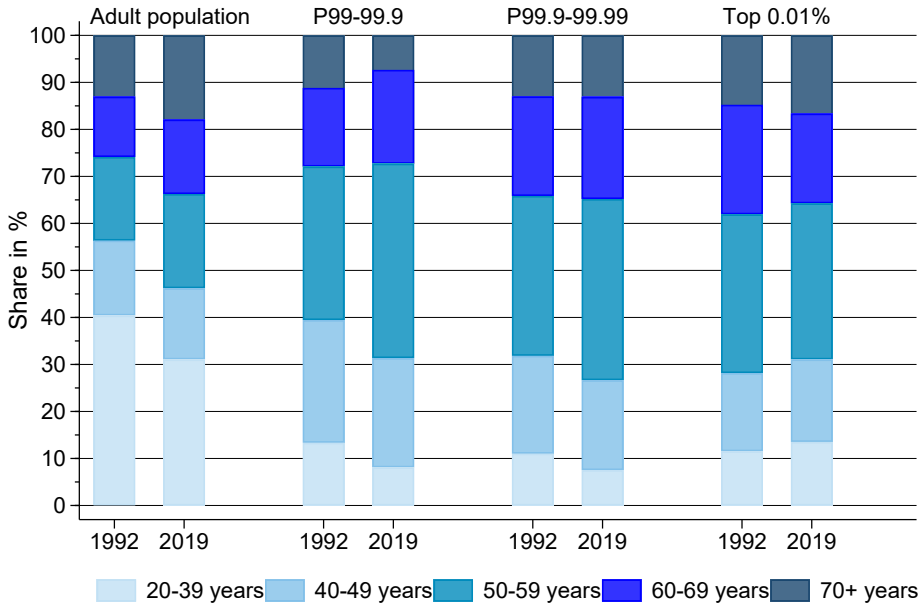
[23]We compare Appendix table A.5 for Germany with (Smith et al., 2019, tables 2,3,& J.3). We lack information in German PIT returns if the recipient of corporate or non-corporate income is an active business owner, i.e., holds a leadership position within the firm. Smith et al. (2019) observe an indicator for active owners.

real estate activities become more important in both countries. Different to the United States, Germany exhibits several top business income earners in agriculture (2% among the top 0.1%) and retail trade (3.2% in the top 0.1%). Two aspects are noteworthy: First, we hardly see any activity in manufacturing among these top earners despite manufacturing contributing about 30% to the overall value-added of the German economy. On the one hand, manufacturing firms might be less likely to be held as partnerships (Statistisches Bundesamt, 2022, Tab. 6). On the other hand, Germany's manufacturing firms are highly specialized so that they do not bunch at particular sector identifiers and are, instead, part of our group *other (less than 0.4%)*. Second, about 15% of non-corporate businesses in PIT returns do not record a sector identifier (*Gewerbekennziffer*). Missings may occur at random or systematically indicate portfolio investments in multiple sectors. If the latter applies, we underestimate the role of financial capital for German top incomes.

Age is another dimension to understand the labor-intensity of top incomes. Figure 9 depicts the age composition of the full population and three groups of the top percentile: P99-99.9, P99.9-99.99 and top 0.01%. The working age share (20 to 59 years) remained relatively stable at ca. 70% at lower top incomes (P99-99.9) and slightly above 60% at the top 0.01%. Yet, the share of older workers (50-59) has increased and the share of younger workers (20-49) decreased in all top income groups. German top income earners are substantially older than the adult population and have become older between 1992 and 2019.

Figure 10 compares the age distributions of top percentile earners who differ in their main source of income for 1992 and 2019. Equivalent to the United States, we find that most German top earners with majority income from wages or non-corporate business are between 40 and 59 and only very few top workers or top non-corporate business owners are older than 70. Capital owners are older (again like in the United States), landlords in particular. Since 1992, top wage earners and top business income earners (owners of the more labor-intensive non-corporate firms) have become older: The share of top wage and business income earners in their 40s has declined and the share of 50- to 69-year-olds has increased. In comparison to Smith et al. (2023, Figure I.2), Germany shows more aging of top earners in labor-

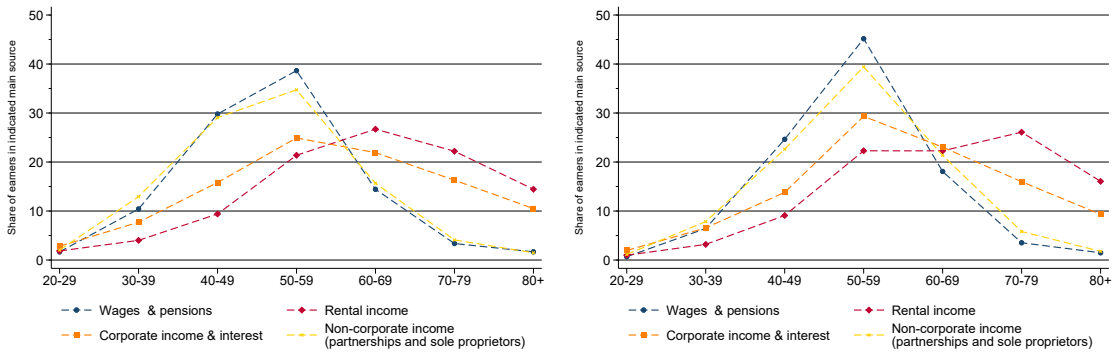
Figure 9: Age composition of fractiles in the top 1% and the adult population, 1992 & 2019



Note: Population aged 20+. Top 1% of the pre-tax national income distribution.

Figure 10: Age composition of the top 1% by main income source, 1992 & 2019

(a) 1992 (b) 2019



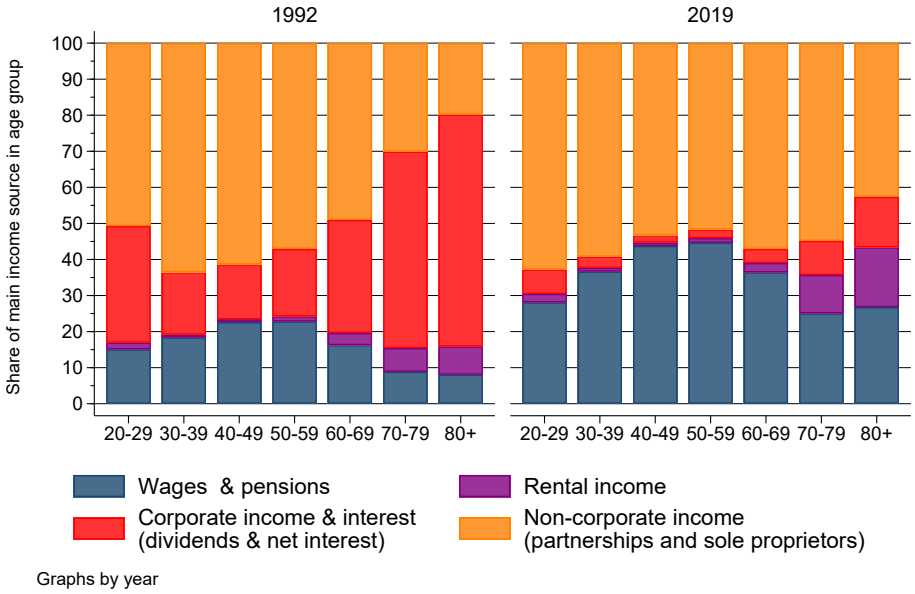
Note: Population aged 20+. Top 1% of the pre-tax national income distribution. Same graph for 1992 in Appendix Figure A.11

intensive professions and sectors than the United States. Compared to Germany, the United States shows a lower share of top non-corporate business owners below 50 and a higher share of top non-corporate business owners above 50 years.

Figure 11 presents the main income sources by age group in 1992 (left-hand graph) and 2019 (right-hand graph), respectively. Interest income collapsed, so all age groups earned less interest income in 2019 than in 1992. However, older age groups show the most prominent decline as such income represents a larger portion

of their total income. This is paralleled by our comparison between 1992 and 2019 in Figures 5 and 6. In contrast, rental income increased, particularly for age groups older than 70 years. The share of wages has increased across age groups, also for those beyond retirement age.

Figure 11: Top 1%'s main source income by age group, 1992 & 2019



Note: Population aged 20+. Top 1% of the the pre-tax national income distribution.

5 Comparing France, Germany and the US

Figure 12 presents the pre-tax national income shares between 1992 and 2019 for six income groups in France, Germany and the United States: bottom 50%, middle 40% (P50-90), the next 9% (P90-99), the lower 0.9% of the top percentile (P99-99.9), the next 0.09% (P99.9-99.99), and the top 0.01%. For these countries, DINA series are based on a combination of survey data and PIT returns, which provide the most comprehensive coverage and precise information on the income distribution from bottom to the very top.

Over the past 30 years, Germany stood between the slightly more equal France and the more dispersed United States. While Germany showed a similar bottom 50% share to France in the 1990s, the rapid decline in the 2000s led to a temporary divergence that closed with rising labor market incomes in Germany in the 2010s.

Still, the United States show a 6%-points lower bottom 50% share than the two European countries. In Germany, the middle class (P50-90) increased their share in the past 30 years from a lower level similar to the United States, almost catching up to the higher shares of France in the 2010s. While the upper middle class (P90-99) and the lower 0.9% of the top 1% show very similar shares for Germany and France (29-30%), these groups earn much lower shares of national income than the United States (37%).

