

Inequality and Redistribution in the Netherlands*

Arjan Bruil¹, Céline van Essen², Wouter Leenders³, Arjan Lejour^{2,4},
Jan Möhlmann², and Simon Rabaté^{2,5}

¹Statistics Netherlands (CBS)

²Netherlands Bureau for Economic Policy Analysis (CPB)

³University of California, Berkeley

⁴Tilburg University

⁵French Institute for Demographic Studies (Ined)

June 2025

Abstract

This paper uses rich administrative data to study income inequality before and after redistribution in the Netherlands. We use a corporate ownership registry to link profits to shareholders and evaluate alternative methods of doing so. This allows us to provide the first exact estimate of the overall tax rate of the super rich internationally. At the very top, the effective individual income tax rate is nearly zero and the only significant tax paid is the corporate tax. We use exceptionally precise data on cash and in-kind transfers to study their redistributive impact and to assess the validity of methods typically used to assign in-kind spending to individuals. Finally, we investigate inequality and redistribution across age, gender and geography.

JEL codes: D3, H2, H3, H5

Keywords: inequality, redistribution, taxes, transfers, Netherlands

*We warmly thank Jonathan Goupille-Lebret for his help throughout the project. We thank Romek Vinke for excellent research assistance. We are also grateful to Mathias André, Alan Auerbach, Charlotte Bartels, Thomas Blanchet, Leon Bettendorf, Luis Bauluz, Koen Caminada, Eva Davoine, Brad DeLong, Remco van Eijkel, Amory Gethin, Demetrio Guzzardi, Rini Hillebrand, Bas Jacobs, Stefan Jestl, Niels Johannesen, Leonie Koch, Sébastien Laffitte, Antoine Levy, Emanuel List, Jasper Menger, Mathilde Muñoz, Marielle Non, Harry ter Rele, Emmanuel Saez, Sebastian Seitz, Michael Sicsic, Johannes Spinnewijn, Marianne Tenand, Toon Vanheukelom, Francis Weyzig, Danny Yagan, Gabriel Zucman and Jorrit Zwijnenburg for their valuable comments and suggestions. We finally thank Statistics Netherlands for providing access to the data and in particular Jos Erkens and Annemieke Redeman for their assistance during the entire process. Remaining errors are our own.

1 Introduction

The level of inequality in economic resources is a defining characteristic of human societies. This level varies greatly over time, with egalitarian hunter-gatherer groups having been replaced by more unequal agricultural, industrial and, ultimately, post-industrial societies, and across countries.¹ Today, inequality, as measured by the share of pre-tax income earned by the 10% of highest incomes, ranges from close to 70% in South Africa to just over 30% in France (Chancel et al., 2022). In each society, collective institutions such as the government shape how income is (re)distributed, often with the explicit goal of limiting inequality (Saez, 2021).² The questions of who pay the taxes and who benefit from government spending are among the most important in democratic societies.

This paper studies income inequality in the Netherlands, before and after redistribution through taxation and government spending. Following the growing literature on *Distributional National Accounts* pioneered by Piketty, Saez and Zucman (2018) and Garbinti, Goupille-Lebret and Piketty (2018), our inequality statistics are consistent with macroeconomic income concepts used by national statistics offices.³ We are able to provide an exceptionally detailed picture of inequality and redistribution through a wide array of detailed administrative datasets covering the full Dutch adult population. Through access to a ownership registry, we can study the incomes and tax burdens of the (super)rich in a manner not previously possible. Precise data on the receipt of in-kind transfers allow us to study the redistributive impact of this largely unexplored component of government spending. Throughout our analysis, we demonstrate the importance of assumptions for the wider inequality literature and try to quantify the level of uncertainty involved in our own statistics.

For the economists responsible for the earliest versions of modern national accounts, the study of inequality was an indispensable component of those accounts (Tarasov and Colm, 1941; Kuznets and Jenks, 1953). More recently, the Stiglitz-Sen-Fitoussi commission (2009) has advocated to give more prominence to the distribution of income, consumption and wealth in the measurement of economic performance and social progress. While average and aggregate values contain important information, they cannot shed light on topics such as the evolution of poverty, top incomes, and, more generally, the economic well-being of different socio-economic groups. In macroeconomics, recent work has demonstrated that explicitly incorporating the distribution of income and wealth can enhance our understanding of the transmission of monetary and fiscal policy (Ahn et al., 2018; Kaplan, Moll and Violante, 2018). By aligning the study of inequality with the national accounts, our inequality statistics are based on an income concept that is

¹In hunter-gatherer societies inequality is contained by the limited accumulation and inheritance of property (Borgerhoff Mulder et al., 2009). As material wealth became more easily transmissible in agricultural societies levels of inequality rose to levels not unlike those in modern times (Kohler and Smith, 2018).

²Aversion to inequality is not uniquely human. Biologists first documented this trait among capuchin monkeys and have since found it in other monkeys, apes as well as dogs and birds (Brosnan and De Waal, 2003, 2014).

³The OECD's Expert Group on Disparities in a National Accounts Framework (EGDNA) has also worked on providing a distributional dimension to macroeconomic statistics, but restricted its focus to the household sector, thereby ignoring the portion of profits not distributed but instead retained within corporations (Fesseau and Mattonetti, 2013; Zwijnenburg et al., 2021).

consistent and comparable over time and across countries.

We improve on existing studies of inequality and redistribution in the Netherlands which only consider income earned and taxes paid directly by households (e.g., Caminada et al. (2021), Olsthoorn et al. (2017), Salverda (2019) and Bruil (2023)). There have been two notable attempts to construct distributional national accounts for the Netherlands by Blanchet, Chancel and Gethin (2022) and Ederer et al. (2022), but both studies rely mostly on survey data and tax tabulations instead of administrative data, limiting their ability to study the top. The granularity of our data allows us to do exactly that and we find that these studies overstate the progressivity of taxes for the bottom 99% and understate the fall in the tax burden for the top 1%.

Our analysis yields four main sets of results. First, we show that the Netherlands has a level of inequality typical of western European countries, with a top 10% share of pre-tax income of 35% slightly above France and Austria and similar to Germany. The top 10% differs markedly from other groups in terms of their source of income, and the top 1% even more so. Whereas most of the bottom 90%'s income consists of labour and pension income, retained earnings, the difference between profits and dividends, dominate the incomes at the top. Studies that ignore earnings retained within firms miss the predominant form of income of the rich, an issue that has previously been documented by a number of studies using corporate registries to assign retained earnings to individuals in Norway, Chile and Canada (Alstadsæter et al., 2016; Fairfield and Jorratt De Luis, 2016; Wolfson et al., 2016). Furthermore, as highlighted by Kopczuk and Zwick (2020), the decision whether or not to distribute profits depends on the precise design of the taxation of corporate and personal income. This means that the inequality statistics that leave out retained earnings are not robust to changes in tax rates and rules. By including retained earnings in our measure of income, we avoid this issue.

In the Netherlands, we can use a corporate ownership registry to link shareholders to closely-held businesses, even in cases of complex ownership structures. This registry enables us to evaluate conventional methods used to assign retained earnings to individuals, such as assigning them proportional to equity wealth or dividends. We find that these methods approximate the true level of inequality well but suffer from several biases that lead to an underestimation of top income shares. An important problem with these methods is that, because equity wealth and dividends are necessarily positive, they cannot account for the prevalence of negative retained earnings. As a result, shareholders of firms with negative retained earnings are assigned too high a share of aggregate retained earnings, and all other shareholders too low a share. We also use the ownership registry to show the importance of retained earnings for return heterogeneity, as studied by Fagereng et al. (2020) and Bach, Calvet and Sodini (2020).

Second, we find that the tax rate is roughly flat – around 45% – for the bottom 90% and collapses to less than half of this level for the very top. Relying on the ownership registry and other administrative datasets, we are able to compute the first exact estimate of the tax rate of the super rich for a single country, considering taxes levied at the personal and corporate level,

as well as indirect taxes.⁴ Combining our result with studies from Italy, France and the United States we establish that the level of tax progressivity is ultimately determined by the interplay of (regressive) consumption and payroll taxes and (progressive) corporate and personal income taxes. At the very top, personal income taxes make up a near zero share of total income such that the tax burden is almost entirely determined by the corporate income tax. This finding is in line with Bach et al. (2023) who find that the personal income tax largely fails to raise revenue from the very wealthy in France and that the corporate tax only partially makes up for this. We can use the ownership registry to link corporations to individuals and obtain an exceptionally precise picture of both income and taxation at the very top. We show that the methods to assign corporate taxes to individuals used in previous studies, Saez and Zucman (2019) for the United States, Bozio et al. (2024) for France and Guzzardi et al. (2024) for Italy, overstate the effective tax rate of the top 1%.

These results relate to the literature on the taxation of the (super)rich as reviewed by Scheuer and Slemrod (2020) and Güçeri and Slemrod (2023). This group is distinct in that most of their income is tied to their ownership of businesses and can take different forms, each with their own distinct tax consequences: wages, dividends, capital gains or retained earnings. Shareholders may instruct their companies to refrain from paying out dividends in order to avoid personal income taxes. Even if businesses pay out dividends, the personal income tax may be avoided through ownership structures containing one or multiple holding companies. The United States applies a surtax on the retained earnings of personal holding companies, but most European countries do not. Furthermore, complex ownership chains are actively discouraged in the United States through the taxation of intercorporate dividends, while such taxes are prohibited in the European Union because of the Parent Subsidiary Directive (Morck, 2005). These institutional differences may help explain why we find that the European (super)rich pay effectively no personal income taxes, while those in the United States do.

Third, we investigate redistribution through government spending. Using precise data on both cash and in-kind transfers, we show that these are highest for the lowest income groups.⁵ Government spending is responsible for effectively all of the reduction in inequality: the bottom 50%'s (top 10%'s) share of income increases (falls) from 21.5% (35.3%) before to 24.4% (32.9%) after taxes and government spending. In-kind transfers often constitute the largest type of government spending, but few studies have been able to use precise data on the receipt of transfers related to health care and education and have instead had to rely on crude assumptions. We provide the most detailed evidence on the redistributive effect of in-kind transfers to date and show that while in-kind transfers reduce inequality, this reduction is muted by the fact that some recipients of in-kind transfers move into income groups higher up in the distribution as a result of those transfers.

The detailed nature of our data allows us to investigate the biases in conventional methods

⁴While Saez and Zucman (2019) estimate the tax burden of US billionaires, it depends largely on publicly available datasets and should be considered a rough approximation that could be improved through the use of administrative tax data.

⁵These results are in line with those of a government report which looked at the incidence of government spending in 2014 (Olsthoorn et al., 2017).

to assign in-kind transfers to individuals, such as assuming that in-kind transfers are distributed equally, as in Jestl and List (2022), or partly in proportion to income, as in Blanchet, Chancel and Gethin (2022). Most recently, researchers have used distributional incidence profiles from external sources to assign an average amount of in-kind transfers to each pre-tax income group, as in André, Germain and Sicsic (2023) and Gethin (2023a). On the one hand, the lump-sum method understates redistribution because on average, low-income individuals receive higher in-kind transfers than high-income individuals. On the other hand, this method ignores variation in the amount of transfers received conditional on income, and thereby overstates the degree of redistribution. Empirically, the latter bias dominates. The method that uses distributional incidence profiles suffers from the second but not the first bias and as a result overstates the extent of redistribution more so than any of the other methods. The method that assigns some transfers lump-sum and others in proportion to income ultimately yields the estimate of redistribution closest to that based on microdata. However, it does so for the wrong reasons: by incorrectly assuming that individuals with high disposable incomes receive the highest in-kind transfers, it makes up for ignoring the variation of in-kind transfers within income groups.

Finally, we link our data to socio-demographic variables to consider inequality and redistribution across dimensions other than income, such as age, gender and location of residence. We improve upon existing statistics of spatial inequality as reported by the OECD 2022 and the *Linking National and Regional Inequality* project (Bauluz et al., 2023) by considering a comprehensive income concept that includes both labour and capital income, as well as retained earnings, and find that regional inequalities are left largely intact by redistribution. For gender, we go beyond a lot of the recent literature that has focused on pre-tax labour earnings (see e.g., Blau and Kahn (2017) or Kleven et al. (2024)) and show that the totality of government redistribution reduces gender inequality by more than 25%. The reduction primarily results from the fact that women earn lower incomes than men, rather than from facing lower tax rates or receiving higher amounts of government spending conditional on income. Redistribution between age groups is mostly relevant for those above the age of 50, while younger age groups pay in taxes almost as much as they receive in spending.⁶

This paper is organised as follows. Section 2 describes the main institutional features of the Dutch system of taxation and government spending. We discuss our methodological framework and data sources used in Section 3. Section 4 presents the results on the distribution of pre-tax income, while Section 5 does so for redistribution and post-tax income. Section 6 concludes.

2 Institutional background

The Netherlands is a high income, high tax country with an extensive welfare state. In 2016, national income was equal to €592 billion, around €44,000 per adult on average. Tax revenue amounted to just below 45% of national income. Tax collection is highly centralised with local taxes representing less than 2% of national income. Taxes can be decomposed into income taxes

⁶As we will explain in Section 3, this comparison excludes redistribution that occurs through the pension system.

(16%), indirect taxes (12%), payroll taxes and mandatory health insurance premiums (13%), the corporate tax (3%) and the inheritance tax (0.3%).

The Dutch income tax treats labour and capital income differently.⁷ Labour income is taxed according to a progressive schedule with a 52% top rate. The taxation of (income from) capital differs for large shareholdings (at least 5% of a company) and all other forms of wealth (excluding owner-occupied housing and pension wealth). In the former case, capital income (dividends and realised capital gains) is taxed at a 25% rate. In the latter case, a 1.2% tax is levied on the stock of net wealth with no further taxation of the income derived from this wealth. Before being distributed as dividends or retained within the firm, profits are taxed by the corporate tax which has a piecewise linear schedule, with a 20% marginal tax rate on the first €200,000 of profits and 25% on profits in excess of that. Profits related to research and development were taxed at a reduced rate of 5% in 2016.⁸

The largest indirect tax is the Value Added Tax (VAT), which has a 21% standard rate and a 6% reduced rate.⁹ Excise taxes are levied on the purchase of gasoline and diesel, tobacco and alcohol. Other important indirect taxes relate to the ownership of cars, the use of energy, insurance, and the sale of real estate. Payroll taxes consist of contributions related to health care and long-term care, for unemployment and disability insurance, as well as for sickness benefits. In addition, basic health insurance is mandatory and paid for through premiums which are unrelated to income.¹⁰ Finally, gifts and inheritances are taxed according to a progressive schedule, with rates depending on the relationship to the deceased person and with substantial exemptions for the transfer of closely-held businesses.

Government spending reached 43% of national income in 2016 and can be decomposed into in-kind transfers (20%), cash transfers (13%) and collective expenditure (10%). In-kind transfers take the form of health care and long-term care (10%), education (5%), and “other in-kind transfers” (5%). This latter category consists mostly of transfers related to child care, youth care and rental costs. The category cash transfers are almost fully made up of either transfers paid by social security funds (9%) or social assistance (4%). Finally, collective expenditure is mostly made up of costs related to economic affairs (3%), public order and safety (2%), general public services (2%), defence (1%), and environmental protection (1%). We provide a more detailed overview of taxes and forms of government spending in Online Appendix A and Tables A.3-A.7.

In addition to government-provided pay-as-you-go pensions, the Netherlands has a large funded, semi-private pension system with compulsory, tax-deductible contributions. According to the National Accounts, pension funds owned financial assets worth 232% of national income at the end of 2016. The investment income associated with collective pension funds is the

⁷The full text of the Income Tax Act of 2001, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0011353/2016-01-01>.

⁸The full text of the Corporate Tax Act of 1969, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0002672/2016-01-01>.

⁹The full text of the Value Added Tax Act of 1968, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0002629/2016-01-01>.

¹⁰To support households on low incomes, there exists a means-tested cash benefit that is nominally related to health insurance.

largest in the European Union, even in absolute amounts. As a result, through their pension entitlements even individuals at the bottom of the income distribution earn capital income.

The Netherlands records unusually large stocks of inward and outward foreign investment, a result of its role as a conduit country for multinational corporations (Lejour, 2021; Weyzig, 2013). Tørsløv, Wier and Zucman (2023) estimate that 32% of Dutch corporate tax receipts stem from multinational profit shifting. This is why we carefully distinguish between retained earnings that accrue to foreign and Dutch shareholders, as well as between corporate taxes that are ultimately paid by foreign and Dutch shareholders. An extensive explanation of how we do so can be found in Online Appendix C.1.