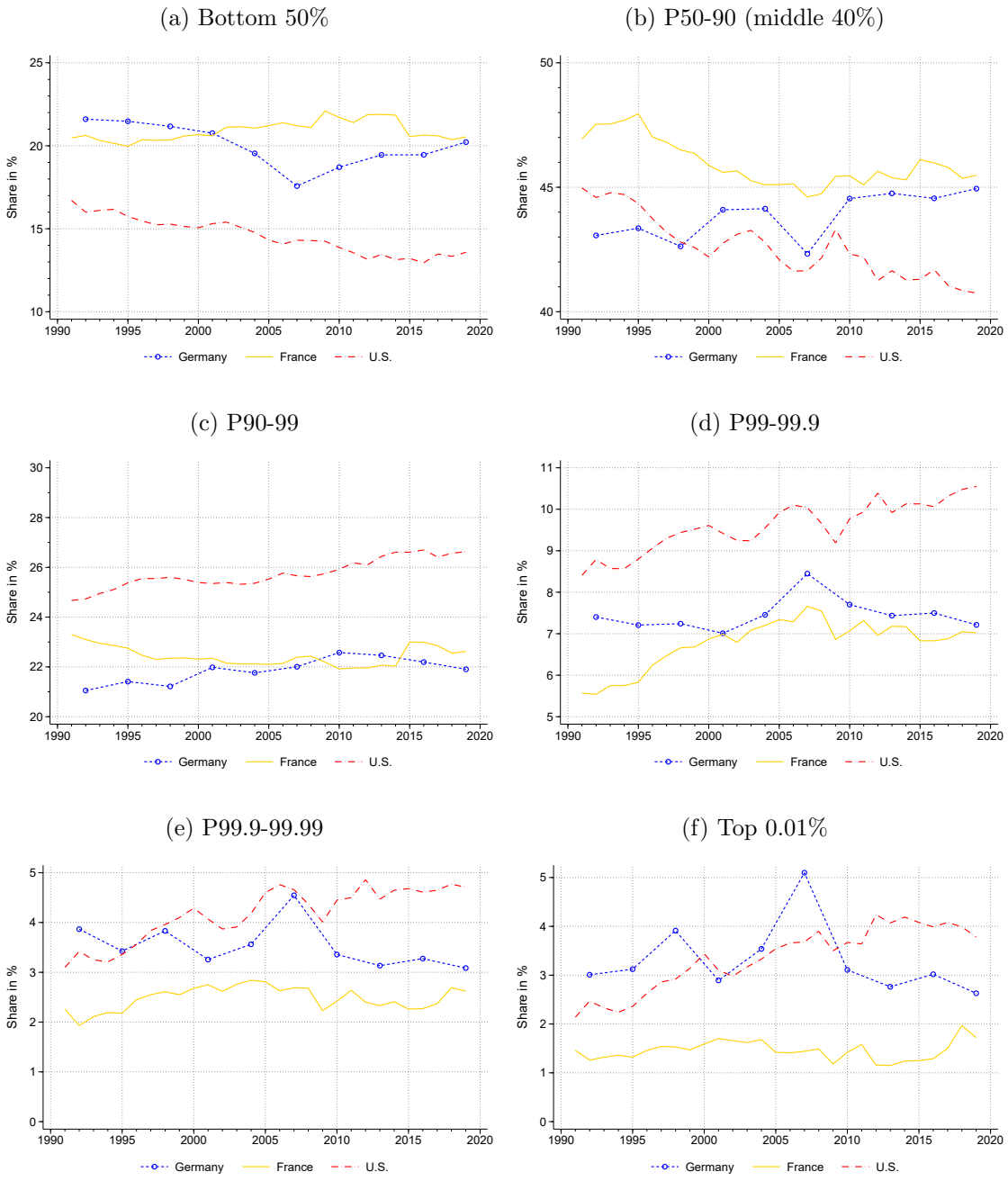
The main divide between Germany and France becomes apparent in the top 0.1% (Panels e and f), where Germany shows substantially higher levels of top income concentration than France – which are similar to the United States, particularly in the 1990s and 2000s. The share of income which is not earned by the bottom 99.9% in Germany (compared to France), is earned by the top 0.1% in Germany. The top 0.01% earned between 2.5 and 4% of pre-tax national income in Germany and the United States, while the same group earned less than 2% in France.

Figure 12 has shown that income concentration in Germany is almost as high as in the United States and has been at par during the 2000s. How can we square high income concentration in the United States and Germany, with lower wealth concentration in Germany compared to the United States (see, e.g. Albers et al., 2022)? Higher returns on business investments are a candidate explanation. Indeed, Fagereng et al. (2020) document sizably higher returns to private equity (i.e., non-listed firms (non-corporate and corporate)) than to public equity (i.e., listed firms and mutual funds) and refer to risk premia as an explanation.[24][25]

[24]However, such returns to private equity might be upward biased because the value of the firm based on book values might be underestimated (denominator) and the return containing a labor component might be overestimated (numerator). Generally, estimating rate of returns for unlisted firms involves a large degree of uncertainty.

[25]Another aspect how income concentration relates to the share of non-corporate firms occurs when estimating income concentration based on fiscal income. Higher measures of fiscal income concentration result mechanically in countries with a high share of pass-through businesses like partnerships and sole proprietorships because pass through incomes are mechanically higher than dividends. Dividends are already net of corporate taxes. Note that, in this paper, we estimate the distribution of pre-tax national income. This means that we add back corporate taxes to dividend income so that both pass through income from non-corporate businesses and corporate income is pre-tax. Cooper et al. (2016) show that almost half of the increase in the top 1% fiscal income share in the United States since the 1980s can be accounted for as a shift to pass-through, not an actual rise in business income.

Figure 12: Distribution of pre-tax national income in Germany, France and the United States

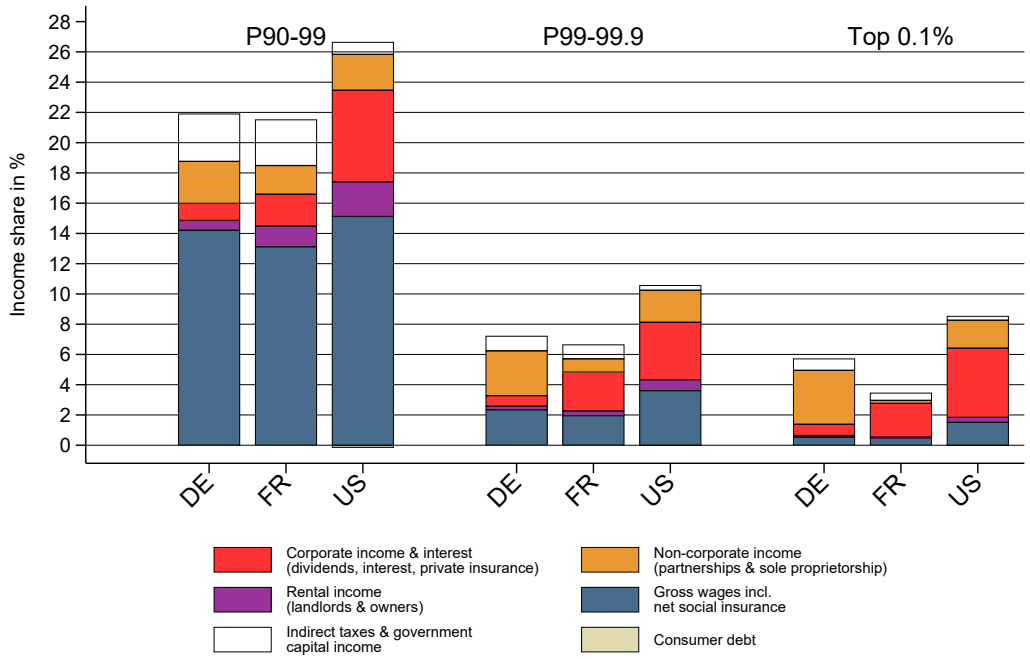


Note: Series for France by Garbinti et al. (2018), and for the United States by Piketty et al. (2018).

While we cannot link PIT returns of the single shareholder to the profits of their respective businesses, which would enable us to estimate the value and return of the firm, we can study the respective income sources of three groups of the top decile (P90-99, P99-99.9 and top 0.1%) distinguishing between corporate and non-corporate income. Figure 13 shows that the gap in wages between the countries is

small in all three groups, but US top earners earn a larger share of income from interest, corporate and non-corporate capital. At the very top, German top earners receive non-corporate income, French top earners receive corporate income and US top earners receive a combination of both. Germany's non-corporate income is larger for all fractiles than in the United States. If the higher returns to private equity found by Fagereng et al. (2020) for Norway apply to Germany, the high share of non-corporate, private businesses might be one mechanism for the elevated top income concentration observed in Germany.

Figure 13: Pre-tax national income share of fractiles in the top 10% by income source

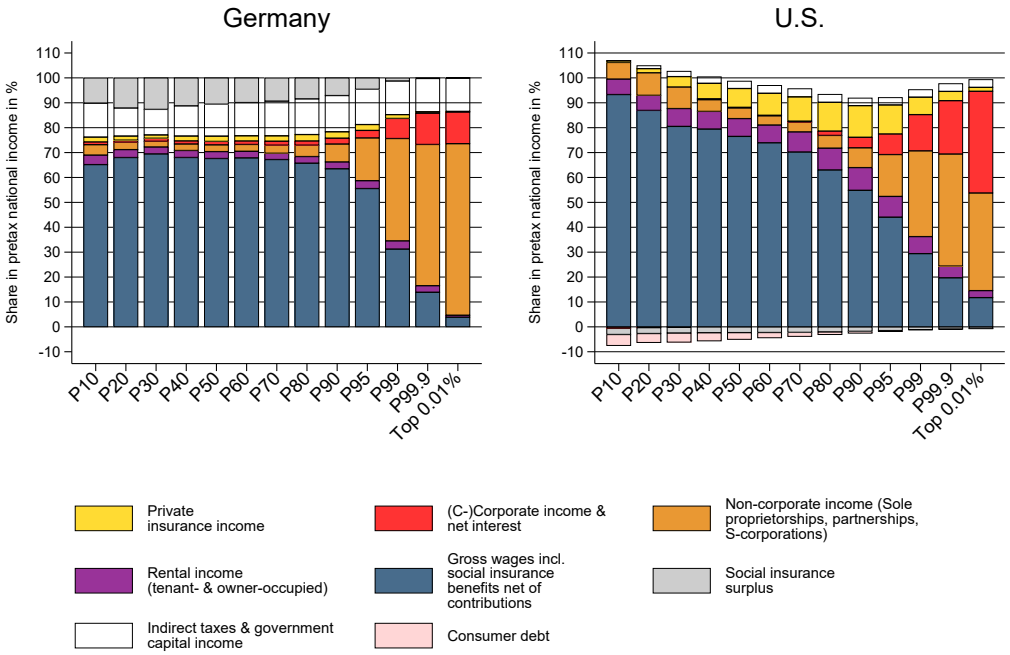


Note: Top 10% of the pre-tax national income distribution. Series for France for 2014 (last year available as synthetic microfile) by Garbinti et al. (2018) and for the United States by Piketty et al. (2018, 2022). Appendix Figure A.14 shows the same analysis for 1995.