3 Methodology and data

3.1 Conceptual framework

Throughout our analysis we follow the World Inequality Lab’s Distributional National Accounts (DINA) guidelines as closely as possible (Blanchet et al., 2021). These guidelines provide a coherent framework to analyse the distribution of income and allow for a meaningful comparison of inequality across countries and over time. The ultimate objective of distributional national accounts is to construct inequality statistics that cover all of national income in a manner consistent with macroeconomic aggregates published by statistical offices around the world. An important improvement over traditional inequality estimates is the inclusion of profits retained within firms. Because of this, shareholders of profitable corporations are considered to have incomes proportional to their share in these corporations’ profits, even if they refrain from paying out dividends. In measuring redistribution, we consider all taxes, both direct and indirect, at both the individual and corporate level, and all government spending, whether they take the form of cash transfers, in-kind transfers or collective expenditure. This way, we avoid the sometimes arbitrary and blurry distinction between different types of taxation and government spending that often complicates international comparisons.

In our main analysis, we study inequality and redistribution at the level of individual adults, where “adults” refers to individuals above the age of 20. In line with the literature, we apply the equal-split approach, where all of income, taxes and government spending is shared equally between adult members of the household.

We distinguish three main income concepts, outlined in Table 1. The first, pre-tax factor income, is equal to net national income and corresponds to the sum of income flows accruing to the factors of production before redistribution through social insurance, taxes and government spending. Under this definition, the income of many retirees and the unemployed will be close to zero and the degree of a country’s inequality and redistribution will be largely driven by its age structure and unemployment rate. For this reason, we prefer the second income concept, pre-tax national income, even if its important drawback is that it ignores the redistributive nature of social insurance. To compute this concept, we subtract social insurance contributions from income and add social insurance benefits. The difference between contributions and benefits,

the social insurance surplus or deficit, is distributed proportionally to pre-tax factor income, as recommended by the Distributional National Accounts (DINA) guidelines so as not to affect the distribution of income. The final income concept, post-tax national income, is that which results after the payment of taxes and receipt of government spending. The guidelines recommend to distribute the resulting government deficit or surplus in proportion to pre-tax factor income, which is what we do. This final concept allows us to measure government redistribution and decompose it into effects of the progressivity of taxation and government spending respectively.

All income concepts include earnings retained within corporations, an important form of income and savings at the top of the income distribution. In many countries, there are strong incentives to save income within corporations rather than paying it out in the form of dividends. Because we include retained earnings in our income concept, our results are not affected by changes to those incentives across time and across countries.

In our analysis, we are able to rely on a large number of administrative datasets that we discuss next. These datasets cover the full Dutch population and allow us to relax as well as test many of the assumptions typically required for the study of redistribution. For example, using a newly created registry on the ownership of closely-held businesses, we obtain a more accurate picture of the distribution of profits and corporate taxes. Similarly, for most in-kind transfers we observe the actual recipients of these transfers as well as the transfer amounts received. This allows us to uncover considerable amounts of heterogeneity in the amount of government support received by individuals, even conditional on demographic or income group.

Table 1: From pre-tax factor income to post-tax national income

	Macro total (% of national income)	Macro total (million €)
(1) Pre-tax factor income , (2) + (5) + (6) + (7)	100	591,574
(2) Pre-tax factor income, households, (3) + (4)	74	435,911
(3) Pre-tax factor income, gross, households	78	462,351
(4) Consumption of fixed capital, households	4	26,439
(5) Pre-tax factor income, corporate sector	14	81,917
(6) Pre-tax factor income, government	12	73,689
(7) Pre-tax factor income, non-profit institutions serving households	0	56
(8) Net social contributions	20	119,015
(9) Social security and insurance benefits	18	104,141
(10) Social insurance surplus	3	14,874
(11) Pre-tax national income , (1) - (8) + (9) + (10)	100	591,574
(12) Taxes, excluding social insurance contributions	35	207,742
(13) Cash transfers	4	20,891
(14) Disposable income , (11) - (12) + (13)	68	404,723
(15) In-kind transfers, health	10	56,749
(16) In-kind transfers, non-health	10	60,468
(17) Collective expenditure	10	57,624
(18) Government surplus	3	17,064
(19) Taxes paid by foreigners, net	1	5,056
(20) Post-tax national income , (14) + (15) + (16) + (17) + (18)	101	596,630

NOTE: This table shows the total amount in euros for different income concepts in 2016. We provide additional detail in tables A.1, A.2, A.3, A.4, A.5, A.6 and A.7.

3.2 Data sources

Microdata We build on and refine the work by Bruil (2023) who constructed distributional national accounts for the household sector in the Netherlands. We make use of a large number of administrative datasets, all maintained by Statistics Netherlands. Most of these datasets cover the full Dutch population and can be linked through a unique individual identifier, maintained

by Statistics Netherlands and in most cases based on a person’s social security number. More precisely, the datasets cover every individual registered in the population registry. This also includes homeless individuals, except when they overlap with the population of undocumented immigrants, whom our study does not cover. Datasets that are available at the household level can be linked to individuals through a file that links household identifiers to individual identifiers. In order to fully exploit the depth of the available datasets, our analysis focuses on a single year, 2016, leaving the construction of a time series for future research. While focusing on a single year naturally carries certain risks, we still believe in the broad representativeness of our results. The year 2016 was characterised by a remarkably stable macroeconomic environment. Real economic growth was positive and inflation was very close to zero. The tax and spending shares were both slowly increasing in the years around 2016.

Municipal registers provide information on basic demographic variables (date of birth, gender) as well as household composition and location of residence. Wages and social insurance contributions are taken from linked employer-employee data. Tax data, data on the receipt of cash transfers and data received from financial institutions on interest and dividends further complement the income data.

Our data on wealth rely on a number of administrative datasets such as the cadastral registry, information from pension funds on pension entitlements, tax data, information from financial institutions and an ownership registry for closely-held firms. We can link these datasets to information on income through the individual and household identifiers.

This ownership registry covers all Dutch shareholders who own at least 5% of a company’s shares. This registry was constructed by Statistics Netherlands, combining data from the Dutch Tax Authority and the Chamber of Commerce. Ownership structures vary. In cases of direct ownership, the firm’s shareholder is a natural person, who often serves as the firm’s director. In many cases, however, firms are indirectly owned, through holding firms and subsidiaries. The registry captures all of these links. We observe balance sheets and income statements of all firms, derived from their tax returns. This allows us to trace (retained) profit and taxes paid at the corporate level back to the individual shareholders, even through multiple layers of ownership. One important limitation is that the registry only covers firms registered in the Netherlands. While we do observe dividends received from foreign firms, we cannot capture their retained earnings. Additionally, shareholdings below 5% are not covered by the ownership registry. While we are therefore not able to link these shares to specific companies, we do observe their value and dividends in the tax data. We discuss how this affects our estimates in section 4.2.

For all important cash and in-kind transfers, we observe the receipt of transfers, either in monetary terms or in terms of real consumption. For transfers that are paid out in cash we observe the precise amount received by each household. For education, we observe the type as well as the number of enrolled months.¹¹ For health care, we directly observe individuals’

¹¹In effect, we assume that within education types, the only variation in receipt of education spending comes from the number of months spent at an educational institution. While there exist programs to support schools with a higher proportion of disadvantaged students, these programs are quantitatively small and public funding

expenditure covered by mandatory basic health insurance. For long-term care, youth care and social support services we observe the type, intensity and duration of care for each Dutch resident. When we observe measures of consumption, we combine these with detailed aggregate cost data in order to assign a monetary value of transfers to individuals.

Finally, we use a detailed budget survey to estimate the distribution of indirect taxes. A more detailed description of the datasets can be found in Online Appendix B.

Macroeconomic aggregates The national accounts are constructed and made publicly available by Statistics Netherlands following the European System of National Accounts (Eurostat, 2013). The Dutch national accounts are unusually detailed and are consistently ranked as some of the most complete in the European Union (Eurostat, 2021, 2022). In addition to the publicly available national accounts, we have access to disaggregated tables, for example on the total expenditures for around 50 sub-categories of in-kind transfers. Finally, for earnings on foreign portfolio investment we rely on estimates produced by the Dutch central bank.¹²

In general, we scale variables in the microdata proportionally to match the relevant national account aggregates. To the extent that the discrepancy between the microdata and the national accounts is due to tax evasion, this practice implicitly assumes that different income groups engage in evasion to the same extent. While Leenders et al. (2023) show that evasion is instead concentrated among the top 10% wealthiest households, Alstadsæter, Johannesen and Zucman (2018) estimate that the stock of offshore wealth belonging to Dutch households is only 6% of GDP, which means that the associated income amounts to considerably less than 1%. Thus, accounting for the skewed nature of offshore tax evasion would hardly affect our results.

4 Inequality of pre-tax income

4.1 Pre-tax factor and national income

In this section, we describe our main results regarding the inequality of pre-tax income. Our analysis starts by considering pre-tax factor income, which corresponds to the incomes earned by factors of production before any form of redistribution through social insurance, taxation and government spending takes place. This income concept is composed of labour income, capital income earned by households, earnings retained by corporations, imputed rent and mixed income. Note that some forms of income, such as capital income and retained earnings, can be negative. The more than 13 million adults living in the Netherlands in 2016 earn an average pre-tax factor income of €44,371, but this masks a substantial degree of inequality which we show in Table 2. As discussed in Section 3.1, individuals who depend on pension benefits or unemployment insurance earn near-zero amounts of pre-tax factor income, explaining the

for education is primarily based on the number of students at an educational institution. Most educational institutions are privately run, but publicly funded. The share of students enrolled in privately-run, privately-funded educational institutions is far below the OECD average for upper secondary education, and near-zero for primary and lower secondary education (OECD, 2024).

¹²These estimates are part of an internal update of a report on the Dutch current account (De Nederlandsche Bank, 2013).

average income of only €12,352 for the bottom 50% of adults. The bottom 50% income share is only 13.9% while that of the top 10% is 37.9% leaving 48.2% for the middle 40% (P50-P90).

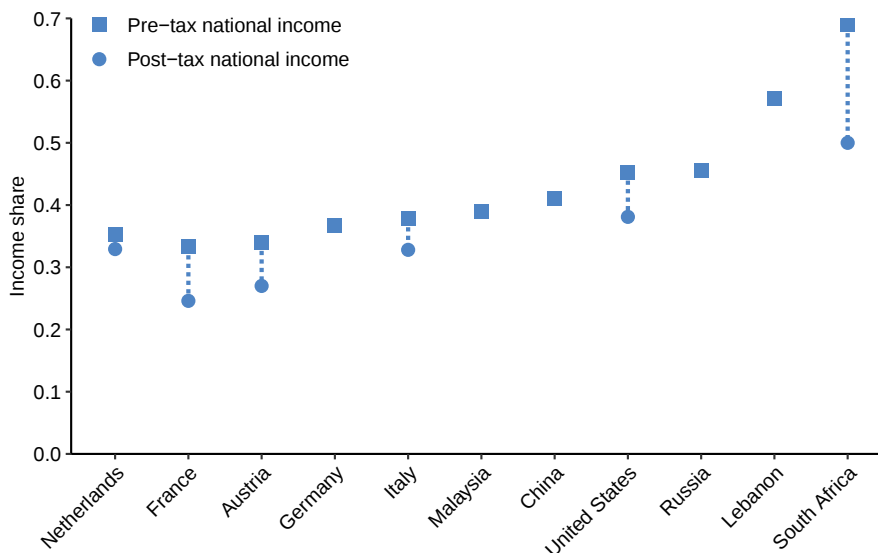
Table 2: The distribution of pre and post-tax income in 2016

Income group	Number of adults	Pre-tax factor income			Pre-tax national income			Post-tax national income		
		Income threshold	Average income	Income share	Income threshold	Average income	Income share	Income threshold	Average income	Income share
Full population	13,332,368		€44,371	100.0		€44,371	100.0		€44,747	100.0
Bottom 50%	6,666,184		€12,351	13.9		€19,049	21.5		€21,811	24.4
Middle 40%	5,332,947	€33,466	€53,467	48.2	€34,158	€47,982	43.3	€34,900	€47,772	42.7
Top 10%	1,333,237	€84,222	€168,083	37.9	€72,164	€156,533	35.3	€70,234	€147,326	32.9
Top 1%	133,324	€235,145	€623,221	14.0	€226,162	€625,482	14.1	€205,568	€585,255	13.1
Top 0.1%	13,333	€1,009,671	€2,641,124	6.0	€1,023,879	€2,694,670	6.1	€955,512	€2,569,045	5.7
Top 0.01%	1,334	€4,271,129	€10,668,753	2.4	€4,372,218	€10,921,054	2.5	€4,160,823	€10,549,048	2.4
Top 0.001%	134	€18,392,004	€39,637,419	0.9	€18,828,918	€40,602,767	0.9	€18,511,744	€39,469,992	0.9
Top 0.0001%	14	€87,588,156	€108,857,900	0.3	€89,761,129	€111,562,388	0.3	€90,844,172	€110,687,676	0.3

NOTE: This table presents statistics on the distribution of pre-tax factor income, pre-tax national income and post-tax national income in the Netherlands in 2016. The unit of analysis is the adult (20+ years old) and income is split among all adult members of a household equally. Income groups are defined in terms of all adults in the population. Adults are ranked according to the income concept that is studied such that they may belong to different income groups depending on the concept of income.

In order to go from pre-tax factor income to pre-tax national income, we need to add social insurance benefits and deduct social insurance contributions. The aggregate difference between benefits and contributions, the social insurance surplus or deficit, is allocated to individuals proportionally to their pre-tax factor income, in line with the guidelines for Distributional National Accounts (Blanchet et al., 2021). Average income remains the same by construction, but the distribution changes when going from factor to pre-tax national income. The income share of the bottom 50% increases to 21.5% at the expense of the middle 40% and top 10%, whose shares fall to 43.3% and 35.3% respectively. The quality of our data allows us to dissect the very top of the income distribution, considering a group as small as the top 0.0001%, a group roughly equal in size to the group of Dutch billionaires, who account for 0.3% of pre-tax factor income.¹³ Comparing the Netherlands to other countries, we show in Figure 1 that pre-tax income inequality in the Netherlands, as measured by the top 10% income share, lies above that of France and Austria and is most similar to that found in Germany and Italy.¹⁴

Figure 1: The share of income accruing to the top 10% in 2016



NOTE: This figure shows the share of pre-tax national income and post-tax national income accruing to the 10% income group, for a set of countries for which comparable estimates are available. We use our results for the Netherlands, Bozio et al. (2024) for France, Jestl and List (2022) for Austria, Bach, Bartels and Neef (2023) for Germany, Guzzardi et al. (2024) for Italy, Khalid and Yang (2021) for Malaysia, Piketty, Yang and Zucman (2019) for China, Piketty, Saez and Zucman (2018) for the US, Novokmet, Piketty and Zucman (2018) for Russia, Assouad (2023) for Lebanon and Chatterjee, Czajka and Gethin (2023) for South Africa.

In addition to the obvious differences in the level of income across the income distribution,

¹³According to the magazine *Quote*, which compiles the Dutch annual rich list, 18 billionaires lived in the Netherlands in 2016. Our ranking of individuals is based on income rather than wealth, but the inclusion of retained earnings means that there is considerable overlap between top income earners and top wealth holders. It is worth noting here that the standard to split income equally among adult household members in a sense understates the income share of billionaires because most billionaires are married to non-billionaires as can be seen in Table A.9.

¹⁴We show the international comparison for the top 1%, middle 40% and bottom 50% income shares in Figures A.1, A.2 and A.3, respectively.

there are striking differences in the source of income. We show in Figure 2 how each income group derives their income from different sources. Labour income and pension benefits make up most of the bottom 90%’s income, but fall in significance for the top 10% and in particular the top 1%. Conversely, capital income and retained earnings play a minor role for the bottom 90%, while dominating the incomes at the top. These patterns show the importance of considering retained earnings when studying the incomes of the rich, often overlooked in traditional inequality studies which focus on personal income.

Figure 2: The composition of pre-tax national income



NOTE: This figure presents the composition of pre-tax income, by group of pre-tax income. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. The decomposition of income is obtained by summing all components of pre-tax national income for each income group, and dividing by the total income accruing to this group.