We can compare the small groups across the whole income distribution and its composition on a fine-grained level for Germany and the United States using synthetic microfiles for the distribution of pre-tax national income in the United States by (Piketty et al., 2022). Figure 14 shows the income composition by decile and smaller groups at the top for Germany (left-hand graph) and the United States (right-hand graph). In both countries, the lower 95% of the income distribution

derive their income from labor.[26] While the importance of capital income in the form of interest income and dividends continuously increases when moving towards the top of the U.S. income distribution, these income types are of minor importance in Germany, even for top income earners. Dividends represent almost 40% of top 0.01% incomes in the United States but only 7% in Germany. In 2019, non-corporate income represented 69% of top 0.01% incomes in Germany and 39% in the United States (adding partnerships, sole proprietorships and S-corporations).[27]

Figure 14: Pre-tax national income by income source in Germany and the United States, 2019



Note: Pre-tax national income distribution in 2019. Figure for the United States based on Piketty et al. (2022). See Appendix Figure A.15 for a more detailed view of income components. Appendix Figure A.16 shows the same Figure for 1995 indicating for both countries higher shares of corporate (incl. interest income) and lower shares of non-corporate income in the top percentile compared to 2019. See Appendix Figure A.17 for an equivalent graph with fewer income groups for France.

The comparison between France, Germany and the United States has revealed that top earners in Germany and the United States earn a larger proportion of national income and are more likely to own non-corporate businesses than in France, where top earners are almost exclusively owners of corporations.

[26]The higher share of home ownership in the United States results in both higher debt service for mortgages (negative net interest income) and higher shares of imputed rent.

[27]In 1995 (2007), non-corporate income represented 58% (62.5%) of top 0.01% incomes in Germany and 25% (33%) in the United States. This increase in the share of non-corporate income is significantly influenced by declining interest incomes.

Top income earners likely select non-corporate legal forms in Germany and the United States and incorporation in France because of the incentives inherent in the tax legislation. The Tax Reform Act of 1986 in the United States lowered PIT tax rates and raised tax burden on C-corporations (Smith et al., 2022). Germany has a long history of favoring partnerships over corporations as discussed in Section 3.1. Using partnerships and sole proprietorships, losses can be passed through to owners so that losses can be used to reduce other incomes and, thereby, reduce the income tax burden. Partnerships allow for less transparency to the broader public and for more flexibility in allocating income to shareholders than corporate forms (Kopczuk and Zwick, 2020). Reasons incentivizing corporations in France include (1) high income tax rates and generous tax-exemptions of capital gains that encourage to retain earnings rather than distribute, (2) the tax-exemption of corporations from the wealth tax and (3) the tax-exemption of capital income from life insurance (*assurance vie*), which contains indirectly held corporate equity (Piketty, 2011; Garbinti et al., 2020).

6 Conclusion

In this paper, we have combined personal income tax returns, SOEP household survey data and national accounts to estimate the distribution of pre-tax national income for Germany from 1992 to 2019, following the DINA method established by Piketty et al. (2018) and Blanchet et al. (2024). Because country-specific income data landscapes and economic structures require country-specific adjustments and modifications, we discussed, adjusted and modified the DINA standards to the fine-grained micro and macro data of Germany. With the DINA approach, we were able to include retained earnings and various forms of capital income into the analysis of income inequality in Germany. Most importantly, the fine-grained nature of personal income tax returns in Germany allowed us to distinguish between business incomes from different legal forms and sectors as well as dividends received indirectly via non-corporate businesses.

We found that inequality of pre-tax national income increased until the late 2000s, with a trend reversal thereafter. A comparison of income distributions between 1992 and 2019 reveals similar income shares. Then and now, German top earners are owners of non-corporate businesses resembling the US top earners. At least half (a quarter) of the firms owned by the German top 1-0.1% (top 0.1%) are in labor-intensive professional services like legal, tax, auditing, IT and management consulting, engineers or physicians. Similarities between US and German top incomes are also found for the concentration of incomes at the very top. The share of the top 0.1% was equally high in Germany and the United States in the 2000s. However, the distribution of pre-tax income differs between the countries: While only the German top percentile receives sizable incomes from other sources than labor, different types of capital income are more widely distributed in the United States with the entire top decile earning relevant income shares from some form of capital ownership.

Gordon and Slemrod (2000) and Kopczuk and Zwick (2020) have argued that shifts between receiving business income in personal or corporate form can influence measures of inequality and the labor share of income. Our findings on the importance of non-corporate businesses for German top incomes and their labor-intensity could stimulate further research on the measurement of the labor and capital share.

Related to Germany's population becoming older, the share of top earners below 50 has declined from 40% in 1992 to 30% in 2019 (P99-99.9). So far, we have little evidence about the consequences of aging business owners. One example is Miller et al. (2024) who find that older business owners are more likely to retain profits within the firm. Future research could investigate how the aging of business owners affects investments and innovation, and, thereby economic growth.

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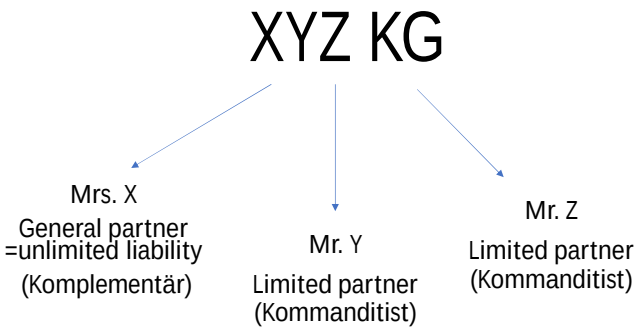
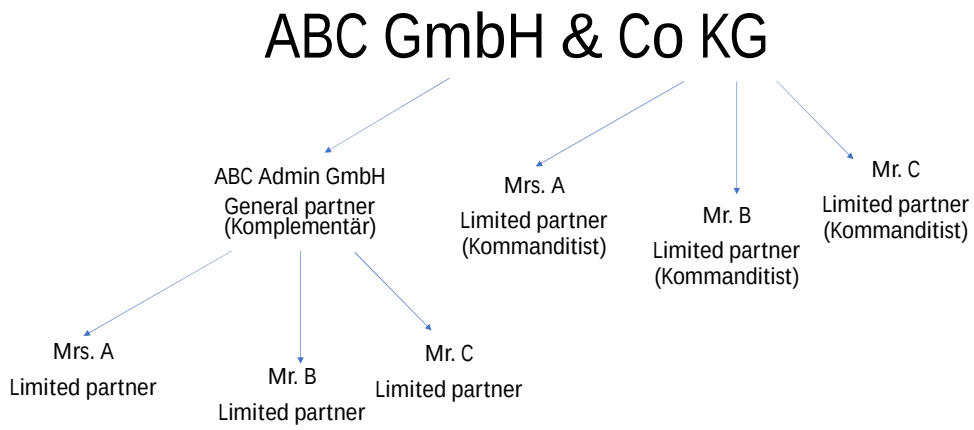
A Appendix Tables & Figures

Figure A.1: Ownership and liability structure of Gmbh & Co KG

(a) Limited partnership: *Kommanditgesellschaft - KG*

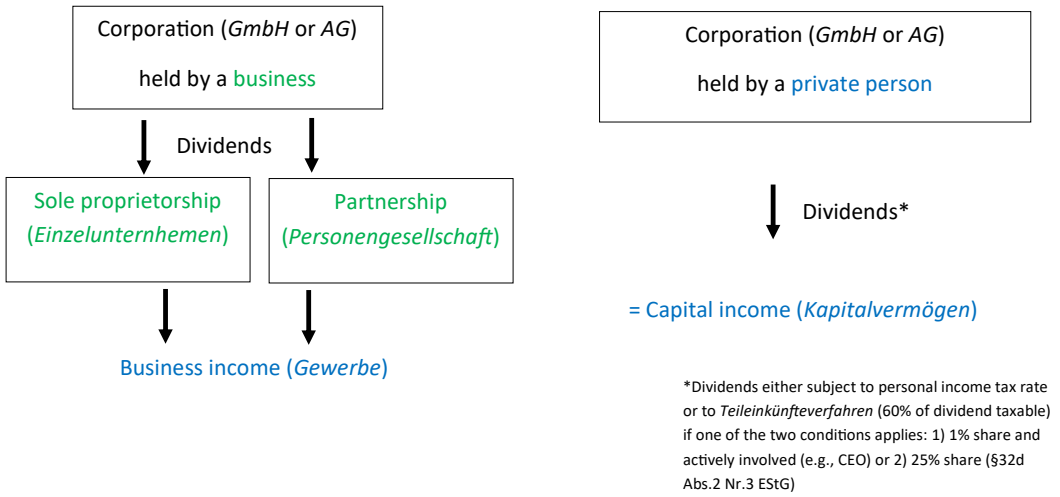


(b) Limited personal liability of all partners: *GmbH & Co KG*



Note: The limited partnership (*Kommanditgesellschaft - KG*) is a partnership with partners with limited personal liability and at least one general partner with unlimited personal liability. The *GmbH & Co KG* is a partnership where the general partner is a previously established limited liability corporation (*Gesellschaft mit beschränkter Haftung - GmbH*) (in our example: ABC Admin GmbH) with a minimum capital requirement of 25,000 Euro and which is usually held by the same owners (in our example: Mrs. A, Mr. B and Mr. C). The *GmbH & Co KG* is a partnership, i.e., a pass-through entity, like the *KG* so that profits are considered as non-corporate business income which is subject to personal income tax. However, if the ABC Admin GmbH operates the ABC GmbH & Co KG, then only 60% of the dividends of the ABC Admin GmbH are taxable (*Teileinkünfteverfahren*).

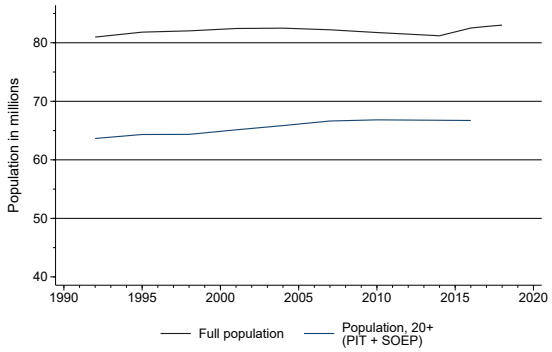
Figure A.2: Dividend taxation



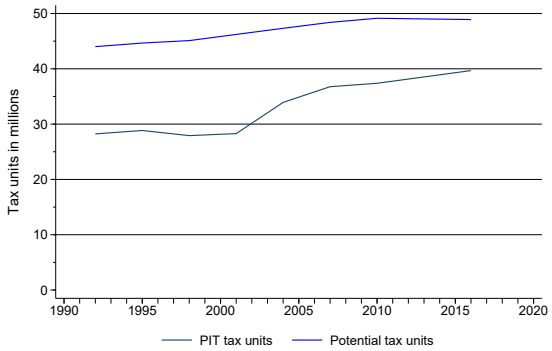
Note: *Teileinkünfteverfahren* = only 60% of the dividends

Figure A.3: Population and income coverage in microdata (PIT+SOEP)

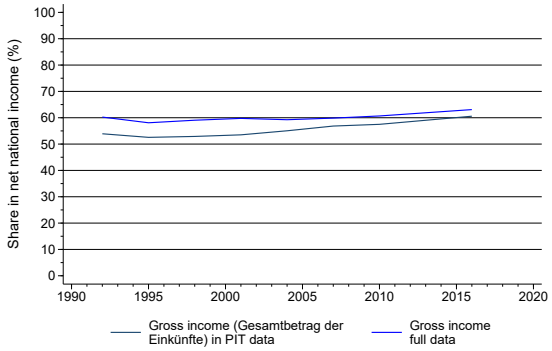
(a) Population



(b) Tax units



(c) Gross income



Note: Graph (a) shows the population 20+ and the total population in Germany. Graph (b) contrasts potential tax units (singles+married couples) with tax units recorded in PIT data. Between 2001 and 2007, payroll taxpayer (who do not have to file a tax return) are subsequently added to PIT data so that the number of PIT tax units increases. Graph (c) depicts the share of gross income in PIT and in our microdata (PIT+SOEP) in net national income. Next to gross market income, net national income also comprises income components such as retained earnings and indirect taxes.

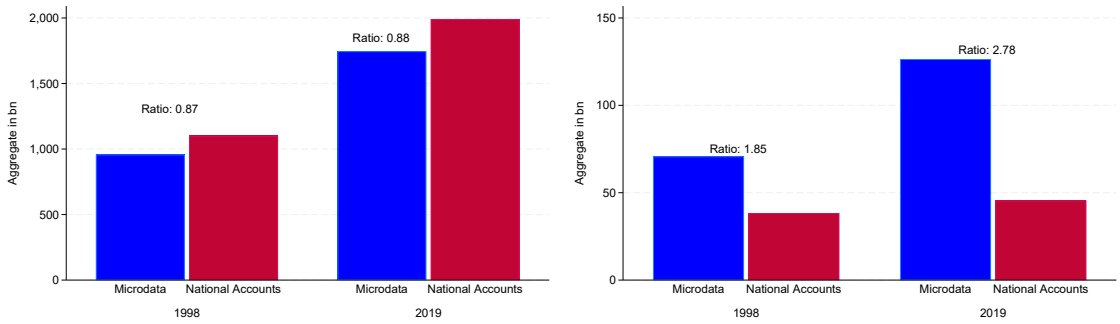
Table A.1: Aligning income tax, survey data and national accounts

Non-filer observations	
Non-filer labor income	Simulated taxable income below income tax allowance in SOEP (= identified non-filers) (DA 4.4.)
Labor income components	
Employer contributions	Simulated using individual's earnings in PIT & SOEP
Social insurance, occupational and private pensions	Taxable share of pensions upscaled to full amount
CEO compensation	Estimated aggregate of CEO compensation moved from D42 to D1 in national accounts data
Capital income components	
Imputed rent	Imputation based on imputed rent from SOEP to PIT-filers
Dividends + interest < savings allowance	Imputation based on SOEP capital incomes to PIT-filers who did not declare capital income (DA 3.6.3.)
Retained earnings	Corporate sector income (personal component) distributed proportionally to the sum of positive dividend and shareholder income from partnerships.
Private insurance income	D441(private health + life insurance) distributed proportionally to income of civil servants, self-employed and business owners D442 (private pensions) distributed proportionally to income of self-employed and top earner employees (above SI ceiling)
Paid interest on mortgages	Mean-value imputation based on SOEP information to PIT filers

Figure A.4: Micro-macro-gap for employee compensation (D1,S1), imputed rents (B2n, S14+S15) and interest received (D41, S14+S15), 1998 and 2019

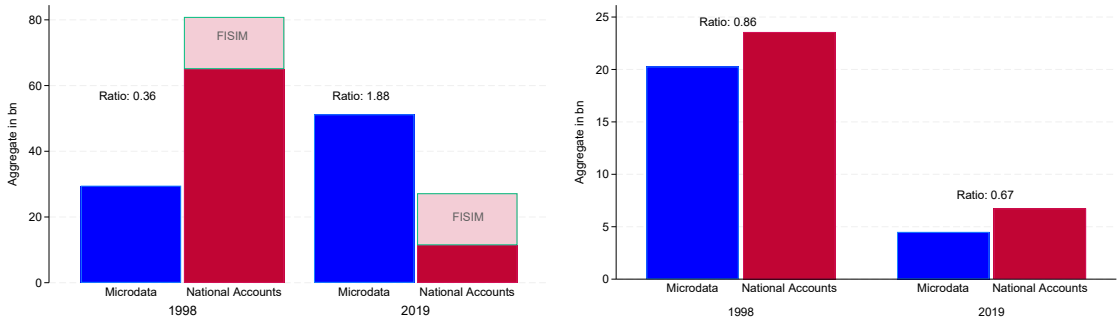
(a) Employees compensation (D1)

(b) Imputed rents (B2n)



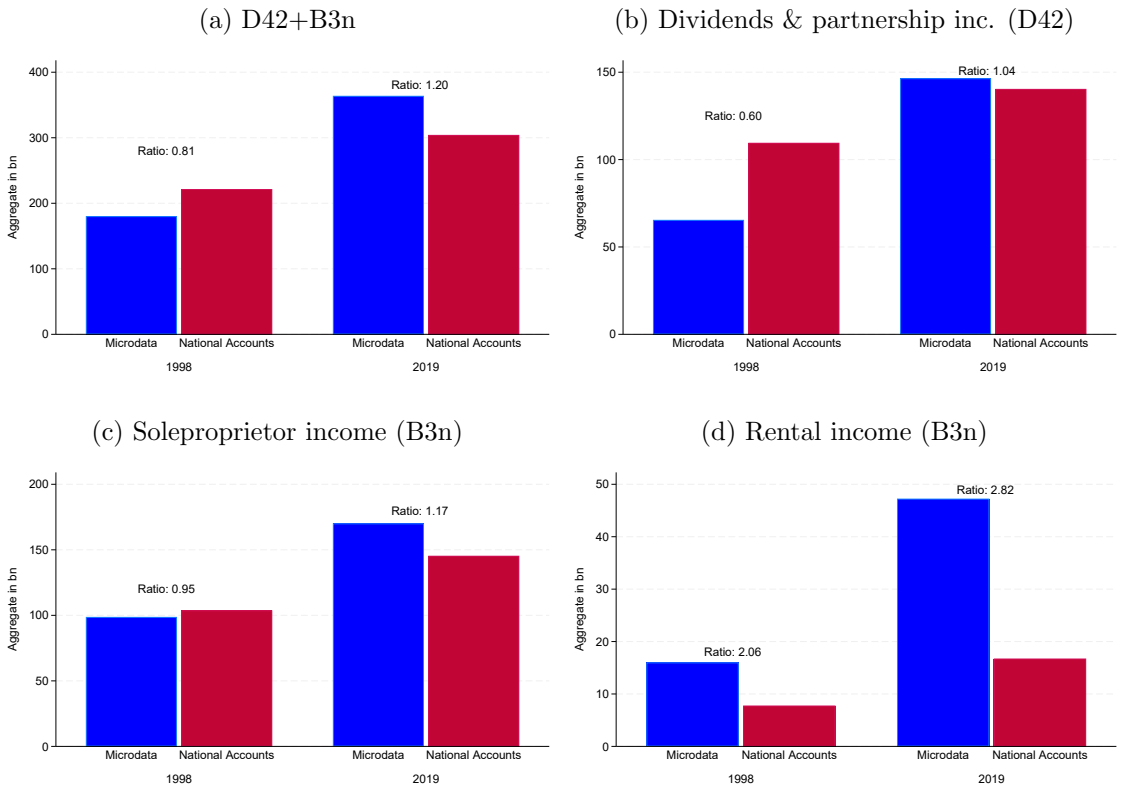
(c) Received Interest (D41)

(d) Paid interest by homeowners (D41)



Note: Financial intermediation services indirectly measured (FISIM) accounts for service fees of financial institutions. FISIM is supposed to capture the difference between interest received and paid by households and the interest that households would have received or paid under the riskfree interbank rate. Thus, FISIM effectively increases interest received and decreases interest payments by the household sector. FISIM is booked in the household sector and thus allocates income to households that effectively flow to financial institutions (and their employees and shareholders). Interest paid by company owners and landlords (D41 paid, S14 + S15) is deducted from B3n to align with microdata income concepts, so that D41 includes interest paid by homeowners.

Figure A.5: Micro-macro-mismatch for sole proprietor and rental income (B3n, S14+S15) and dividends and withdrawals from partnerships (D42, S14+S15), 1998 and 2019



Note: The national accounts aggregates of sole proprietor and rental income (B3n) are reduced by the interest paid by company owners and landlords (D41 paid, S14 + S15) to harmonize with microdata income concepts. In PIT data, we can distinguish between dividend income (part of D42, S14+S15), business income from partnerships (part of D42, S14+S15) and sole proprietors (part of B3n, S14+S15) and rental income (part of B3n, S14+S15). In national accounts, we have separate information for rental and sole proprietor income, but only pooled information for dividends and partnership income (D42, S14+S15). We find significant misaligments between microdata and national accounts in these components. Reports of statistical offices acknowledge substantial uncertainty about the amount and composition of business and property income in German national accounts. All net operating surplus – including business incomes from sole proprietors and partnerships, interest and dividends – is computed as a residual in German national accounts by deducting employment income (D1), intermediate consumption, depreciation and net production taxes from output (P1) of the production account (Statistisches Bundesamt, 2016). The estimated business income is then distributed between the corporate sector (including quasi-corporations) and the household sector according to the turnover share of corporations vs. non-corporate firms. In our view, using turnover shares of corporate vs. non-corporate firms likely allocates too much profits to the corporate sector that generates higher turnover but not necessarily higher profits. For example, VAT statistics show that sole proprietors and partnerships contribute about 26% of total turnover, while business tax statistics show that sole proprietors and partnerships contribute around 46% of total business profits (*Gewerbeertrag*). In line with this hypothesis, we find that the microdata aggregate of sole proprietor income is close to or even exceeds the national accounts aggregate, while the dividend and partnership microdata income only reaches 50% to 60% of the macro aggregate. In our benchmark estimation, we resolve this issue by pooling dividends, partnership and sole proprietor incomes and rental incomes before aligning with national accounts. Figure A.5a shows that we capture approx. 80% of the D42+B3n aggregate in our microdata. We show and discuss results from uprating these items separately in the Data Appendix.