4.2 The anatomy of retained earnings

The importance of retained earnings at the top of the income distribution warrants a closer look. The Netherlands functions as a conduit country used by multinational corporations for the purposes of profit shifting (Weyzig, 2013; Lejour, 2021). This makes it particularly important to distinguish between retained earnings ultimately accruing to Dutch and foreign households, as well as the corporate taxes paid by either type of household.¹⁵ Furthermore, we need to consider both earnings retained by domestic firms and by firms abroad. Relying on highly disaggregated tables from the national accounts, we find that Dutch households had a claim on retained earnings in both domestic and foreign corporations of €81.9 billion or 14% of national income. Almost 60% of these earnings were retained by domestic firms (€47.6 billion, 8% of national income), while the remainder was retained by firms abroad. The corporate taxes that ultimately accrue to Dutch households amounted to €19.8 billion (3% of national income). Note that this is lower than the total in corporate taxes received by the government because

¹⁵We provide a step-by-step account of how we make this distinction in Online Appendix C.1.

the latter also includes taxes paid by foreign-owned corporations. We do not assign retained earnings accruing to and corporate taxes paid by foreign households to Dutch households.

The ownership registry for closely-held businesses allows us to unravel ownership chains and link domestic firms' retained earnings to shareholders. Tracing ownership through several layers of ownership, we recover €34.1 billion (6% of national income) of earnings retained by closely-held businesses that belong to Dutch shareholders. This does not yet cover earnings retained by widely-held firms. To get at this, we use the fact that 7% of households' shares are held in widely-held firms and assume that payout rates are the same between closely and widely-held firms. This yields an estimate of earnings retained by widely-held firms attributable to households through their equity ownership of €2.4 billion (0.4% of national income), which we assign to individuals proportionally to their equity in widely-held firms. This brings the total of retained earnings that accrue to Dutch households through their equity ownership to €36.5 (6% of national income). The remaining €11.1 billion¹⁶ (2% of national income) in earnings retained by domestic firms accrue to either pension funds or the government. The part that accrues to pension funds is assigned to individuals proportionally to their pension entitlements. The part accruing to the government is treated like other capital income earned by the government and assigned to individuals in proportion to their pre-tax factor income. In Table A.8, we show the impact of including retained earnings in our definition of income. The top 10% income share falls from 35.3% to only 29.1% when we exclude retained earnings.¹⁷ The discrepancy only grows when zooming in on the top: ignoring retained earnings understates the income share of the top 0.0001% by a factor 3. Income groups below the top 10% are less affected, since almost all retained earnings are concentrated among the top 10%.

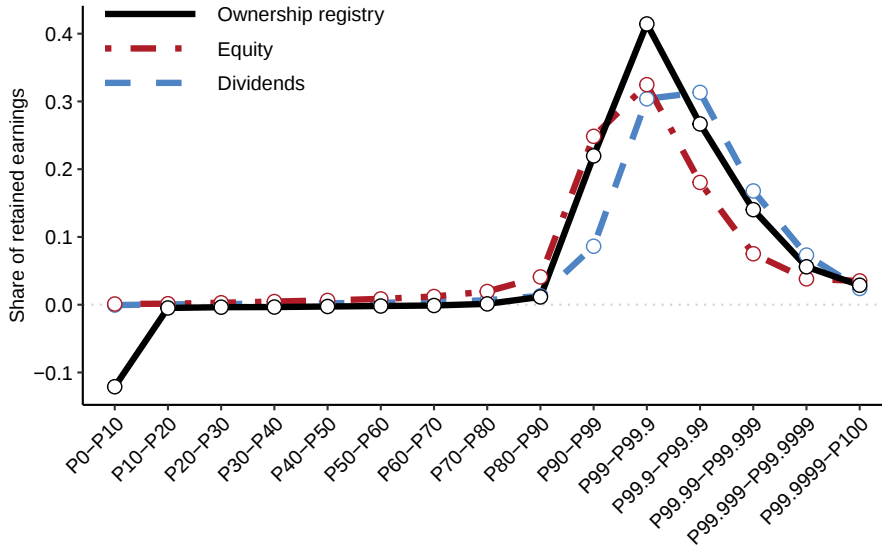
The use of the ownership registry to precisely trace retained earnings to shareholders is an important contribution of our study. In the absence of such a registry, other studies have allocated retained earnings in proportion to either equity wealth or dividends. We find that the use of either of these methods approximates the overall level of inequality well. However, each of these methods has distinct problems and the richness of our data allows us to explore them. We do this in Figure 3, which shows each income group's share in total retained earnings under different allocation methods. A problem shared by both the dividend and equity allocation methods, is that negative retained earnings, which are very common in the microdata, are ignored. The amount of retained earnings recorded in the national accounts is the net result of positive and negative retained earnings. Therefore, the equity and dividend methods tend to underestimate the amount of retained earnings accruing to the top of the income distribution (where retained earnings are typically and partly mechanically positive)¹⁸, and overestimate the amount accruing to the bottom (where negative retained earnings are concentrated). Concretely, we show in Figure A.5 that the equity and dividend allocation methods understate the top 10% income share by as much as 3% (1.2%-points).

¹⁶€47.6 billion minus €36.5 billion.

¹⁷The pre-tax income shares that exclude retained earnings are similar to those in Caminada et al. (2021).

¹⁸In Figure A.4 we also show the distribution of retained earnings if we cap losses at 0.

Figure 3: The distribution of retained earnings under different allocation methods



NOTE: This figure presents the distribution of retained earnings. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Specifically, retained earnings are summed by each income group and then divided by total retained earnings.

Assigning retained earnings in proportion to dividends naturally amplifies the income of those who receive dividends. This is problematic because, conditional on the level of profits, there is a mechanical negative relationship between dividends and retained earnings. Furthermore, this allocation method rests on the assumption that the share of profits retained and distributed does not change with the level of income. We can test this assumption empirically and we show in Figure A.6 that the share of profits distributed falls sharply up until the 90th percentile.¹⁹ It is then relatively flat within the top 10%, with the notable exception of the top 0.0001% who retain almost all of their profits. This is in line with the finding by Saez and Zucman (2020) that billionaires in the United States often own non-dividend paying stocks.

It is less common to assign retained earnings proportional to equity wealth, mostly due to the paucity of administrative data on wealth. In some studies, equity wealth is obtained through capitalising dividends and realised capital gains, in which case many of the previously mentioned concerns remain valid. If instead, equity wealth is taken directly from administrative or survey data, the required assumption is that the rate of return on equity does not differ by income group. This goes against widespread evidence that rates of return are correlated with wealth (Fagereng et al., 2020; Bach, Calvet and Sodini, 2020). In Figure A.7 we divide each income group's claim to profits by its equity wealth. The resulting "rate of return" should be interpreted with caution. The fact that the rate increases with income has two causes. Firstly, there is the true increase that reflects a greater degree of financial sophistication and access to investment opportunities at the top of the income distribution. Secondly, the shares in

¹⁹Note that for the income groups below the 70th percentile, profits by closely-held corporations are miniscule and, on aggregate, negative, which means we cannot express retained and distributed profits as a share of the total.

closely-held businesses are notoriously difficult to value and an undervaluation of these shares automatically leads to an overstatement of rates of return. The problem of undervaluation may be less pressing at the very top because shares are more often held in publicly traded firms, possibly through holding firms.²⁰ Still, for the Netherlands allocating retained earnings in proportion to equity wealth results in the largest understatement of top income shares due to the the positive correlation between the rate of return and income, regardless of its source.

It is important to note that the ownership registry, while a substantial improvement, still faces limitations. The most important is that of cross-border ownership of firms, which is particularly prevalent at the top of the distribution. While we capture the distributed portion of foreign profits, we cannot observe earnings retained abroad. This issue is unfortunately inherent in most national data sets. Future research may be able to use country-by-country reports now required from multinational corporations, but these suffer from their own issues, such as the incomplete coverage of firms. A second issue is that in any given year, a substantial number of firms reports business losses. We address this by adding back certain tax deductions, but the extent to which other forms of tax planning distort corporate tax returns remains an open question that needs to be studied in future research.

5 Redistribution

5.1 From pre-tax to post-tax national income

Post-tax national income is obtained by adding all forms of government spending to and subtracting all taxes from pre-tax national income. This is the income that can be used to accumulate wealth or to consume private and public goods and services. We show the transition in the top 10% share of income as we move from pre-tax to post-tax income in Figure 4.²¹ From this, we can see that the reduction of inequality in the Netherlands is the result of the progressivity of government spending rather than that of taxation.

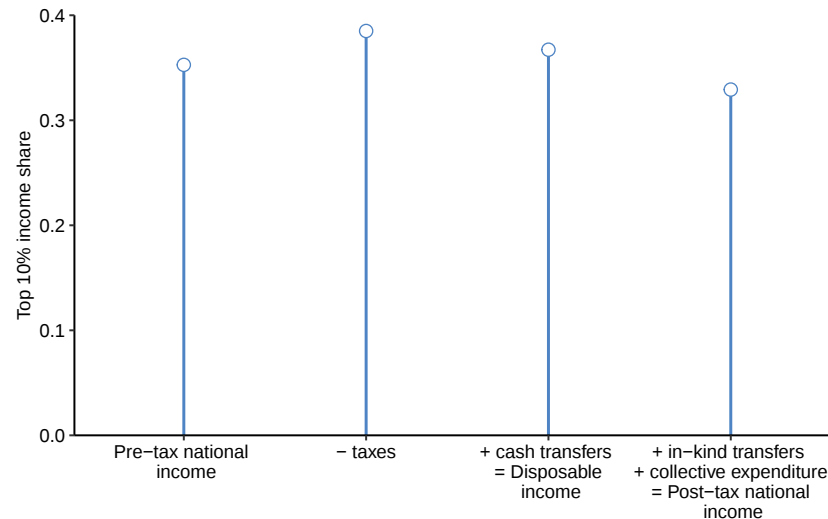
The difference in the inequality of pre-tax and post-tax national income can be seen as the result of two factors. The first factor is that different income groups receive different amounts of government spending and pay different amounts of taxes. The second factor is related to the fact that there is considerable variation in spending received and taxes paid by individuals even within income groups, so that individuals may change income group when moving from pre to post-tax income. Having access to dozens of administrative datasets related to both government spending and taxation makes this paper uniquely suited to study the variation in the net benefit from redistribution. In Figure 5, we show the distribution of the net benefit for each pre-tax income group. Most individuals in all income groups receive between -€25,000 and €25,000 in government spending net of taxes, but there is a non-negligible group in the lower

²⁰We do not try to correct for undervaluation of closely-held shares as our method does not depend on it directly. We observe retained earnings at the firm-level and assign these to individuals in proportion to their ownership share. For an attempt to correct for the undervaluation of shares in closely-held firms, see Toussaint et al. (2020) and Toussaint (2024).

²¹Figures A.8–A.15 shows the same evolution for the income shares of the middle 40% and the bottom 50%, P99-P99.9, P99.9-P99.99, P99.99-P99.999, P99.999-P99.9999, P99.9999-P100 and the Gini coefficient, respectively.

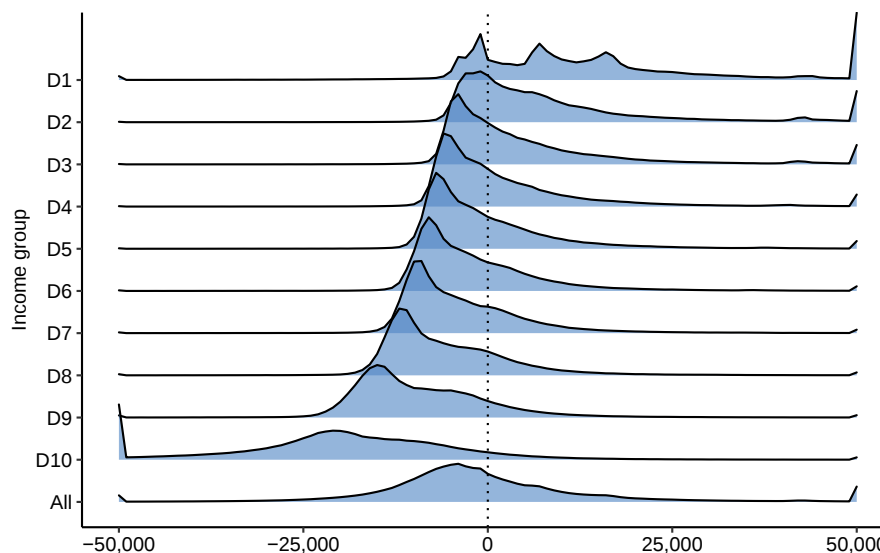
income groups that receives government spending in excess of €50,000. Such large amounts are typically associated with health care and long-term care and can push low pre-tax income individuals into high post-tax income groups.

Figure 4: Top 10% income share under different income concepts



NOTE: This figure presents the top 10% share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable income, or post-tax national income.

Figure 5: The distribution of government spending net of taxes within each income group



NOTE: This figure shows the difference between government spending received and taxes paid by each income group in the Netherlands in 2016. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income.

5.2 Anatomy of redistribution: taxes

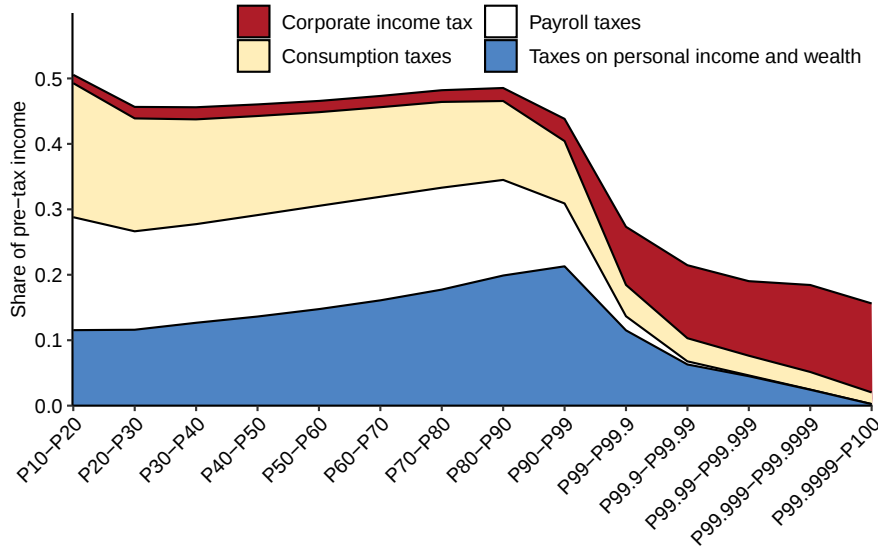
In our analysis of redistribution, we consider all taxes and divide them into four broad categories: taxes on income and wealth, corporate taxes, payroll taxes and consumption taxes. In line with the Distributional National Accounts methodology, we assign taxes to the corresponding factor of production: taxes on labour are assigned to workers, taxes on capital are assigned to the owners of capital. In doing so, we disregard the statutory incidence of taxes: payroll taxes paid by employers are assigned to employees. Consumption taxes are assigned to consumers in proportion to their consumption of taxed goods. Note that this exercise tries to establish who pays taxes, taking as given pre-tax incomes, coined *distributional current-tax analysis* by Saez and Zucman (2023). This differs conceptually from analysing the incidence of (hypothetical) tax reforms, *distributional tax-reform analysis*, which studies how pre-tax and post-tax incomes change in response to changes in tax rates or bases.

The macroeconomic effective tax rate in the Netherlands is equal to 45% of pre-tax national income. Figure 6 shows how this rate varies by income group. This figure includes all taxes and social contributions paid to the government. Strictly speaking, some social contributions are deducted when going from pre-tax factor to pre-tax national income. Still we have included these here to answer the question of how much of all taxes and social contributions each income group pays.²² The tax burden is highest for the lowest income groups with a rate close to 50% of pre-tax national income. It stabilises around the macroeconomic average for income groups between the median and the 99th percentile before falling dramatically to somewhat below 20% for the top 0.0001%.²³ This regressive profile means that inequality increases due to the operation of the tax system, as can be seen in Figure 4. The top 10% income share increases from 35.3% for pre-tax national income to 38.5% when taxes are deducted.

²²In Figure A.16 we exclude payroll taxes.

²³There exists a tradition of estimating the distribution of the tax burden in the Netherlands, but these notably exclude retained earnings and corporate taxes from their analysis as well as a number of smaller taxes such as the inheritance tax. See for example De Kam et al. (1996) and Trimp and De Kam (2011).

Figure 6: The effective tax rate by tax type



NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands in 2016, decomposed by type of tax. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. The effective tax rate is obtained by adding up all taxes paid by each income group and dividing by the pre-tax national income of that group.

The detailed nature of our data allows us to study the sensitivity of our results to different methodological choices. In Figure A.20, we document how the tax burden profile changes when we assign retained earnings and corporate taxes proportionally to either equity wealth or dividends. While the equity and dividend methods somewhat overstate the tax burden of the top 1%, they confirm the general finding of tax regressivity.

Combining our result with studies conducted in Italy, France and the US using the same methodology allows us to draw several general conclusions.²⁴ On average the Dutch tax burden lies above that of the US at a level similar to that of France, but Figure 7 shows that the Netherlands is in fact a high-tax country for low income groups and a low-tax country for the highest earners.²⁵ Tax progressivity is ultimately determined by the interplay of two types of taxes, as we show in Figure 8: consumption and payroll taxes which tend to be regressive and corporate and personal taxes on income which tend to be progressive.

Consumption taxes are typically regressive because the consumption rate falls with income (Blasco, Guillaud and Zemmour, 2023), as is the case in the Netherlands (see Figure C.1).²⁶

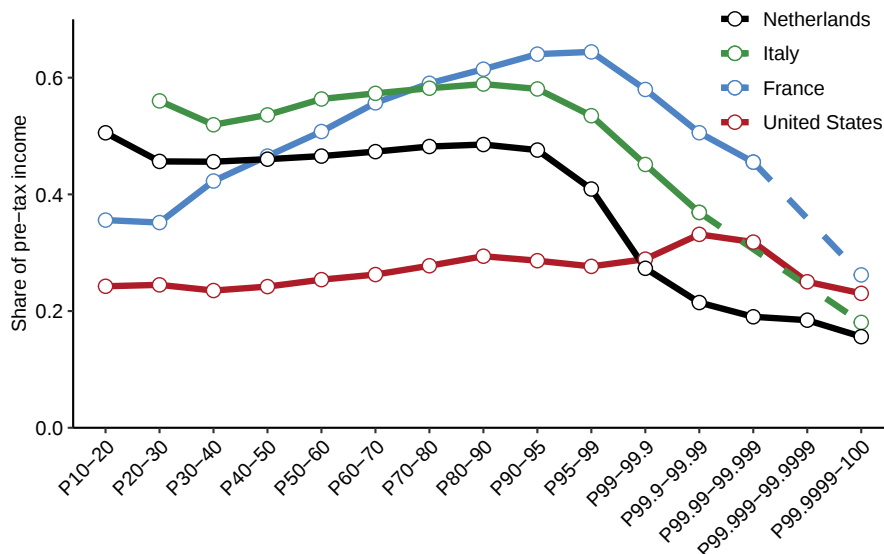
²⁴For the United States, we use the tax profiles in Saez and Zucman (2019). For France, we show the tax profiles from (Bozio et al., 2024) up until P99.99-99.999. For the top group, P99.9999-100, we rely on estimates by Bach et al. (2023). For Italy, Guzzardi et al. (2024) estimate the tax profile up until the top 0.1%. We show this top group here as P99.9-99.99. The data for Italy's top group is an estimate of the tax rate faced by the late Silvio Berlusconi, one of Italy's most prominent billionaires, whose personal tax returns were made public when he was a senator in 2022. Data on his corporate shares were derived from ORBIS 2020 data. This estimate is purely illustrative and was shared with us by Demetrio Guzzardi.

²⁵It is important to note that we only consider taxes in this subsection. In addition to taxes, the receipt of government spending is an important factor determining the ultimate level of post-tax income, especially at the bottom of the income distribution. In Figure A.17 we exclude payroll taxes.

²⁶Consumption can be financed out of current income, savings, or cash transfers. In the latter two cases, individuals may pay consumption taxes even when their income is low.

Some goods may be subject to reduced tax rates or may be exempt altogether, but these policies are usually insufficiently targeted to substantially increase tax progressivity (see Figure A.18).²⁷ The payroll tax burden falls with income for two reasons. Firstly, payroll taxes are levied on labour income and the income of the highest earners is predominantly composed of retained earnings and capital income. Secondly, payroll taxes often feature thresholds above which no additional tax is levied. This is also the case in the Netherlands. As a result, the average payroll tax burden falls rapidly when income exceeds these thresholds.²⁸

Figure 7: The effective tax rate in the Netherlands, Italy, France and the United States

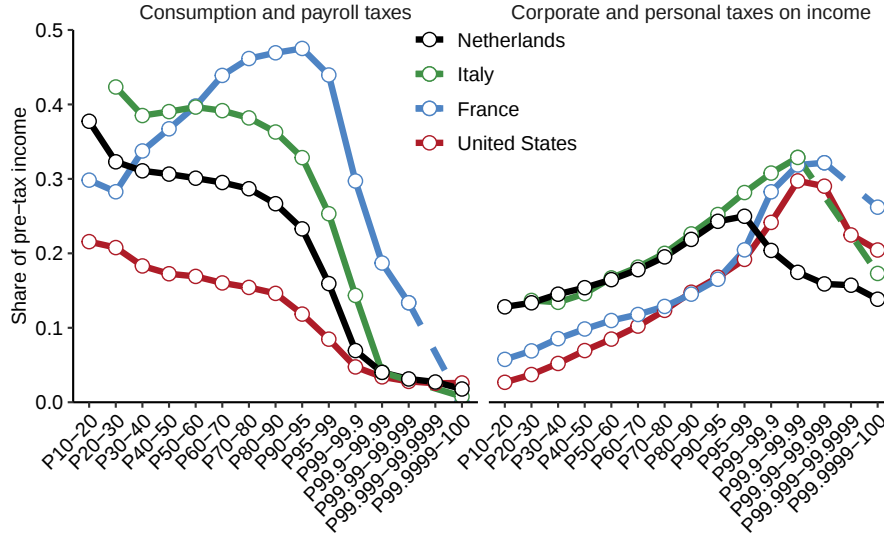


NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands in 2016, and a number of countries for which comparable estimates are available. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. For Italy, we use the 2015 profile from Guzzardi et al. (2024); for France, we use the 2018 profile from Bozio et al. (2024); for the United States, we use the 2018 profile from Saez and Zucman (2019). For the top group in France, we rely on a recent estimate by Bach et al. (2023). For the top group in Italy, we rely on an estimate shared with us by Demetrio Guzzardi which intends to reflect the effective tax rate faced by the late billionaire and politician Silvio Berlusconi.

²⁷Bettendorf and Cnossen (2014) have shown that reduced rates and exemptions in the Dutch VAT have a minor effect on tax progressivity because the consumption patterns of the poor and the rich do not differ a lot in this dimension.

²⁸France is a notable exception in that its payroll taxes are largely progressive. This is the result of a number of reforms during the past 50 years that have been studied by Bozio, Breda and Guillot (2023).

Figure 8: The race for tax progressivity



NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands, Italy, France and the United States, decomposed by tax type. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. The left panel shows the sum of consumption and payroll taxes as a percentage of pre-tax national income for each income group. The right panel does the same, but for corporate and personal taxes on income and wealth.

The personal income tax often exempts those on very low incomes and generally features multiple tax brackets with increasing marginal tax rates. These elements make that the personal income tax burden increases with income.²⁹ At the very top, income is often retained within (holding) firms in such a way that no personal income tax is due, explaining the decreasing importance of this tax among the top 1% of earners (see Figure A.19).³⁰ This is only partially offset by the corporate income tax whose headline rate lies considerably below the top personal income tax rate but which is levied regardless of whether profits are distributed and therefore acts as a sort of minimum tax for the very wealthy.

5.3 Anatomy of redistribution: spending

In a recent study of 151 countries, Fisher-Post and Gethin (2023) show that it is common for tax systems to be flat and for the spending side to account for the bulk of redistribution. The wide range of administrative data sources in the Netherlands allows us to study who benefits from government spending in an exceptionally detailed manner.

Government spending can be divided into collective expenditure, in-kind transfers and cash transfers. Collective expenditure refers to government spending which is deemed non-individualisable. Collective goods and services are i) delivered to all members of a community simultaneously, ii) consumed passively, without the explicit approval of each member, and iii)

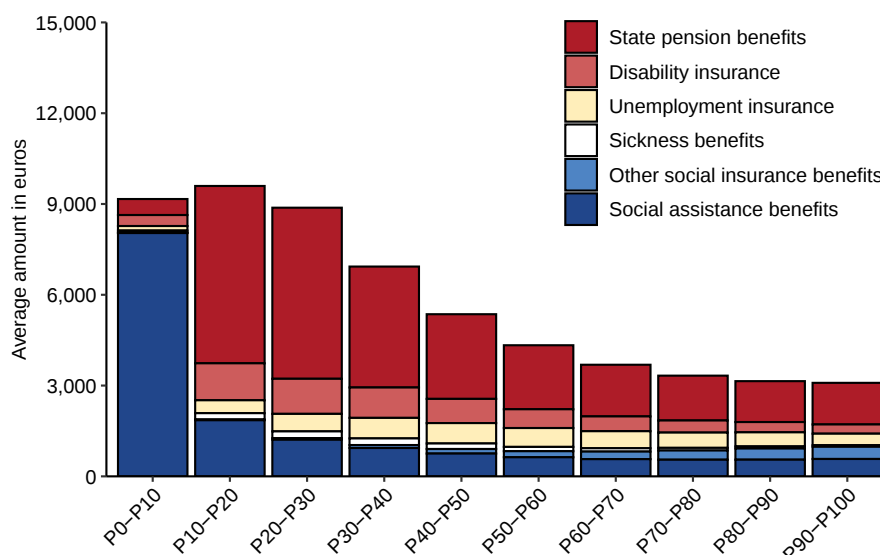
²⁹The progressive profile of the Dutch income tax has previously been documented by Caminada et al. (2021).

³⁰Yagan (2023) similarly finds that the federal income tax imposes a burden of less than 10% of Haig-Simons income on the United States' 400 wealthiest families. Advani, Hughson and Summers (2023) finds a similar though less pronounced decline in the effective tax rate at the top of the distribution in the United Kingdom.

non-rival (Eurostat, 2013). All of these characteristics make it conceptually difficult to assign this type of spending to individuals. Some collective goods (e.g., street lights) seem to benefit all individuals more or less equally, while other goods (e.g., the protection of property) are of greater value to individuals with more property.³¹ In line with the literature, we have decided to treat collective expenditure in a distributionally neutral manner and assign it proportionally to disposable income.³²

We have access to administrative data covering virtually all cash transfers. Cash transfers can be divided into social security benefits (state pension, disability insurance, unemployment insurance, and sickness benefits), which are part of pre-tax national income, and social assistance benefits, which are not. We show a detailed decomposition of cash transfers in Figure 9.³³ Overall, cash transfers are highest at the bottom of the income distribution, largely because of out-of-work welfare benefits. Because of the inclusion of social security benefits in pre-tax national income, their recipients are mechanically pushed up in the income distribution. The broadly universal nature of the state pension explains that even the top 10% of earners receives a small amount of cash transfers.

Figure 9: The average amount of cash transfers received by each income group



NOTE: This figure shows the amount of cash transfers received by each income group in 2016, with more detailed categories than in Figure 11. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Transfers are assigned to the individuals who receive them or, in the case of individuals below the age of 20, their parents.

In-kind transfers make up by far the largest category of spending. In-kind transfers are

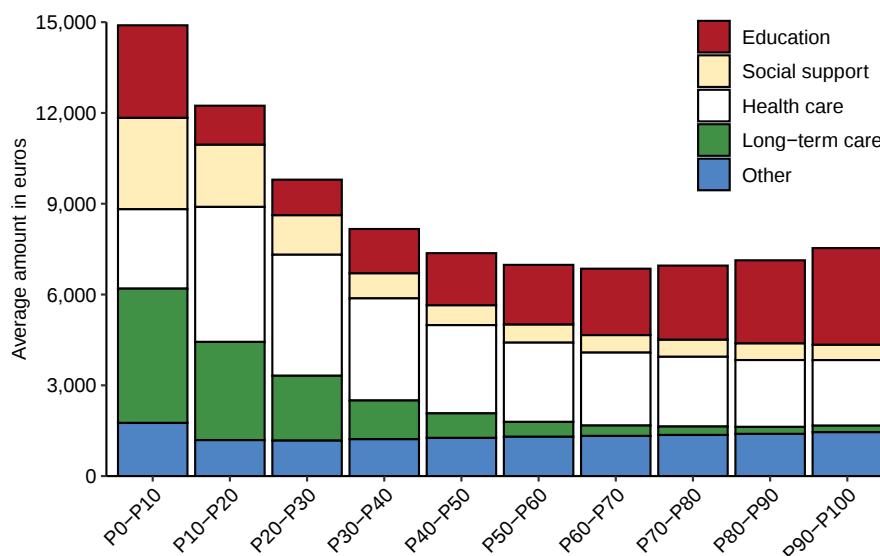
³¹The notion that the benefits of the protection of property offered by the state accrue largely to those who own property has historically been an important argument for the introduction of proportional or progressive tax schedules. See Seligman (1908) for a critical history of these arguments. Even spending on infrastructure may not benefit all citizens equally. Recent evidence from the United States documents substantial differences in road quality between poorer and more affluent neighbourhoods (Currier, Glaeser and Kreindler, 2023).

³²For completeness, we also show the distribution of government spending if we assign collective expenditure on a lump-sum basis in Figure A.21.

³³In Figure A.22, we divide cash transfers by each income group's pre-tax national income.

goods and services, typically related to education or health care, provided to individuals without charge or at a heavily reduced cost. Some in-kind transfers take the form of cash payments that are conditional on the consumption of a specific good or service, such as rental support or child care subsidies. Figure 10 shows that, in absolute terms, in-kind transfers decrease with income up to the 70th percentile and then increase slightly. A more detailed decomposition can be found in Figure A.23. Note that despite this increase in absolute amounts, in-kind transfers still fall rapidly at the top of the income distribution when expressed as a share of income, as we do in Figure A.24.

Figure 10: The average amount of in-kind transfers received by each income group



NOTE: This figure shows the amount of in-kind transfers received by each income group in 2016. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Transfers are assigned to the individuals who receive them or, in the case of individuals below the age of 20, their parents.

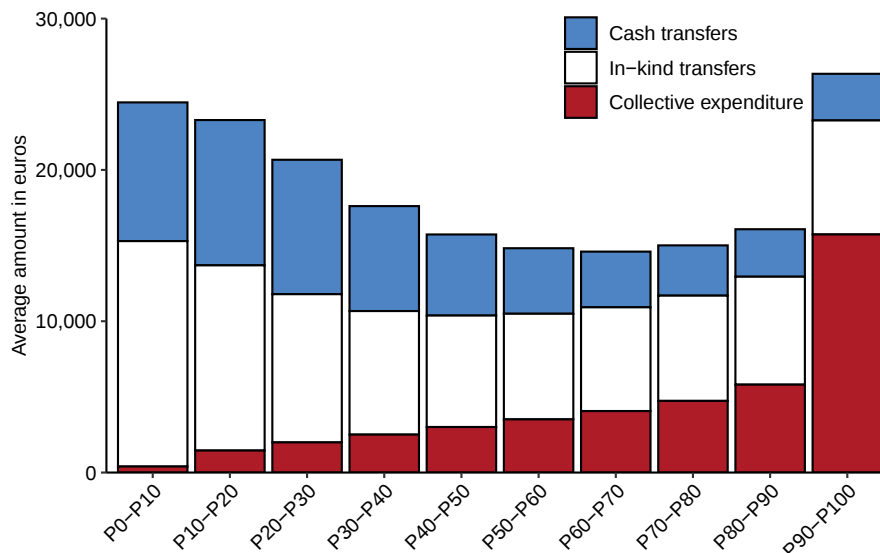
Spending programs that fall under “social support” such as rental assistance or municipal social support are often explicitly means-tested which make this the most progressive type of government spending. Spending on health care, and long-term care in particular, also falls with income. On the one hand, this is the case because the conditions that give rise to health care consumption may also hamper an individual’s earning capacity. On the other hand, government support for long-term care expenditure depends on both income and wealth tests, which may explain why higher income individuals often opt for publicly-funded home care which is less costly than institutional care (Tenand, Bakx and Van Doorslaer, 2020). The reason why the absolute amount of in-kind transfers increases at the top of the distribution is that education spending increases with income. This is not primarily the result of unequal access to education, but rather because the likelihood of having children increases strongly with income, as we show in Figure A.36.³⁴ At the bottom, fewer than 30% of adults is part of a household with children,

³⁴We assign spending on education to the student if they are older than 20 and to their parents otherwise. This explains why a relatively large share of tertiary education spending is received by the bottom decile, around

while over 50% of the top decile is.