Table A.2: Firms' categorization into the corporate or the household sector by legal form.

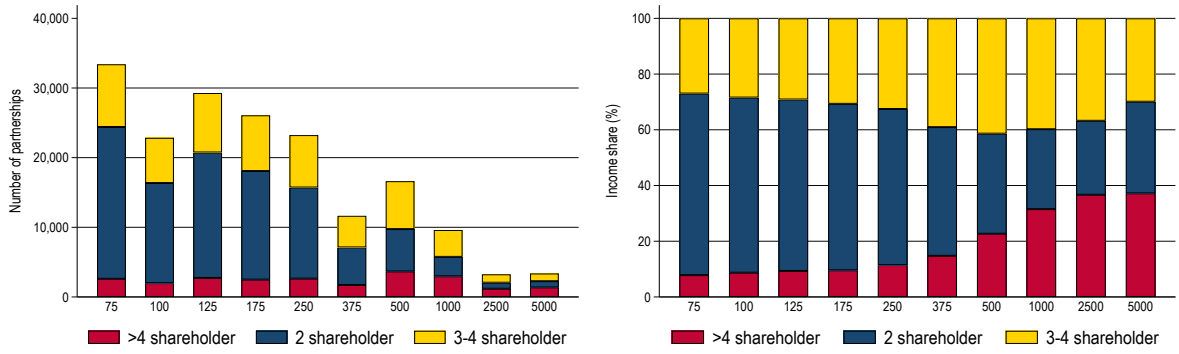
	Corporations		Partnerships				Sole
	AG	GmbH	KG	GmbH&Co KG	OHG	GbR	proprietor
National accounts	co	co	co	co	co	n-co	n-co
Income tax law	co	co	n-co	n-co	n-co	n-co	n-co

Note: This table displays the categorizations of the most widely used legal forms of firms in Germany according to national accounts and to income tax law. In national accounts, partnerships like the limited partnership (*Kommanditgesellschaft - KG*), *GmbH&Co KG* and the general partnership (*Offene Handelsgesellschaft - OHG*) are defined as *quasi-corporations* and categorized as part of the corporate sector. Partnerships under civil law (*Gesellschaft bürgerlichen Rechts (GbR)*) and sole proprietorships are categorized as part of the household sector. German income tax law distinguishes between corporate income, i.e., dividends from limited liability companies (*Gesellschaft mit beschränkter Haftung - GmbH*) und public companies (*Aktiengesellschaft - AG*), and business income.

Figure A.6: Business wealth by founding year of the family business

Source: MM-list 2018, additional information on founding years of the family businesses is kindly provided by Andreas Bornefeld (co-author of the MM-List 2017 and 2018).

Figure A.7: Number of shareholders and income share by partnership income group



(a) Number of shareholders (b) Income share

Note: The figure displays the number of shareholders and the income share by income group of the respective partnership in 2007. The income group is marked by the lower income thresholds in 1,000 Euro. For example, panel (a) shows that 2,793 partnerships earning between 1 and 2.5 mio. Euro are held by only two shareholders. Panel (b) shows that the partnerships earning between 1 and 2.5 mio. Euro held by only two shareholders contribute almost 30% of total profits within this income group.
Source: Destatis (2012): Lohn- und Einkommensteuer – Statistik über die Personengesellschaften/Gemeinschaften 2007

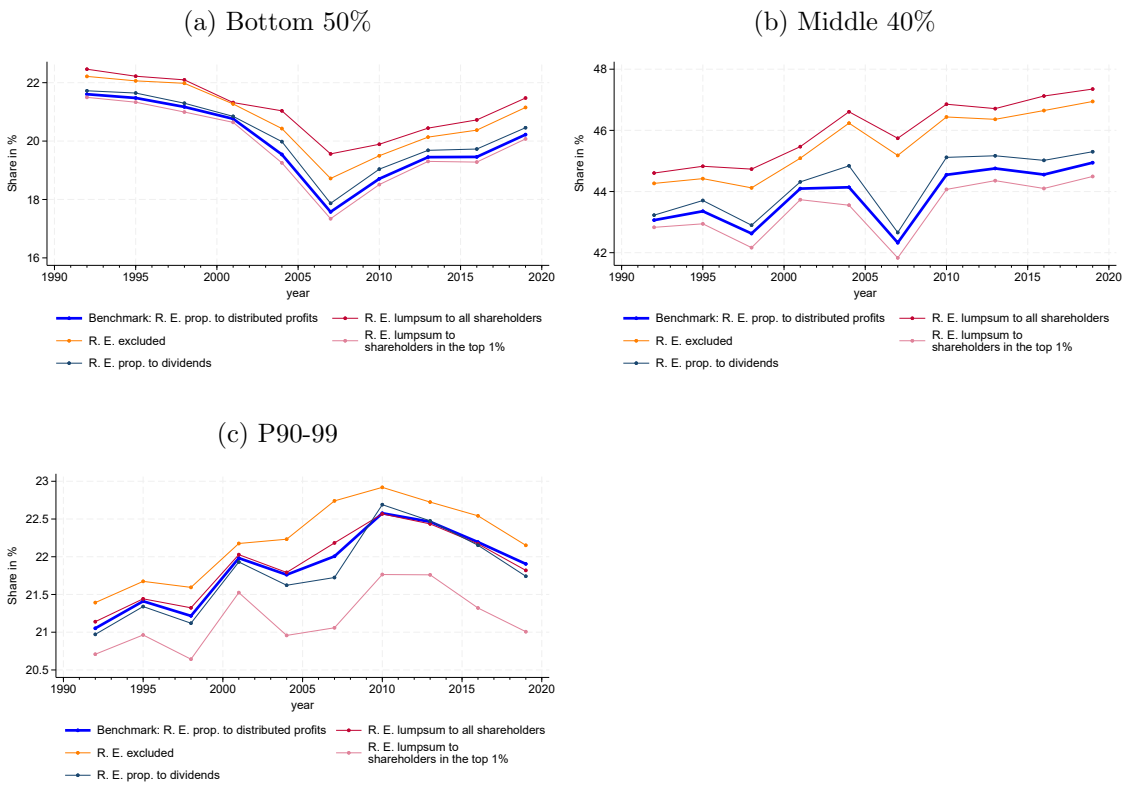
Table A.3: Post-tax profit income by legal form

Corporation	Until 2001		2002-2008	Since 2009	
	Retain	Distr.	HE	AbgSt	TE
Profit before tax	100.00	100.00	100.00	100.00	100.00
LBT deduction	16.67	16.67	16.67		
Base after LBT deduction	83.33	83.33	83.33		
LBT	16.67	16.67	16.67	14.00	14.00
Corporate tax	33.33	25.00	20.83	15.00	15.00
Solidarity surcharge	1.83	1.38	1.15	0.83	0.83
Gross dividend		56.96	61.35	70.18	70.18
Distribution of profits					
Assessment Basis		100.00	30.68	70.18	42.11
Capital Gains Tax				17.54	
Income Tax		48.50	12.88		18.95
Corporate Tax Credit		25.00			
Remaining Income Tax		23.50			
Solidarity Surcharge		1.29	1.69	0.96	2.32
Net Dividend	48.17	32.17	46.78	51.67	48.91
Tax Burden on Retained Earnings	51.83%		38.65%	29.83%	29.83%
Tax Burden on Dividends	67.83%		53.22%	48.33%	51.09%

Partnership	Until 2007	Since 2008		
		Regular	Retain	
Profit before tax	100.00	100.00	100.00	100.00
LBT deduction	16.67			
Base after LBT deduction	83.33	100.00	100.00	100.00
LBT	16.67	14.00	14.00	14.00
Profit after LBT	83.33	86.00	86.00	86.00
Retained earnings			100.00	63.83
Withdrawal	83.33	100.00	100.00	36.17
Income Tax on Withdrawal	35.00	45.00		16.28
LBT deduction	7.50	13.30		
Remaining Income Tax	27.50	31.70		
Solidarity Surcharge	1.51	1.74		0.90
Income Tax (34a)			28.25	18.03
LBT credit (34a)			13.30	13.30
Remaining Income Tax (34a)			14.95	4.73
Solidarity Surcharge (34a)			0.82	0.26
Re-assessment Amount			70.20	44.81
Re-assessment			17.55	11.20
Solidarity Surcharge			0.97	0.62
Net Income	54.32	52.56	51.71	52.02
Tax Burden on Retained Earnings			29.77%	36.16%
Tax Burden on Withdrawal	45.68%	47.44%	48.29%	47.98%

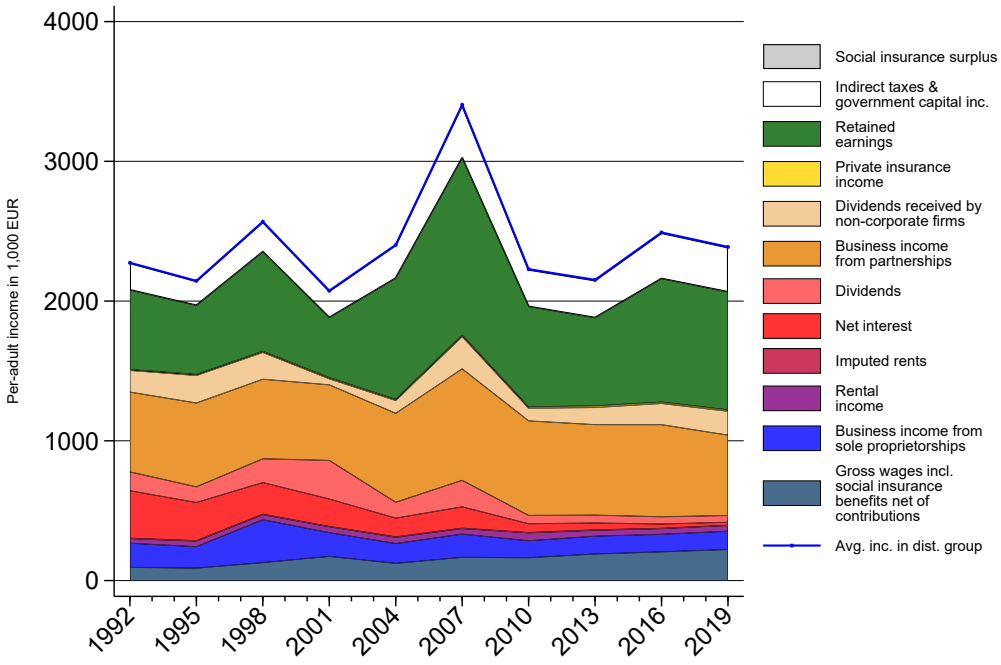
Note: HE: Halbeinkünfteverfahren, TE: Teileinkünteverfahren, AbgSt: Capital Gains Tax= Abgeltungsteuer (withholding tax on capital), LBT: Local Business Tax= Gewerbesteuer

Figure A.8: Pre-tax national income shares varying the distributional assumptions for retained earnings



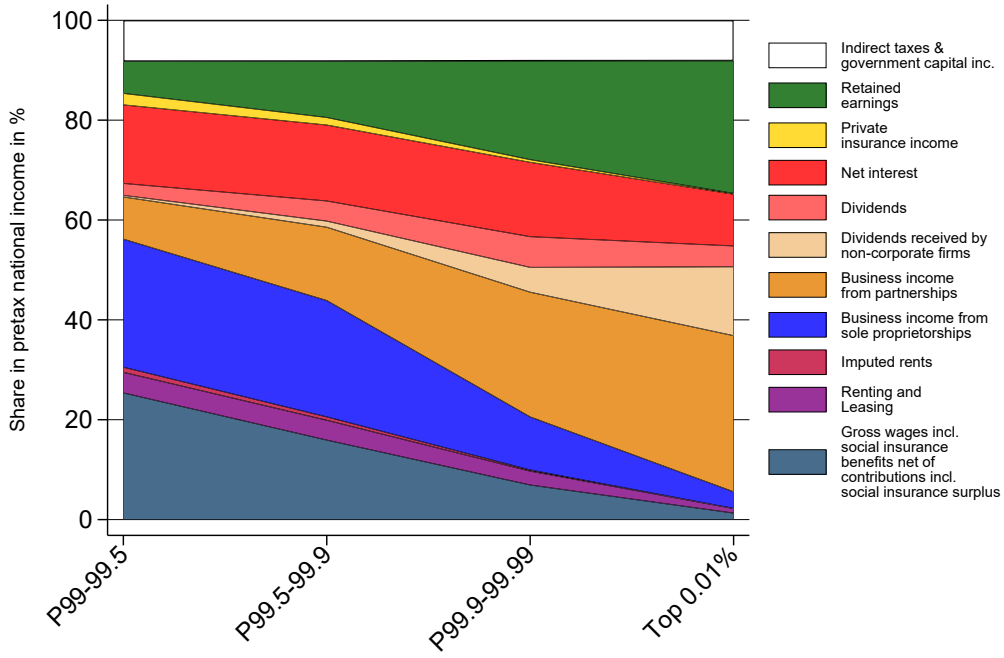
Note: Population aged 20+. Top 0.1% of the pre-tax national income distribution.

Figure A.9: Pre-tax national income decomposition, Top 0.1%



Note: Population aged 20+. Top 0.1% of the pre-tax national income distribution.

Figure A.10: Pre-tax national income by income source and fractile of the top 1%, 1995



Note: Population aged 20+. Top 1% of the pre-tax national income distribution.

Figure A.11: Age composition of the top 0.1% by main income source, 1992 and 2019

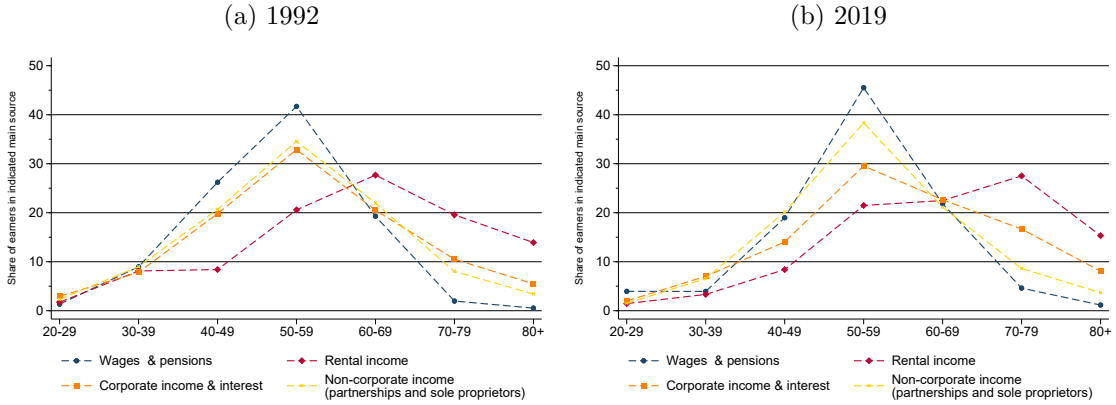
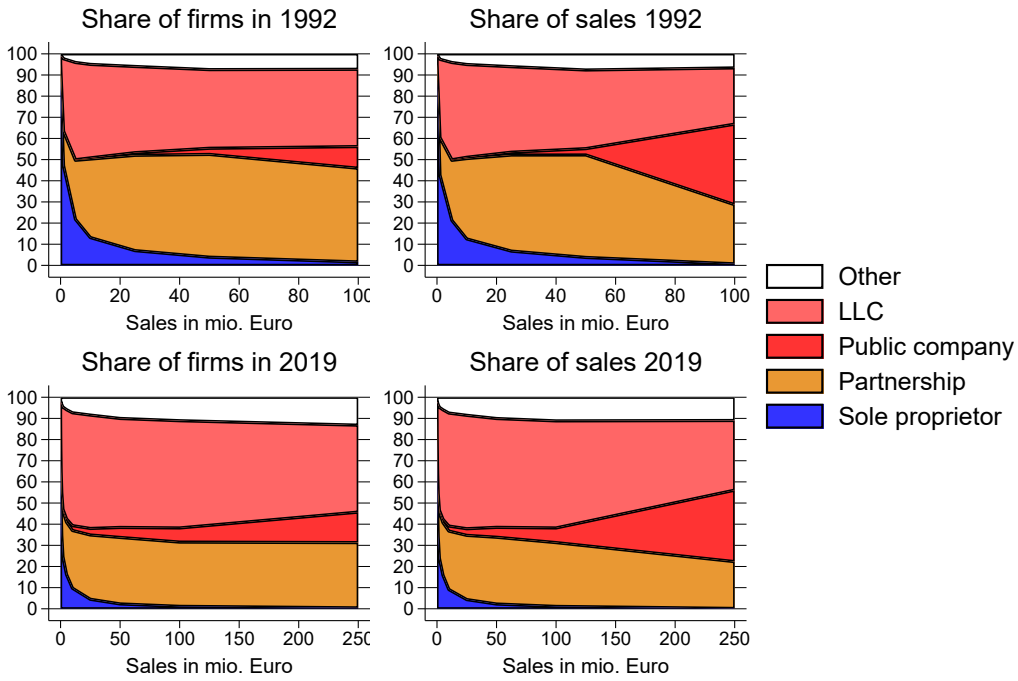
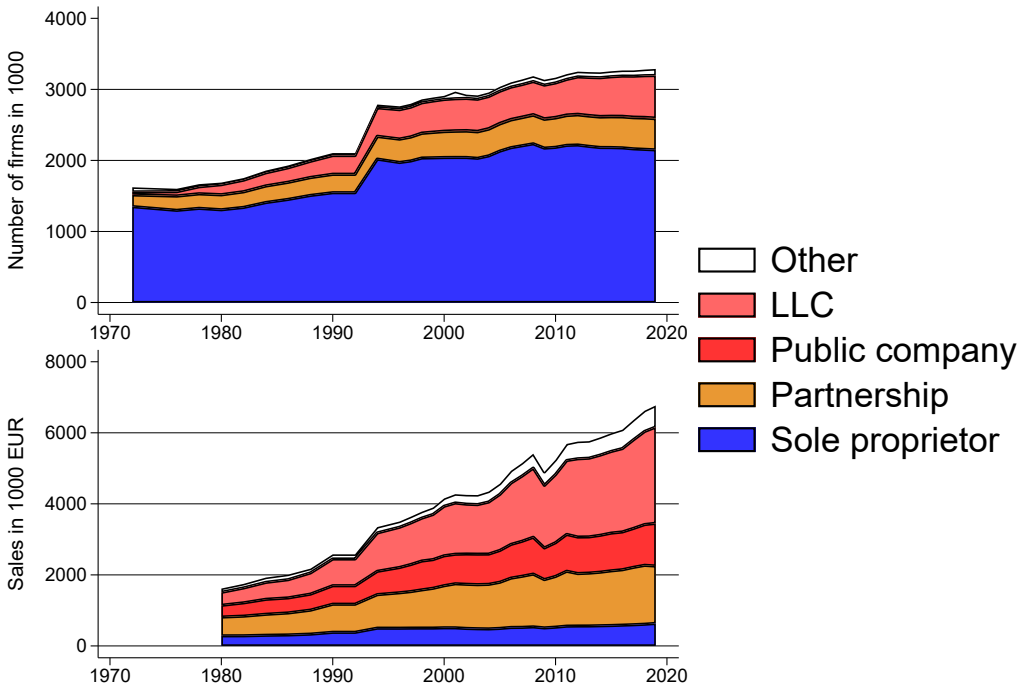