When we combine all types of government spending, as we do in Figure 11, we find that the average amount of all government spending falls with income, stabilises around the 70th percentile, and increases for the top decile. Naturally, the decreasing profile is starker when transfers are expressed as a share of income as we do in Figure A.25.

Figure 11: The average amount of government spending received by each income group



NOTE: This figure shows the amount of government spending received by each income group in 2016. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Cash and in-kind transfers are assigned to the individuals who receive them or, in the case of individuals below the age of 20, their parents. Collective expenditure is assigned to individuals in proportion to their disposable income.

Taken together, taxation and government spending reduces income inequality, as illustrated in Figure 4 which shows how the top 10%'s income share evolves when we subtract and add each component to pre-tax national income. Inequality reaches its highest level after removing taxes from pre-tax income, reflecting the regressive nature of taxation. It is reduced by cash and in-kind transfers, which are largest, relative to income, for the income groups at the bottom of the distribution. These components are thus the main drivers of redistribution in the Netherlands, as they are in most other countries (Fisher-Post and Gethin, 2023).

Sensitivity to distributional assumptions Despite the importance of in-kind transfers for overall redistribution, most studies rely on crude assumptions about their distribution because data is scarce. Since we directly observe the receipt of most in-kind transfers at the individual level, we are able to investigate the accuracy of different methods used to assign in-kind transfers to individuals and more generally assess the sensitivity of inequality statistics to different

15% of whom are students. When we assign all education spending to parents instead, the education spending profile does become steeper, but the overall pattern remains mostly driven by primary and secondary education.

methodological choices.³⁵

The most simple method for assigning in-kind transfers is to assign the same amount to each adult (the *Lump-sum* method).³⁶ A slightly different method is the one recommended by the World Inequality Lab’s most recent Distributional National Accounts guidelines which assigns in-kind transfers related to health care in a lump sum manner, while assigning all other in-kind transfers proportionally to disposable income (the *WIL* method). The main motivation for this recommendation lies in the comparison between the United States and countries with public health care systems. This comparison is distorted if health care transfers are assigned to actual (mostly low-income) beneficiaries in the United States while being assigned like collective expenditure, i.e., proportionally to disposable income, in countries with public health care systems. This, however, presumes that no information exists on the use of health care in public systems, which is not necessarily true. Finally, some researchers have used tabulated data on average health care consumption by income group to assign health care spending to individuals (André, Germain and Sicsic, 2023; Gethin, 2023b) (the *Tabulated data* method).

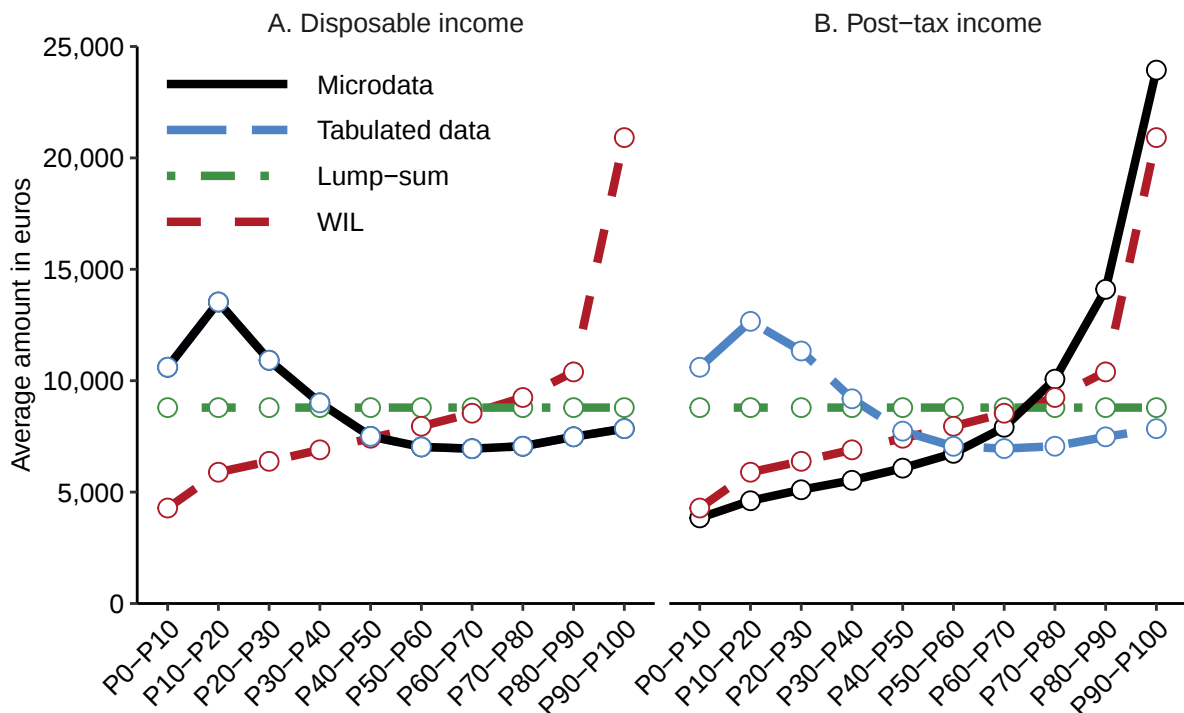
We show in Figure 12 how these different methods compare to assigning in-kind transfers on the basis of their actual receipt.³⁷ It is important to realise that a method may suffer from multiple biases, possibly offsetting each other. A method may thus return the “correct” level of redistribution for the wrong reasons. As we saw in Figure 10, in-kind transfers are highest at the bottom of the income distribution. This is a fact that both the lump-sum and WIL methods fail to capture. In this sense, both of these methods understate the degree of redistribution, as can be seen from panel A of Figure 12. The use of tabulated data overcomes this first type of bias by construction since it matches the average amount of transfers received by each pre-tax income group.

³⁵ An interesting example of a paper showing the sensitivity of inequality statistics to methodological choices is Assouad (2023). This paper shows a decision tree containing the main assumptions and investigates how the top 10% income share changes when varying each of these assumptions.

³⁶ In their preferred specifications, Jestl and List (2022) and Bozio et al. (2024) use the lump-sum method.

³⁷ In Figure A.26, we show more refined versions of the “tabulated data” method.

Figure 12: The average amount of in-kind transfers received by income group under different assumptions



NOTE: This figure shows the average amount of in-kind transfers received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. The *lump-sum* method assigns in-kind transfers equally across all adults. The *WIL* method assigns health care spending lump sum, while assigning all other in-kind transfers proportional to disposable income. The *Tabulated data* method assigns the average value of in-kind transfers received by an income group to all members of that income group. In the left panel, adults are ranked by their disposable income. In the right panel, adults are ranked instead by their post-tax national income.

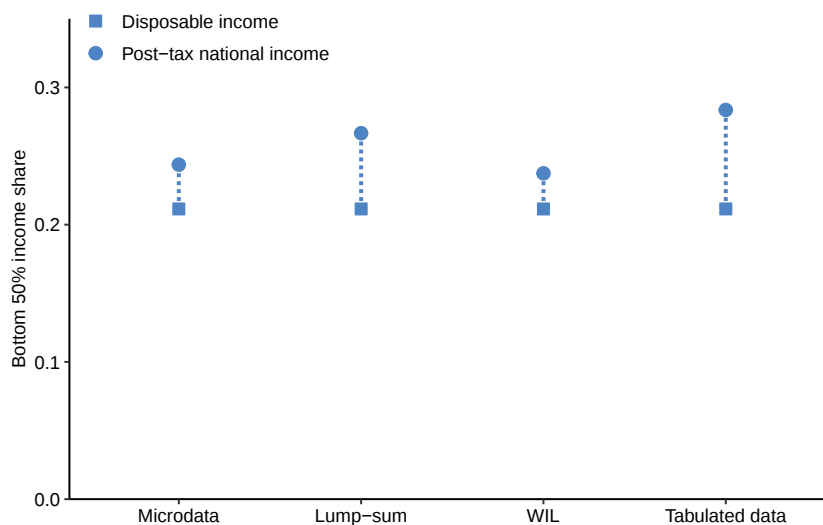
All these methods suffer from a second type of bias. They assign the same amount of in-kind transfers to individuals with the same level of income and therefore ignore inequality in the receipt of in-kind transfers conditional on income.³⁸ This inequality can be considerable, as we show in Figure A.32: most individuals receive in-kind transfers below a few thousand euros, but a non-negligible group receives transfers in excess of €30,000. When we do assign in-kind transfers based on their actual receipt, individuals who receive a lot of in-kind transfers will be pushed up in the post-tax income distribution at the expense of individuals who receive less. This explains why the average amount of in-kind transfers rises with post-tax income, as shown in panel B of Figure 12. In Figures A.27-A.31, we reproduce this figure for education, social support, health care, long-term care and other in-kind transfers separately. These figures show that most of the re-ranking of individuals is due to spending on health care and to an even greater extent long-term care. The WIL method (health care: lump sum, other in-kind

³⁸This concern can be mitigated if the tabulated data provides information on dimensions other than income, such as age or region.

transfers: proportional to disposable income) also returns a profile of in-kind transfers that increases with post-tax income, but does not do so for the right reasons: the average amount increases because a large fraction of in-kind transfers is assigned to individuals in proportion to their disposable incomes, regardless of whether these individuals actually receive in-kind transfers. One way to improve the allocation of in-kind transfers would be to match not just the average receipt, as in the *Tabulated data* method, but also the distribution of transfers conditional on income. This could be achieved, if data allows, by randomly assigning in-kind transfers within income groups so as to match the within-group variation of transfer receipt.

Ultimately, we show in Figure 13 how the redistributive impact of in-kind transfers varies by imputation method. As expected, the method that relies on tabulated data overstates the amount of redistribution most, followed by the lump-sum method. For the Netherlands, the WIL method actually comes closest to the microdata-based “truth”, but as we said, it does not do so for the right reasons. Another illustration of the important differences between the WIL and microdata imputation methods in spite of similar amount of redistribution is presented in Appendix Table A.10, which shows transition matrices between groups of pre- and post-tax income, for different imputation methods for in-kind transfers. Our approach generates more re-ranking, with fewer individuals on the matrix diagonal (i.e., same income rank pre- and post-tax) and more moving up or down the income distribution as a result of taxes and government spending.

Figure 13: Inequality reduction through in-kind transfers under different assumptions



NOTE: This figure shows the share of disposable and of post-tax national income of the bottom 50% in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. Adults are ranked by either disposable or post-tax national income. The *lump-sum* method assigns in-kind transfers equally across all adults. The *WIL* method assigns health care spending lump sum, while assigning all other in-kind transfers proportional to disposable income. The *Tabulated data* method assigns the average value of in-kind transfers received by an income group to all members of that income group.

Comparison to Blanchet, Chancel and Gethin (2022) Compared to our results, Blanchet, Chancel and Gethin (2022) find a lower level of pre-tax income inequality and a higher degree of redistribution. There are two factors that at least partially explain the low level of inequality. First, Blanchet, Chancel and Gethin (2022) calibrate their survey data on top-coded tax data tabulations, which mechanically suppresses top income shares.³⁹ Second, they use the ECB’s Household Finance and Consumption Survey (HFCS). Unlike in other countries, the Dutch survey does not oversample wealthy households, meaning that they are largely missing from the survey (Vermeulen, 2018). Consequently, Blanchet, Chancel and Gethin (2022) conclude that the top 10% of earners owns a rather low 21.7% of corporate stocks. As a result, adding retained earnings in proportion to stocks only increases their top 10% income share by 1.0%-point, compared to more than 6%-points according to our estimates. One factor explaining part of the discrepancy in measured redistribution is that Blanchet, Chancel and Gethin (2022) allocate non-health in-kind transfers and collective expenditure proportional to the sum of disposable income and a lump-sum amount for health care spending (instead of proportional to only disposable income, as prescribed by Blanchet et al. (2021)). This raises their bottom 50%’s post-tax income share by almost a full percentage point.

Discussion of the post-tax income concept Our analysis emphasises the sensitivity of the redistributive impact of in-kind transfers to distributional assumptions. Our results reveal the importance of using individual data for the distribution of in-kind transfers if the goal is to determine which individuals actually benefit from government spending. Yet the granularity of our data also sheds light on previously overlooked conceptual issues regarding post-tax national income. When assigning in-kind transfers on the basis of their actual receipt, individuals receiving high amounts of health care-related in-kind transfers could end up at the top of the post-tax income distribution. This is less true for cash transfers because their range is considerably smaller.

Many in-kind transfers aim to alleviate specific disadvantages such as being in poor health. It would therefore be wrong to conclude that individuals with high post-tax incomes are necessarily “well-off” in a non-monetary sense. A large literature has tried to more closely approximate a notion of “welfare” by accounting for differences in “need” due to differences in household composition by using so-called “equivalence scales” (Buhmann et al., 1988). Aaberge et al. (2010), Aaberge et al. (2019) and Aaberge, Langørgen and Lindgren (2024) further try to address differences in “needs” for in-kind transfers with specific equivalence scales for in-kind transfers. It is important to note, however, that we have thus far only considered inequality in income and have not made any claims regarding welfare. Estimating inequality in welfare is an immeasurably more ambitious as well as contentious exercise which would require accounting not just for income, wealth, but also tastes, health (of oneself, of family members and friends), age, relationship status, and equivalence scales only very partially do so.

There are a few more reasons why we do not use equivalence scales. These scales typic-

³⁹Specifically, dividend income is capped at €250,000.

ally depend on the number and age of household members, and are applied to pre-tax income, taxes and government spending to obtain “equivalised income”. This breaks the link between inequality statistics and the national accounts. The sum and growth of equivalised income are not equal to those of national income. Another problem is that the most commonly used equivalence scales do not depend on income and thus do not account for the fact that a substantial portion of income is not consumed but saved, especially so at the top of the income distribution. Under the commonly used modified OECD scale, a child aged 14 or above counts as half a consumption unit. Concretely, this means that having two such children reduces the equivalised income of a single parent on an average income by €22,000, but that of a single parent in the top 0.0001% by €56 million. This income-independent adjustment poorly reflects the true change in needs associated with children and results in an understatement of inequality.

In-kind transfers make up almost half of all government spending and require further discussion. For any international comparison, it is naturally crucial that the same method for their allocation is used. However, we feel reluctant to allocate these transfers in a way that ignores who receives government transfers when data exists that identifies the actual recipients. An important reason is that this creates a somewhat arbitrary distinction between cash transfers, which are allocated to the actual recipients, and in-kind transfers, which are not. The distinction between these different categories of spending can be blurry and so treating them differently would make measures of redistribution more fragile.

In the case of spending on health care and long-term care, some have alluded to the idea of allocating these categories not on the basis of their receipt but according to their “insurance value”. There are several reasons why we have reservations about such an approach. First, while many forms of public health spending can be seen as providing insurance against the financial consequences of health shocks, many taxes and cash transfers provide insurance against income shocks. While it is interesting to consider the insurance value of all the different forms of government spending and taxes, it is outside of the scope of this project.⁴⁰ It then seems somewhat arbitrary to treat spending on health care and long-term care differently from other types of spending. Second, one might want to account for the fact that the insurance value is higher for the elderly given that they face higher health risks. However, it is unclear which factors to consider in addition to age and this adds another element of arbitrariness. Besides, if one has sufficiently granular data to compute the insurance value that reflects an individual’s underlying health status, this value could be very close to the value of the spending actually received in the case of individuals suffering from chronic diseases. It is important to note that many such cases would actually not be covered by insurance in the absence of government regulation such as insurance mandates, defined sets of essential health benefits, and policies that prohibit insurers from screening on the basis of health status.

It is also worth noting that measuring redistribution as the difference between pre-tax and post-tax incomes can give an incomplete picture of the impact of government policy on inequality. As Bozio et al. (2024) argue, redistributive policies affect both pre-tax and post-tax

⁴⁰See e.g., Stepner (2019) for an attempt to estimate the insurance value of progressive taxes and transfers in Canada.

incomes. For example, if high earners reduce their pre-tax income in response to high tax rates, the difference between pre-tax and post-tax income would understate the true equalising effect of government policies.