Figure A.12: Legal form by sales, 1992 and 2019



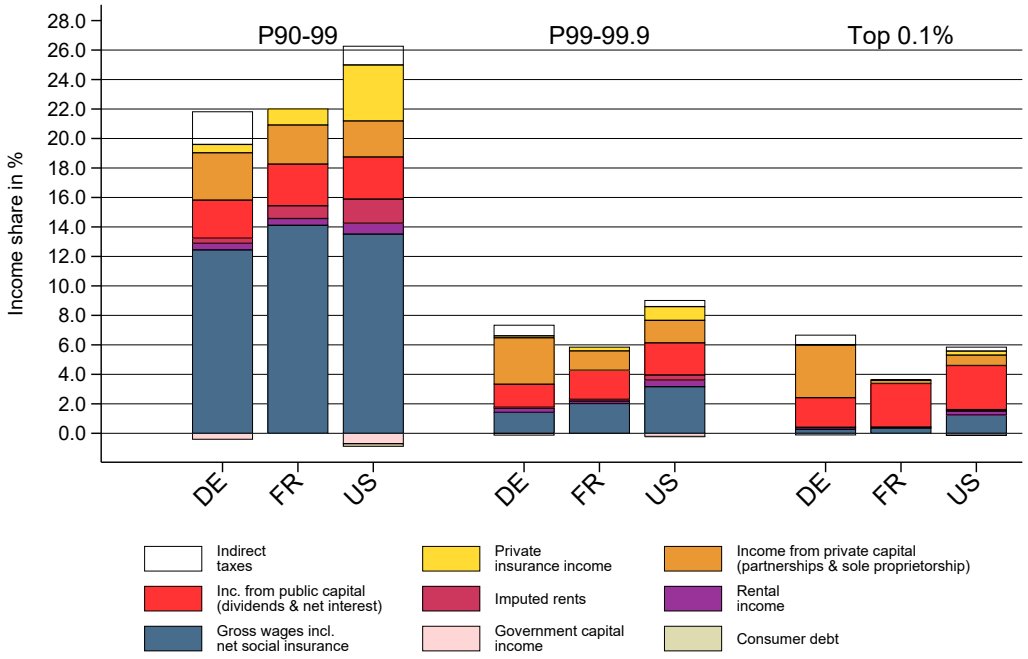
Note: Firms with sales exceeding 17,500 Euro per year (approx. 3 million firms in Germany) are subject to sales tax (*Umsatzsteuer*) and, hence, included in sales tax statistics. The left-hand graphs show the legal form composition over the sales distribution measured by the number of firms in 1992 (upper graph) and 2019 (lower graph). The right-hand graphs depict the legal form composition over the sales distribution measured by the sales sum of the respective legal form in 1992 (upper graph) and 2019 (lower graph). Legal forms include limited liability company (LLC) (*GmbH*), public company (*AG, KGaA*), partnership (*OHG, KG, GbR, Gmbh & Co KG*), sole proprietor (*Einzelunternehmer*) and other (*Genossenschaften, Körperschaften des öffentlichen Rechts etc.*). Moving to the top of the sales distribution, public companies generate a third of total sales although representing only 15% of the firms. Partnerships also feature importantly at the top of the sales distribution, generating more than 20% of total sales and representing about a third of the firms. Between 1992 and 2019, limited liability companies (*GmbH*) and public companies (*Aktiengesellschaften (AG)*) have gained importance compared to partnerships (*KG*, *OHG*, *GmbH & Co KG*, *GbR*) and sole proprietorships. Appendix Figure A.13 additionally illustrates the evolution of firms by legal form and their sales from the 1970s until 2019, also pointing at the traditionally important role of partnerships and sole proprietorships compared to corporations.
Source: Sales tax statistics from the federal statistical office.

Figure A.13: Legal form of German firms, 1972-2019



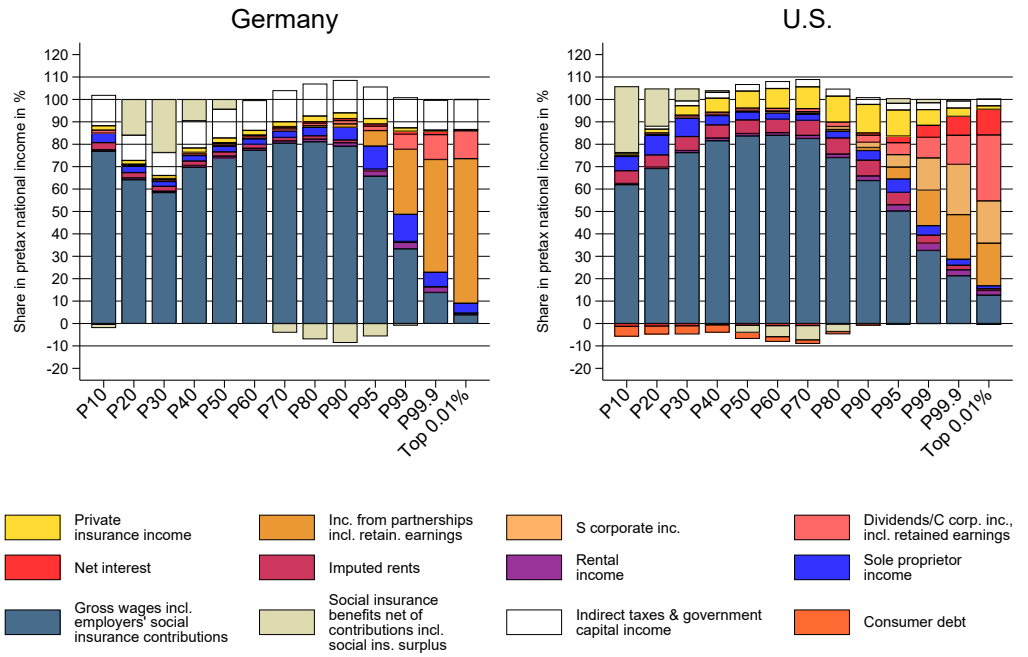
Note: Firms with sales exceeding 17,500 Euro per year are subject to sales tax (*Umsatzsteuer*). The upmost graph shows the number of firms by legal form and the lower graph shows total sales by legal form from 1972 to 2019. Legal forms include limited liability company (LLC) (*GmbH*), public company (*AG, KGaA*), partnership (*OHG, KG, GbR, Gmbh & Co KG*), sole proprietor (*Einzelunternehmer*) and other (*Genossenschaften, Körperschaften des öffentlichen Rechts etc.*).
Source: Sales tax statistics from the federal statistical office.

Figure A.14: Top income composition in international comparison, 1995: Germany, France and the United States



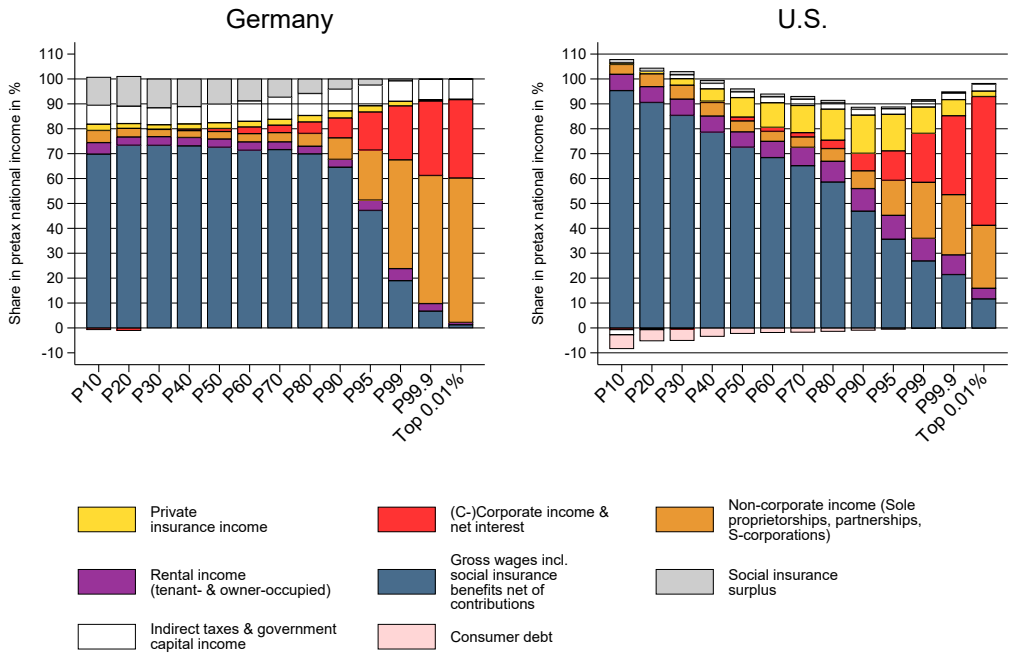
Note: Top 10% of the pre-tax national income distribution. Series for France for 2014 (last year available as synthetic microfile) by Garbinti et al. (2018) and for the United States by Piketty et al. (2018, 2022).

Figure A.15: Pre-tax national income composition in Germany and the United States, 2019



Note: Population aged 20+. Pre-tax national income distribution. Series for the United States by Piketty et al. (2018, 2022).

Figure A.16: Pre-tax national income composition in Germany and the United States, 1995

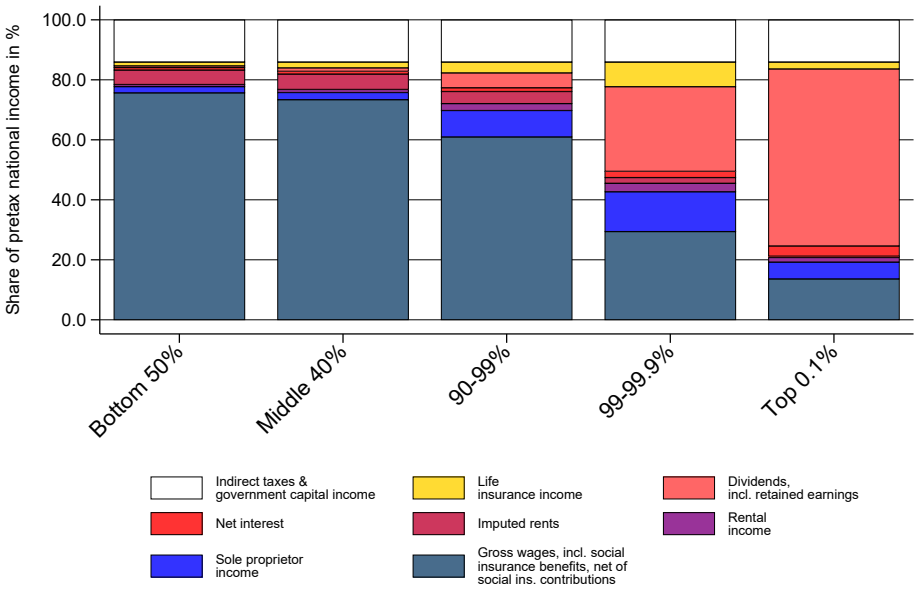


Note: Pre-tax national income distribution in 1995. Series the United States by Piketty et al. (2018, 2022).

Table A.5: Top firms owned by the top 1-0.1% (P99-99.9) and top 0.1%, 2019

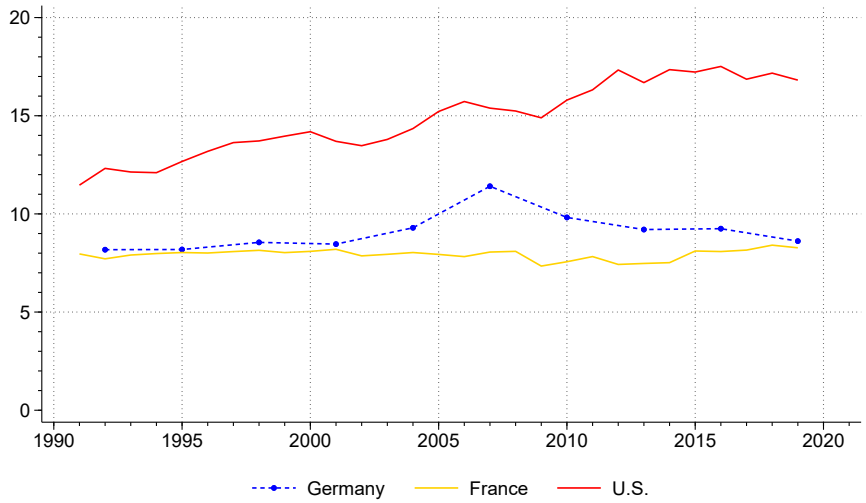
P99-99.9			Top 0.1%		
Share in %	Number of individuals	Occupation	Share in %	Number of individuals	Occupation
23.0	73,642	Medical and dental practices	24.0	12,940	NA (possibly multi-sector or undisclosed)
15.4	49,174	NA (possibly multi-sector or undisclosed)	10.3	5,520	Renting and leasing of own or leased properties
5.4	17,412	Legal consultancy	8.0	4,280	Medical and dental practices
4.8	15,462	Electricity supply	7.0	3,745	Legal consultancy
4.3	13,732	Architectural and engineering offices	6.1	3,270	Electricity supply
4.1	13,165	Renting and leasing of own or leased properties	3.0	1,639	Architectural and engineering offices
3.5	11,137	Accounting, auditing and tax consultancy	2.9	1,544	Public relations and management consultancy
2.9	9,196	Retail trade of miscellaneous goods (in stores)	2.8	1,500	Provision of other predominantly personal services
2.8	8,891	Other health care activities	2.6	1,390	Other freelance, scientific, and technical activities
2.7	8,494	Agriculture and forestry	2.2	1,195	Creative, artistic, and entertainment activities
2.2	7,160	Provision of other predominantly personal services	2.0	1,071	Agriculture and forestry
2.0	6,384	Public relations and management consultancy	1.7	896	Retail trade of miscellaneous goods (in stores)
1.4	4,595	Creative, artistic, and entertainment activities	1.5	785	Holding companies
1.4	4,446	Other freelance, scientific, and technical activities	1.5	802	Accounting, auditing and tax consultancy
1.2	3,895	Insurance and pension funding activities	1.4	753	Management of companies and enterprises
1.2	3,886	Building installation/Construction	1.2	660	Other health care activities
1.1	3,431	Other education services	1.1	576	Provision of other economic services
0.9	2,732	Real estate activities and management	1.0	520	Other education services
0.8	2,510	Provision of IT services	1.0	519	Real estate activities and management
0.7	2,262	Other construction installation	0.8	412	Provision of other information services
0.7	2,282	Trade mediation	0.7	379	Provision of IT services
0.6	1,801	Other specialized construction activities	0.6	302	Building installation/Construction
0.6	2,065	Retail trade of various goods (in stores)	0.6	319	Retail trade of various goods (in stores)
0.6	2,007	Holding companies	0.6	334	Rental of machinery, equipment and other movable property
0.6	2,053	Restaurants, cafes, snack bars, ice cream parlors	0.5	258	Activities auxiliary to insurance services and pension funds
0.5	1,534	Retail trade of household appliances, textiles, and furnishings	0.5	253	Automobile trade
0.5	1,605	Provision of other economic services	0.5	285	Trade mediation
0.5	1,629	Automobile trade	0.4	227	Retail sale of other household appliances, textiles, DIY and furnishing supplies (in stores)
0.4	1,427	Management of companies and enterprises	0.4	225	Purchase and sale of own land, buildings and apartments
0.4	1,339	Veterinary activities	13.4	7,218	Other (less than 0.4%)
12.6	40,284	Other (less than 0.4%)			

Figure A.17: Pre-tax national income composition in France, 2014



Note: Pre-tax national income distribution. Series for France by Garbinti et al. (2018).

Figure A.18: Top 10% average income to bottom 50% average income



Note: Top 10% average income divided by bottom 50% average income. Series for France by Garbinti et al. (2018), and for the United States by Piketty et al. (2018).

B Comparison with previous series

Long-run income share series over the 20th century have been estimated previously using income tax data and applying a harmonized methodology.[28] For Germany, Bartels (2019) estimated fiscal income shares using tabulated income tax statistics and national accounts. Blanchet et al. (2022) estimated pre-tax national income shares using EU-SILC survey data and a top-correction based on top incomes from Bartels (2019). Figure B.1 compares our series with these previous series and reveals two visible deviations from previous series.

First, all studies find a decline of the bottom 50% income share. Yet, Bartels (2019) and Blanchet et al. (2022) document a continuous decline of the bottom 50% income share, while this paper's series suggests a trend reversal after 2007. Different coverage of low-income workers is a potential reason for this gap. If the trend reversal in 2007 primarily occurred for low-income workers below the tax allowance, this is not visible in fiscal data used Bartels (2019), who first computes the top 50% income share and then computes the bottom 50% as a residual given that data on the bottom 50% are missing for most of the 20th century until the introduction of survey data in the 1970s and 1980s. In contrast to Bartels (2019), our series and Blanchet et al. (2022) use survey data for the bottom of the income distribution. While survey data provide better coverage of low-income workers below the tax allowance, they might suffer from a middle-class bias overestimating low-income workers' incomes.

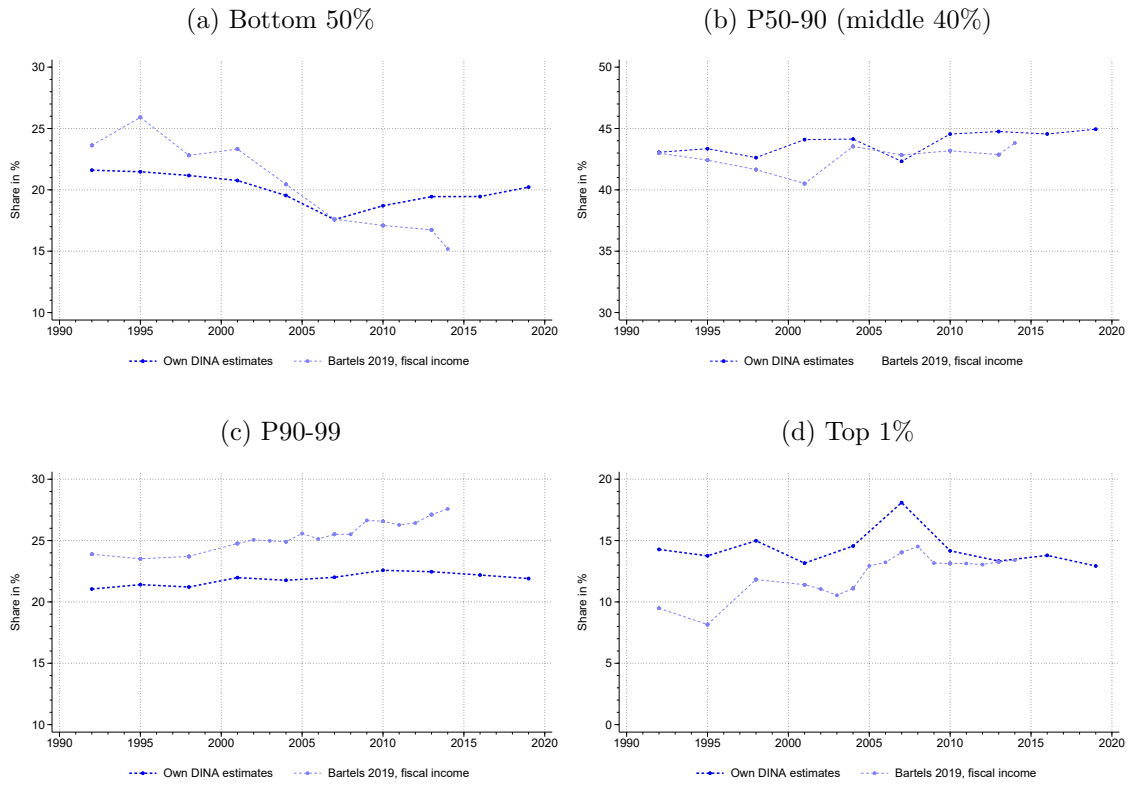
Second, our top 1% income share is higher than the fiscal top 1% income share by Bartels (2019) and Blanchet et al. (2022) and, conversely, our P90-99 share is lower. A likely reason for this discrepancy is re-ranking because of deductions and consumption out of business income. In our series of pre-tax national income based on PIT returns, we individually adjust for deductions, particularly for the prominent deduction schemes for real estate investments in Eastern Germany after German unification in the 1990s (where discrepancies between the series are largest). PIT tabulations used by Bartels (2019) display a ranking based on fiscal income, which is after deductions and consumption out of business profits. Fiscal income is a consolidated measure of profits and losses from all income sources. This means that some top business income earners, who we observe in the top 1% in our series of pre-tax national income based on PIT returns, move out of the top 1% in PIT tabulations based on fiscal income and into P90-99. This inflates the fiscal income share of the P90-99. At the same time, some labor income earners move up into the top 1%. An indication of such a re-ranking is a higher labor income share in the fiscal top 1%. Indeed, labor income represents about two-thirds of income for the fiscal top 1% by Bartels (2019), but less than one-fifth for the pre-tax national top 1%.

Note that the comparability between the three series is limited because of different observation units and income concepts. The observation unit is the individual (equal-split) in this paper's series, but it is the tax unit in Bartels (2019). The share of married couples in total potential tax units has declined from 41% in 1992 to 36% in 2016. This means that the fiscal series has more single observations as opposed to married couples in 2016 than in 1992 which might drive upward measured inequal-

[28] These series are collectively available at the World Inequality Database (wid.world).

ity. Bartels and Metzing (2019) show that moving from smaller observation units tends to increase inequality. Income concepts also differ between the series. For example, the fiscal series is based on distributed income, thereby excluding retained earnings. As retained earnings have gained importance over time, the fiscal series' total income became smaller than net national income. The DINA income total is net national income. The share of fiscal income total in net national income is 69% of net national income in 1992 and 64% in 2016. For a given sum of top 1% income, a larger income total generates relatively lower top 1% fiscal shares in the 1990s and relatively higher top 1% fiscal shares since 2004, after which retained earnings have gained importance.

Figure B.1: Pre-tax national income shares in comparison with previous series



Note: Series from Bartels (2019) based on fiscal income per tax unit from official PIT tabulations.

Halle Institute for Economic Research –
Member of the Leibniz Association

Kleine Maerkerstrasse 8

D-06108 Halle (Saale), Germany

Postal Adress: P.O. Box 11 03 61

D-06017 Halle (Saale), Germany

Tel +49 345 7753 60

Fax +49 345 7753 820

www.iwh-halle.de

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