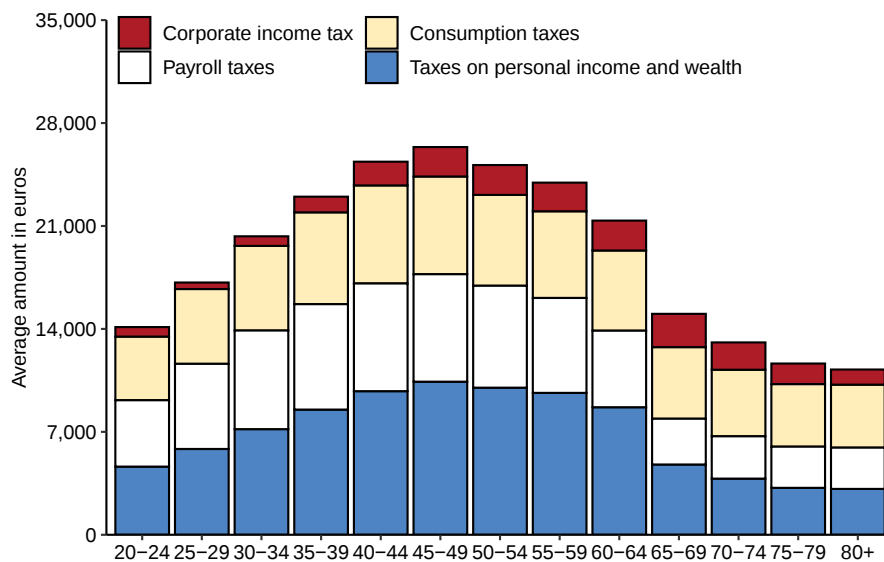
Finally, even though we study the redistributive impact of the system of taxation and government spending as a whole, it is worth mentioning that the primary goal of many government programs is not to redistribute across income groups. In the case of health care, for example, the intended redistribution is from the healthy to the unhealthy. Other programs explicitly redistribute from the young to the old. In the next section, we show how our analysis can be extended to study such redistribution along dimensions other than income.

5.4 Redistribution across social groups

So far we have looked at inequality and redistribution along the income dimension, but both phenomena are more complex than that. In modern states, resources may be redistributed along many different dimensions, such as age, gender, or region. By linking our income data with other administrative data, we can study many of these different dimensions of redistribution.⁴¹

To take age as an example, we show how the average tax burden varies with age in Figure 14.⁴² Since the majority of taxes are levied on either labour income or consumption, the distribution of taxes largely reflects the distribution of income across age groups, which we show in Figure A.34. The only tax category that increases roughly monotonically until the highest age groups is the corporate income tax, reflecting the higher concentration of equity ownership, both directly and indirectly through pension funds, among the old.

Figure 14: The average tax burden by age



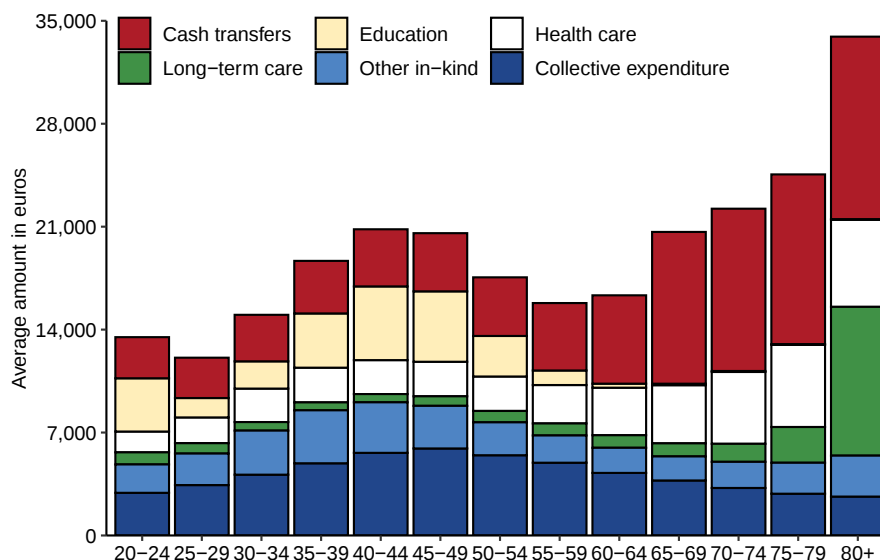
NOTE: This figure shows the amount of taxes paid for different age groups in 2016. The unit of analysis is the individual adult. Taxes on labour are assigned to workers. Taxes on capital are assigned to the owners of capital. Consumption taxes are assigned in proportion to the consumption of taxed goods and services.

⁴¹André, Germain and Sicsic (2023) also study inequality and redistribution across social groups.

⁴²In Figure A.33 we show how the tax burden expressed as a share of pre-tax national income varies with age.

The age distribution of government spending shown in Figure 15, on the other hand, is not primarily determined by the income-age profile. Education spending is concentrated among the age groups that contain a high share of parents with school-going children, as well as among students in the 20-24 age group.⁴³ The receipt of health care-related transfers increases with age, but most clearly so for the 80+ age group, in part because of the large public long-term care sector in the Netherlands.⁴⁴

Figure 15: The receipt of government spending by age



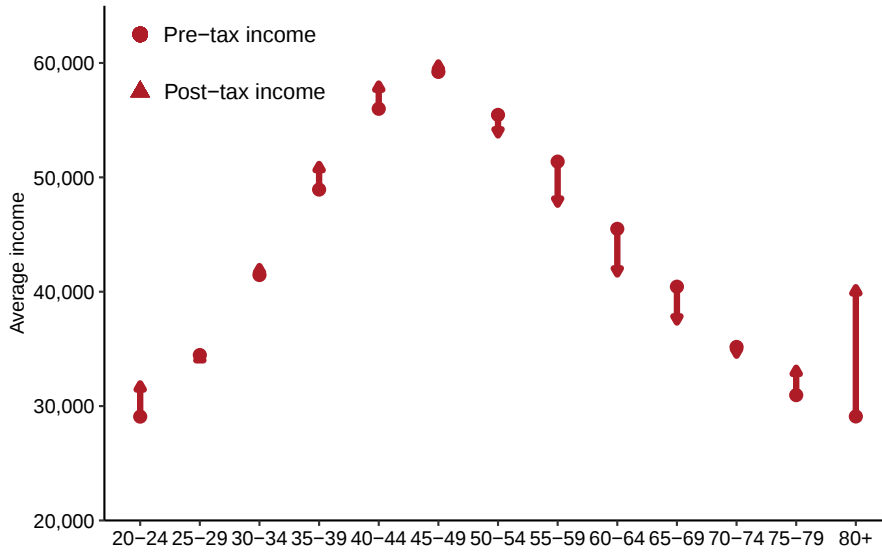
NOTE: This figure shows the value of government spending received by different age groups in 2016. The unit of analysis is the individual adult. All cash and in-kind transfers are assigned to the individuals who receive them. Collective expenditure is assigned to individuals in proportion to their disposable income.

We combine taxation and spending to show the net impact of redistribution by comparing each age group's share of pre-tax and post-tax national income in Figure 16. Interestingly, most redistribution takes place between the age groups over 50, while those between the ages 25 and 50 receive roughly as much in government spending as they pay in taxes. Recall that the redistribution related to the social insurance system happens when going from pre-tax factor income to pre-tax national income and is thus not included here. When considered in a static framework as in this paper, redistribution through the social insurance system would mostly benefit those above the retirement age (around 65 in 2016) at the expense of the working-age population's older cohorts.

⁴³We show in Figure A.35 what share of adults in each income group belongs to which age group. In Figure A.36 we show the prevalence of different household types across the income distribution.

⁴⁴See Bakx, Van Doorslaer and Wouterse (2023) for more details on the system of long-term care in the Netherlands.

Figure 16: Pre- and post-tax income by age



NOTE: This figure shows the share of pre-tax national income and post-tax national income accruing to different age groups in 2016. The unit of analysis is the individual adult and income is split equally among all adult members of a household.

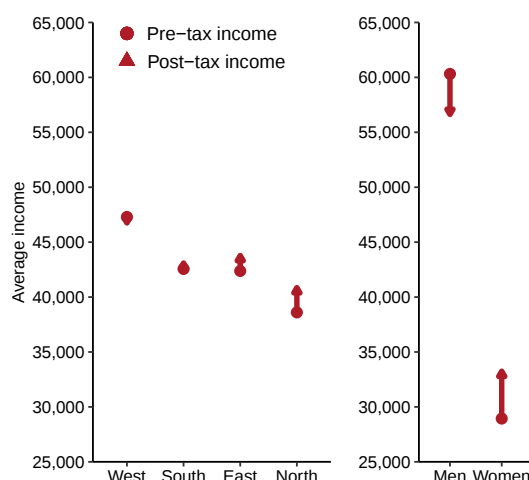
We repeat this exercise for other dimensions such as region and gender in Figure 17. There is a growing interest in spatial inequality, as evidenced by the construction of regional statistics by the OECD (2022) and the multi-country *Linking National and Regional Inequality* project (Bauluz et al., 2023). With individual-level data on residency, it is reasonably straightforward to construct *Distributional Regional Accounts*. Here, we show statistics at the NUTS1 level, but our data allows us to study inequality and redistribution across much finer geographic categories such as municipalities or ZIP codes. Our regional accounts have a number of advantages over traditional methods to analyse both between- and within-region inequality. First of all, we use a comprehensive income concept that includes not just labour income, but also distributed and undistributed profits. Importantly, these profits are assigned to the locations where a firm's shareholders live rather than to the location of production. This latter point is particularly relevant for highly localised production where the location of production and ownership are largely unrelated, such as resource extraction. We find that there is considerable geographic inequality in pre-tax income between NUTS1 regions, with an average of over €47,000 in the west of the Netherlands and less than €39,000 in the north.⁴⁵ This inequality is left largely unchanged by redistribution.

Finally, one of the most prominent dimensions of inequality is that of gender. A large body of research has documented a decline in the gender wage gap over much of the 20th century in many countries around the world (Blau and Kahn, 2017; Neef and Robilliard, 2021). In the last years, a lot of research has focused on the role of children in explaining this wage gap (see e.g., Kleven, Landais and Søgaaard (2019) and Lundborg, Plug and Rasmussen (2017)). An

⁴⁵In Figure A.37 we show the flip side of this result by plotting the prevalence of the different regions for each income group.

important finding from this literature is that gender inequality in pre-tax labour income has been left largely unaffected by the expansion of family policies in the past 60 years (Kleven et al., 2024). Our analysis allows us to look beyond pre-tax income and also consider the direct effect of redistribution on gender inequality. For this part of our analysis, we have to deviate from the usual choice of splitting resources equally among the adult members of households. Instead, we assign income, taxes and spending that can be individualised to the individual that receives or pays it and only split resources equally when they cannot. This approach unavoidably ignores redistribution that occurs within households. We find that government redistribution leads to a sizeable fall in the gender gap: the difference in the average income falls by a quarter, from €31,377 for pre-tax income to €23,370 for post-tax income.

Figure 17: Redistribution across region and gender



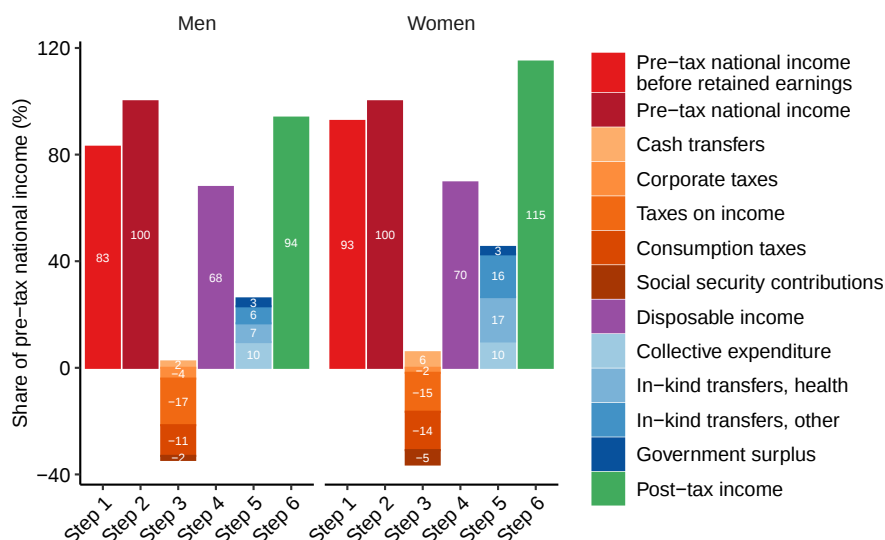
NOTE: The left panel of this figure shows the share of pre-tax national income and post-tax national income accruing to different regions in 2016. The unit of analysis is the individual adult and income is split equally among all adult members of a household. The right panel shows the share of pre-tax national income and post-tax national income accruing to men and woman, respectively. The unit of analysis is the individual adult, but, exceptionally, income is assigned to the individual who nominally earns it.

In Figure 18, we show the gradual transition from pre-tax to post-tax income for men and women separately. In these figures, each income category is expressed as a share of the group's pre-tax national income. The combination of taxation and government spending result in post-tax incomes that exceed pre-tax incomes for women, while the reverse is true for men. The tax burden when expressed as a percentage of pre-tax national income is similar for men and women, but cash and in-kind transfers represent a greater share of income for women. This is primarily the result of the fact that women's incomes tend to be lower, and transfers are targeted at those lower in the income distribution.⁴⁶ Figure A.39 shows that conditional on income there are small differences in the amounts of transfers received by men and women, but these matter less than the fact that women's average pre-tax national income lies below that of men. In Figures A.40 and A.41, we perform a similar analysis for geographical inequality and redistribution and find essentially no differences across regions in the generosity of government

⁴⁶In Figure A.38, we show that women are overrepresented at the bottom of the income distribution.

spending conditional on income.

Figure 18: Transition from pretax to post-tax income, by gender



NOTE: This figure presents the transition from pre-tax national income before retained earnings to post-tax income for men and women separately. Each income component is expressed as a share of each gender's pre-tax national income. The unit of analysis is the individual adult, but, exceptionally, income is assigned to the individual who nominally earns it.

6 Conclusion and perspectives

This paper has sought to answer some of the most pressing questions in economic policy: how is income distributed, which social groups contribute to the government's revenues and which groups benefit from its spending? To answer these questions for the Netherlands, we have combined exceptionally comprehensive administrative datasets with household surveys and detailed macroeconomic data. The richness of the data has allowed us to critically review the importance of several crucial assumptions and quantify the uncertainty of inequality statistics. Our study reveals a number of interesting avenues for future research.

First, in today's world the ownership of financial assets is highly globalised. This has important implications both for the measurement of income as well as that of tax burdens, in particular at the very top of the distribution. Income that is retained by foreign firms abroad is mostly not captured by national data sources. To overcome this issue, researchers could exploit cross-border datasets, such as the OECD's Country-by-Country Reports that have already been used to study tax avoidance (Garcia-Bernardo, Janský and Tørsløv, 2021). These reports contain information on income and taxes paid by a limited set of very large firms, but do not provide information on smaller firms.

Second, we have provided a snapshot of income and redistribution, but one would ideally follow individuals over a longer period of time. In some cases, the generation of income and the payment of taxes or receipt of spending may not perfectly align. Average income across

several years may be a more robust indicator of an individual’s “ability to pay”. Relatedly, corporate tax returns reveal a high prevalence of firms with business losses in any given year, even after adding back certain tax deductions. It is vital to study the extent to which these losses represent true economic losses rather than mere tax planning. This could lead to improvements to inequality statistics as well as to the national accounts.

Third, in this study, we have measured the redistributive impact of government spending by its cost value. A natural, but ambitious next step would be to study the causal effect that different types of government spending have on (future) pre-tax income. There is already an abundance of research studying the causal effects of (public) education (see e.g., Card (1999)), and to a lesser extent that of certain types of income support (Hoynes, Schanzenbach and Almond, 2016). As of yet, however, no effort has been undertaken to combine such estimates in a comprehensive analysis of the effects of government redistribution.

The distributional tax profiles presented in this study can be used by policy makers who pursue a specific degree of tax progressivity. We have documented the significance of the corporate tax at the very top of the income distribution. This underlines the importance for tax progressivity of current efforts undertaken by the OECD to impose a minimum tax on corporate profits, as well as of initiatives to similarly introduce minimum levels of taxation for billionaires. Still, today, most redistribution occurs through the spending rather than the tax side. This insight warrants more empirical as well as conceptual research into the precise distributive impact of different spending programs.

References

- Aaberge, Rolf, Audun Langørgen, and Petter Lindgren.** 2024. “A European Equivalence Scale for Public In-Kind Transfers.” *Journal of Economic Inequality*, 22: 1–32.
- Aaberge, Rolf, Lasse Eika, Audun Langørgen, and Magne Mogstad.** 2019. “Local Governments, In-Kind Transfers, and Economic Inequality.” *Journal of Public Economics*, 180: 103966.
- Aaberge, Rolf, Manudeep Bhuller, Audun Langørgen, and Magne Mogstad.** 2010. “The Distributional Impact of Public Services When Needs Differ.” *Journal of Public Economics*, 94: 549–562.
- Advani, Arun, Helen Hughson, and Andy Summers.** 2023. “How Much Do the Rich Really Pay? Evidence from the UK.” *Oxford Review of Economic Policy*, 39(3): 406–437.
- Ahn, SeHyoun, Greg Kaplan, Benjamin Moll, Thomas Winberry, and Christian Wolf.** 2018. “When Inequality Matters for Macro and Macro Matters for Inequality.” *NBER Macroeconomics Annual*, 32(1): 1–75.

- Alstadsæter, Annette, Martin Jacob, Wojciech Kopczuk, and Kjetil Telle.** 2016. “Accounting for Business Income in Measuring Top Income Shares: Integrated Accrual Approach using Individual and Firm Data from Norway.” NBER Working Paper 22888.
- Alstadsæter, Annette, Niels Johannesen, and Gabriel Zucman.** 2018. “Who Owns the Wealth in Tax Havens? Macro Evidence and Implications for Global Inequality.” *Journal of Public Economics*, 162: 89–100.
- André, Mathias, Jean-Marc Germain, and Michaël Sicsic.** 2023. “Do I Get My Money Back?: A Broader Approach to Inequality and Redistribution in France With a Monetary Valuation of Public Services.” Document de travail Insee 2023-07.
- Assouad, Lydia.** 2023. “Rethinking The Lebanese Economic Miracle: The Extreme Concentration of Income and Wealth in Lebanon, 2005–2014.” *Journal of Development Economics*, 161: 103003.
- Bach, Laurent, Antoine Bozio, Arthur Guillouzo, and Clément Malgouyres.** 2023. “Quels Impôts Les Milliardaires Paient-Ils ?” Note de l’IPP n° 92.
- Bach, Laurent, Laurent Calvet, and Paolo Sodini.** 2020. “Rich Pickings? Risk, Return, and Skill in Household Wealth.” *American Economic Review*, 110: 2703–2747.
- Bach, Stefan, Charlotte Bartels, and Theresa Neef.** 2023. “Distributional National Accounts (DINA) for Germany, 1992-2016.” Available at SSRN: <https://ssrn.com/abstract=4487665>.
- Bakx, Pieter, Eddy Van Doorslaer, and Bram Wouterse.** 2023. “Long-term Care in the Netherlands.” NBER Working Paper 31823.
- Bauluz, Luis, Paweł Bukowski, Mark Fransham, Annie Lee, Margarita López Forero, Filip Novokmet, Sébastien Breau, Neil Lee, Clément Malgouyres, Moritz Schularick, and Gregory Verdugo.** 2023. “Spatial Wage Inequality in North America and Western Europe: Changes Between and Within Local Labour Markets 1975-2019.” World Inequality Lab WP 2023/14.
- Bettendorf, Leon, and Sijbren Cnossen.** 2014. “The Long Shadow of the European VAT, Exemplified by the Dutch Experience.” *FinanzArchiv / Public Finance Analysis*, 71(1).
- Blanchet, Thomas, Lucas Chancel, and Amory Gethin.** 2022. “Why Is Europe More Equal than the United States?” *American Economic Journal: Applied Economics*, 14(4): 480–518.
- Blanchet, Thomas, Lucas Chancel, Ignacio Flores, and Marc Morgan.** 2021. “Distributional National Accounts Guidelines: Methods and Concepts Used in the World Inequality Database.” World Inequality Lab.

- Blasco, Julien, Elvire Guillaud, and Michaël Zemmour.** 2023. “The Inequality Impact of Consumption Taxes: An International Comparison.” *Journal of Public Economics*, 222: 104897.
- Blau, Francine, and Lawrence Kahn.** 2017. “The Gender Wage Gap: Extent, Trends, and Explanations.” *Journal of Economic Literature*, 55(3): 789–865.
- Borgerhoff Mulder, Monique, Samuel Bowles, Tom Hertz, Adrian Bell, Jan Beise, Greg Clark, Ila Fazzio, Michael Gurven, Kim Hill, Paul Hooper, William Irons, Hillard Kaplan, Donna Leonetti, Bobbi Low, Frank Marlowe, Richard McElreath, Suresh Naidu, David Nolin, Patrizio Piraino, Rob Quinlan, Eric Schniter, Rebecca Sear, Mary Shenk, Eric Alden Smith, Christopher Von Rueden, and Polly Wiessner.** 2009. “Intergenerational wealth transmission and the dynamics of inequality in small-scale societies.” *Science*, 326(5953): 682–688.
- Bozio, Antoine, Bertrand Garbinti, Jonathan Goupille-Lebret, Malka Guillot, and Thomas Piketty.** 2024. “Predistribution vs. Redistribution: Evidence from France and the U.S.” *American Economic Journal: Applied Economics*, 16: 31–65.
- Bozio, Antoine, Thomas Breda, and Malka Guillot.** 2023. “Using Payroll Taxes as a Redistribution Tool.” *Journal of Public Economics*, 226: 104986.
- Brosnan, Sarah, and Frans De Waal.** 2003. “Monkeys Reject Unequal Pay.” *Nature*, 425: 297–299.
- Brosnan, Sarah, and Frans De Waal.** 2014. “Evolution of Responses to (Un)fairness.” *Science*, 346: 1251776.
- Bruil, Arjan.** 2023. “Distributional National Accounts for the Netherlands and a Comparison with 12 Other Countries.” *Review of Income and Wealth*, 69(4): 886–906.
- Buhmann, Brigitte, Lee Rainwater, Guenther Schmaus, and Timothy Smeeding.** 1988. “Equivalence Scales, Well-Being, Inequality, and Poverty: Sensitivity Estimates Across Ten Countries Using the Luxembourg Income Study (LIS) Database.” *Review of Income and Wealth*, 34(2): 115–142.
- Caminada, Koen, Egbert Jongen, Wim Bos, Marion Van Bakel, and Ferdi Otten.** 2021. *Inkomen Verdeeld 1977-2019*. CBS, Universiteit van Leiden.
- Card, David.** 1999. “The Causal Effect of Education on Earnings.” *Handbook of labor economics*, 3: 1801–1863.
- Chancel, Lucas, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman.** 2022. *World Inequality Report 2022*. Harvard University Press.

- Chatterjee, Aroop, Léo Czajka, and Amory Gethin.** 2023. “Redistribution Without Inclusion? Inequality in South Africa Since the End of Apartheid.” Available at <https://amory-gethin.fr/files/pdf/ChatterjeeCzajkaGethin2023.pdf>.
- Currier, Lindsey, Edward Glaeser, and Gabriel Kreindler.** 2023. “Infrastructure Inequality: Who Pays the Cost of Road Roughness.” NBER Working Paper 31981.
- De Kam, Cornelis, Jakob De Haan, Chris Giles, Antonio Manresa, Eduard Berenguer, Samuel Calonge, Joachim Merz, and Kshama Venkatarama.** 1996. “Who Pays the Taxes? The Distribution of Effective Tax Burdens in Four EU Countries.” *EC Tax Review*, 5(4): 175–188.
- De Nederlandsche Bank.** 2013. “Nederlands lopende rekeningoverschot gevoelig voor dividenduitkeringen.” Accessed on: 27 October 2023.
- Ederer, Stefan, Predrag Četković, Stefan Humer, Stefan Jestl, and Emanuel List.** 2022. “Distributional National Accounts (DINA) with Household Survey Data: Methodology and Results for European Countries.” *Review of Income and Wealth*, 68(3): 667–688.
- Eurostat.** 2013. *European System of Accounts: ESA 2010*. Publications Office of the European Union.
- Eurostat.** 2021. *Quality report on National and Regional Accounts: 2020 data*. Publications Office of the European Union.
- Eurostat.** 2022. *Quality report on National and Regional Accounts: 2021 data*. Publications Office of the European Union.
- Fagereng, Andreas, Luigi Guiso, Davide Malacrino, and Luigi Pistaferri.** 2020. “Heterogeneity and Persistence in Returns to Wealth.” *Econometrica*, 88(1): 115–170.
- Fairfield, Tasha, and Michel Jorratt De Luis.** 2016. “Top Income Shares, Business Profits, and Effective Tax Rates in Contemporary Chile.” *Review of Income and Wealth*, 62(S1): S120–S144.
- Fesseau, Maryse, and Maria Liviana Mattonetti.** 2013. “Distributional Measures Across Household Groups in a National Accounts Framework: Results from an Experimental Cross-country Exercise on Household Income, Consumption and Saving.” *OECD Statistics Working Papers*.
- Fisher-Post, Matthew, and Amory Gethin.** 2023. “Government Redistribution and Development.” World Inequality Lab WP 2023/17.
- Garbinti, Bertrand, Jonathan Goupille-Lebret, and Thomas Piketty.** 2018. “Income Inequality in France, 1900–2014: Evidence from Distributional National Accounts (DINA).” *Journal of Public Economics*, 162: 63–77.

- Garcia-Bernardo, Javier, Petr Janský, and Thomas Tørsløv.** 2021. “Multinational Corporations and Tax Havens: Evidence from Country-by-Country Reporting.” *International Tax and Public Finance*, 28(6): 1519–1561.
- Gethin, Amory.** 2023a. “Revisiting Global Poverty Reduction: Public Goods and the World Distribution of Income, 1980-2022.” Available at <https://amory-gethin.fr/files/pdf/Gethin2023PublicGoods.pdf>.
- Gethin, Amory.** 2023b. “Who Benefits from Public Goods? Public Services and Inequality in Post-Apartheid South Africa.” Available at <https://amory-gethin.fr/files/pdf/Gethin2023SouthAfrica.pdf>.
- Guzzardi, Demetrio, Elisa Palagi, Andrea Roventini, and Alessandro Santoro.** 2024. “Reconstructing Income Inequality in Italy: New Evidence and Tax System Implications from Distributional National Accounts.” *Journal of the European Economic Association*, 22(5): 2180–2224.
- Güçeri, İrem, and Joel Slemrod.** 2023. “Taxing the rich (more).” *Oxford Review of Economic Policy*, 39(3): 399–405.
- Hoynes, Hilary, Diane Whitmore Schanzenbach, and Douglas Almond.** 2016. “Long-run Impacts of Childhood Access to the Safety Net.” *American Economic Review*, 106(4): 903–934.
- Jestl, Stefan, and Emanuel List.** 2022. “Inequality, Redistribution, and the Financial Crisis: Evidence from Distributional National Accounts for Austria.” *The Review of Income and Wealth*, 69(1): 195–227.
- Kaplan, Greg, Benjamin Moll, and Giovanni Violante.** 2018. “Monetary Policy According to HANK.” *American Economic Review*, 108(3): 697–743.
- Khalid, Muhammed Abdul, and Li Yang.** 2021. “Income inequality and ethnic cleavages in Malaysia: Evidence from distributional national accounts (1984–2014).” *Journal of Asian Economics*, 72: 101252.
- Kleven, Henrik, Camille Landais, and Jakob Egholt Søgaaard.** 2019. “Children and Gender Inequality: Evidence from Denmark.” *American Economic Journal: Applied Economics*, 11(4): 181–209.
- Kleven, Henrik, Camille Landais, Johanna Posch, Andreas Steinhauer, and Josef Zweimüller.** 2024. “Do Family Policies Reduce Gender Inequality? Evidence from 60 Years of Policy Experimentation.” *American Economic Journal: Economic Policy*, 16: 110–149.
- Kohler, Timothy, and Michael Smith,** ed. 2018. *Ten Thousand Years of Inequality: The Archaeology of Wealth Differences*. The University of Arizona Press.

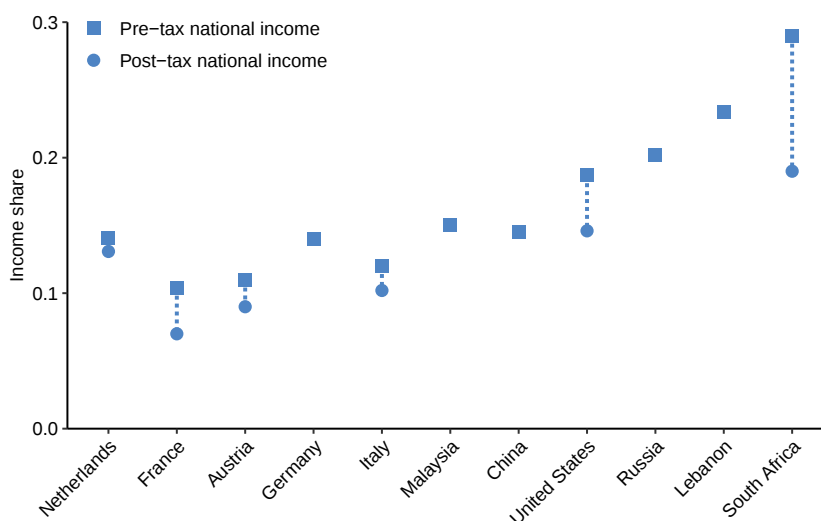
- Kopczuk, Wojciech, and Eric Zwick.** 2020. “Business Incomes at the Top.” *Journal of Economic Perspectives*, 34(4): 27–51.
- Kuznets, Simon, and Elizabeth Jenks.** 1953. *Shares of Upper Income Groups in Income and Savings*. National Bureau of Economic Research.
- Leenders, Wouter, Arjan Lejour, Simon Rabaté, and Maarten Van ’t Riet.** 2023. “Offshore Tax Evasion and Wealth Inequality: Evidence from a Tax Amnesty in the Netherlands.” *Journal of Public Economics*, 217: 104785.
- Lejour, Arjan.** 2021. “The Role of Conduit Countries and Tax Havens in Corporate Tax Avoidance.” CentER Discussion Paper Nr. 2021-014.
- Lundborg, Petter, Erik Plug, and Astrid Würtz Rasmussen.** 2017. “Can Women Have Children and a Career? IV Evidence from IVF Treatments.” *American Economic Review*, 107(6): 1611–1637.
- Morck, Randall.** 2005. “How to Eliminate Pyramidal Business Groups: The Double Taxation of Intercompany Dividends and Other Incisive Uses of Tax Policy.” *Tax Policy and the Economy*, 19: 135–179.
- Neef, Theresa, and Anne-Sophie Robilliard.** 2021. “Half the Sky? The Female Labor Income Share in a Global Perspective.” World Inequality Lab WP 2021/22.
- Novokmet, Filip, Thomas Piketty, and Gabriel Zucman.** 2018. “From Soviets to oligarchs: inequality and property in Russia 1905-2016.” *Journal of Economic Inequality*, 16: 189–223.
- OECD.** 2022. *OECD Regions and Cities at a Glance 2022*. OECD Publishing.
- OECD.** 2024. *Education at a Glance 2024*. OECD Publishing.
- Olsthoorn, Martin, Evert Pommer, Michiel Ras, Ab Van der Torre, and Jean Marie Wildeboer Schut.** 2017. *Voorzieningen Verdeeld*. Sociaal en Cultureel Planbureau.
- Piketty, Thomas, Emmanuel Saez, and Gabriel Zucman.** 2018. “Distributional National Accounts: Methods and Estimates for the United States.” *Quarterly Journal of Economics*, 133(2): 553–609.
- Piketty, Thomas, Li Yang, and Gabriel Zucman.** 2019. “Capital Accumulation, Private Property, and Rising Inequality in China, 1978-2015.” *American Economic Review*, 109(7): 2469–2496.
- Saez, Emmanuel.** 2021. “Public Economics and Inequality: Uncovering Our Social Nature.” *AEA Papers and Proceedings*, 111: 1–26.
- Saez, Emmanuel, and Gabriel Zucman.** 2019. *The Triumph of Injustice: How the Rich Dodge Taxes and How to Make Them Pay*. W. W. Norton & Company.

- Saez, Emmanuel, and Gabriel Zucman.** 2020. “Trends in US Income and Wealth Inequality: Revising After the Revisionists.” NBER Working Paper 27921.
- Saez, Emmanuel, and Gabriel Zucman.** 2023. “Distributional Tax Analysis in Theory and Practice: Harberger Meets Diamond-Mirrlees.” <https://gabriel-zucman.eu/files/SaezZucman2023.pdf>.
- Salverda, Wiemer.** 2019. “Top Incomes, Income and Wealth Inequality in the Netherlands: The First 100 Years 1914-2014 - What’s Next?” World Inequality Lab WP 2019/2.
- Scheuer, Florian, and Joel Slemrod.** 2020. “Taxation and the Superrich.” *Annual Review of Economics*, 12(1): 189–211.
- Seligman, Edwin.** 1908. *Progressive Taxation in Theory and Practice, 2nd Edition*. American Economic Association.
- Stepner, Michael.** 2019. “The Insurance Value of Redistributive Taxes and Transfers.” working paper.
- Stiglitz, Joseph, Amartya Sen, and Jean-Paul Fitoussi.** 2009. “Report by the Commission on the Measurement of Economic Performance and Social Progress.”
- Tarasov, Helen, and Gerhard Colm.** 1941. *Who Pays the Taxes?* Washington D.C.:Temporary National Economic Committee. Monograph No. 3.
- Tenand, Marianne, Pieter Bakx, and Eddy Van Doorslaer.** 2020. “Equal long-term care for equal needs with universal and comprehensive coverage? An assessment using Dutch administrative data.” *Health Economics*, 29(4): 435–451.
- Tørsløv, Thomas, Ludvig Wier, and Gabriel Zucman.** 2023. “The Missing Profits of Nations.” *Review of Economic Studies*, 90(3): 1499–1534.
- Toussaint, Simon.** 2024. “Robust Estimation of Private Business Wealth.” working paper.
- Toussaint, Simon, Bas Van Bavel, Wiemer Salverda, and Coen Teulings.** 2020. “Nederlandse vermogens schever verdeeld dan gedacht.” *Economische en Statistische Berichten*, 105(4789): 438–441.
- Trimp, Rens, and Flip De Kam.** 2011. “De Drukverdeling van Collectieve Lasten.” *Economisch Statistische Berichten*, 96(4623): 698–701.
- Vermeulen, Philip.** 2018. “How Fat is the Top Tail of the Wealth Distribution?” *Review of Income and Wealth*, 64(2): 357–387.
- Weyzig, Francis.** 2013. “Tax Treaty Shopping: Structural Determinants of Foreign Direct Investment Routed through the Netherlands.” *International Tax and Public Finance*, 20: 910–937.

- Wolfson, Michael, Mike Veall, Neil Brooks, and Brian Murphy.** 2016. “Piercing the Veil: Private Corporations and the Income of the Affluent.” *Canadian Tax Journal*, 64(1): 1–30.
- Yagan, Danny.** 2023. “What is the average federal individual income tax rate on the wealthiest Americans?” *Oxford Review of Economic Policy*, 39(3): 438–450.
- Zwijnenburg, Jorrit, Sophie Bournot, David Grahn, and Emmanuelle Guidetti.** 2021. “Distribution of Household Income, Consumption and Saving in Line with National Accounts: Methodology and Results from the 2020 Collection Round.” OECD Statistics Working Papers.

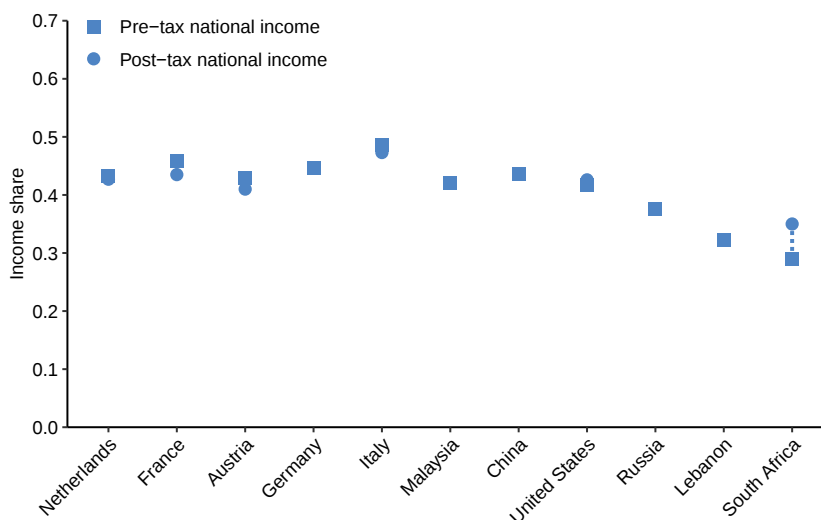
A Appendix Figures and Tables

Figure A.1: The share of income accruing to the top 1%



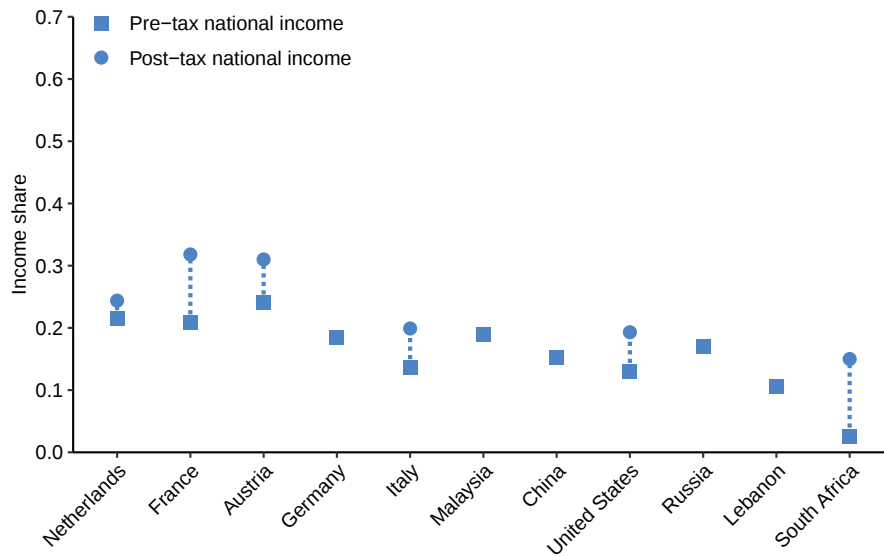
NOTE: This figure shows the share of pre-tax national income and post-tax national income accruing to the 1% income group, for a set of countries for which comparable estimates are available. We use our results for the Netherlands, Bozio et al. (2024) for France, Jestl and List (2022) for Austria, Bach, Bartels and Neef (2023) for Germany, Guzzardi et al. (2024) for Italy, Khalid and Yang (2021) for Malaysia, Piketty, Yang and Zucman (2019) for China, Piketty, Saez and Zucman (2018) for the US, Novokmet, Piketty and Zucman (2018) for Russia, Assouad (2023) for Lebanon and Chatterjee, Czajka and Gethin (2023) for South Africa.

Figure A.2: The share of income accruing to the middle 40%



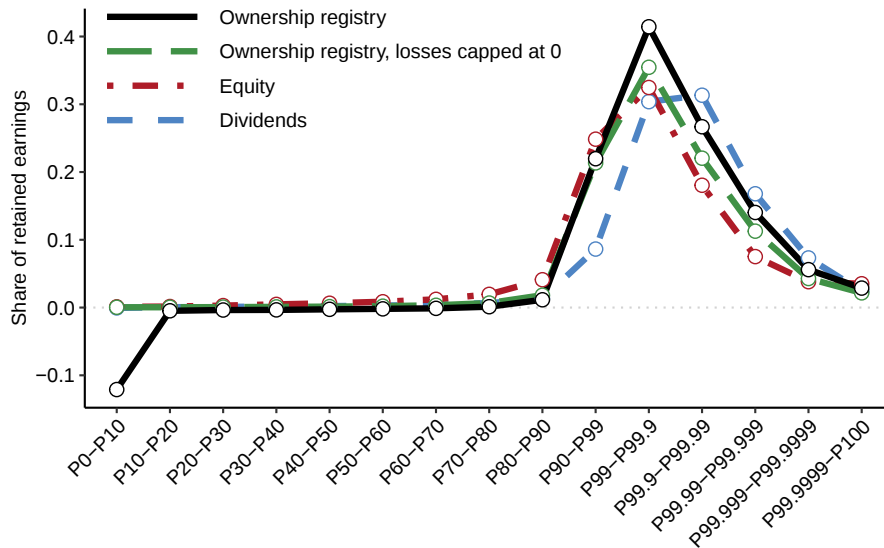
NOTE: This figure shows the share of pre-tax national income and post-tax national income accruing to the P50-P90% income group, for a set of countries for which comparable estimates are available. We use our results for the Netherlands, Bozio et al. (2024) for France, Jestl and List (2022) for Austria, Bach, Bartels and Neef (2023) for Germany, Guzzardi et al. (2024) for Italy, Khalid and Yang (2021) for Malaysia, Piketty, Yang and Zucman (2019) for China, Piketty, Saez and Zucman (2018) for the US, Novokmet, Piketty and Zucman (2018) for Russia, Assouad (2023) for Lebanon and Chatterjee, Czajka and Gethin (2023) for South Africa.

Figure A.3: The share of income accruing to the bottom 50%



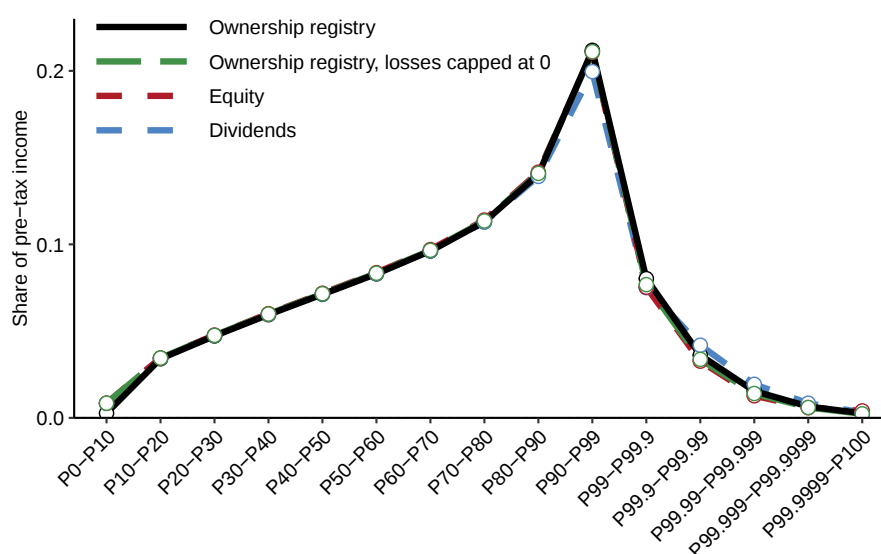
NOTE: This figure shows the share of pre-tax national income and post-tax national income accruing to the bottom 50% income group, for a set of countries for which comparable estimates are available. We use our results for the Netherlands, Bozio et al. (2024) for France, Jestl and List (2022) for Austria, Bach, Bartels and Neef (2023) for Germany, Guzzardi et al. (2024) for Italy, Khalid and Yang (2021) for Malaysia, Piketty, Yang and Zucman (2019) for China, Piketty, Saez and Zucman (2018) for the US, Novokmet, Piketty and Zucman (2018) for Russia, Assouad (2023) for Lebanon and Chatterjee, Czajka and Gethin (2023) for South Africa.

Figure A.4: The distribution of retained earnings under different allocation methods



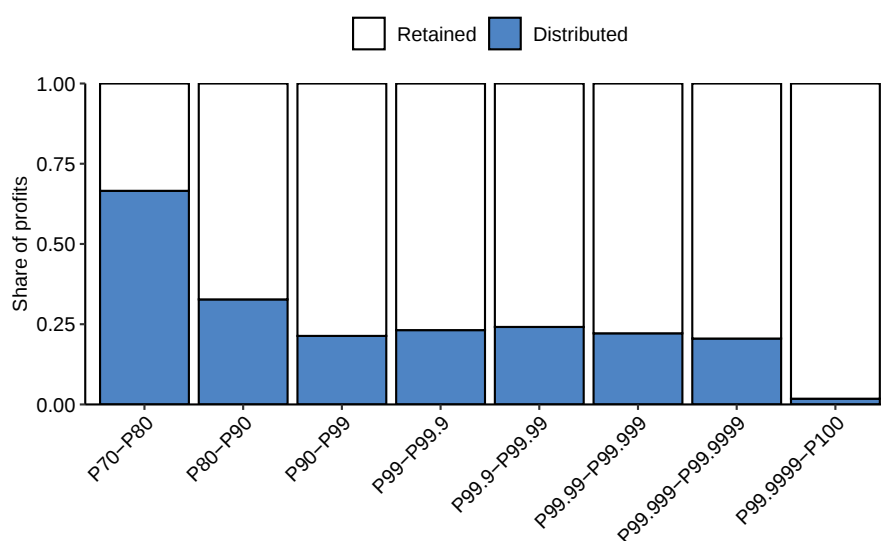
NOTE: This figure presents the distribution of retained earnings. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Specifically, retained earnings are summed by each income group and then divided by total retained earnings.

Figure A.5: The distribution of pre-tax income under different assumptions



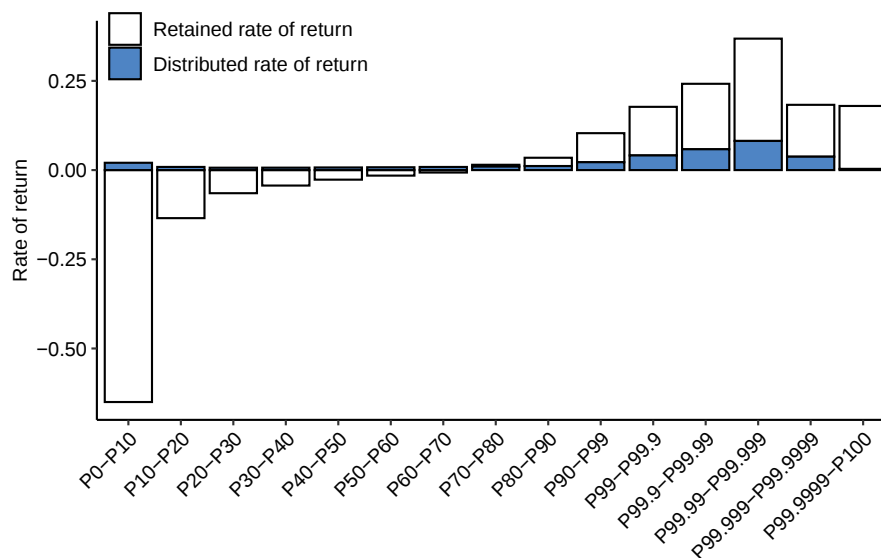
NOTE: This figure shows the share of pre-tax national income accruing to each income group under different assumptions regarding the distribution of retained earnings. The blue line presents our main estimate using ownership registries, and the red and black lines present alternative distribution assumptions based on equity held and dividends distributed.

Figure A.6: The share of profits retained and distributed



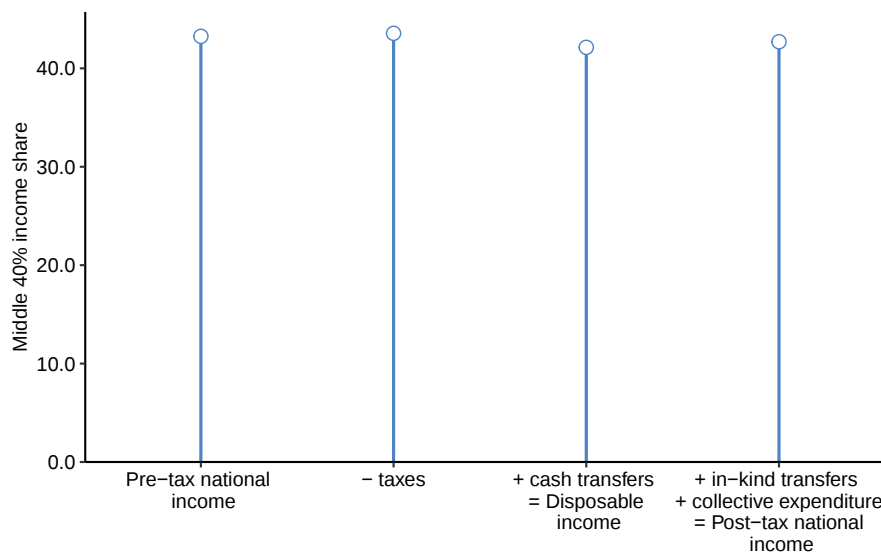
NOTE: This figure shows the share of profits of closely-held corporations that is distributed as dividends and that is retained within the firm for different income groups in 2016. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income.

Figure A.7: The rate of return on equity by income group



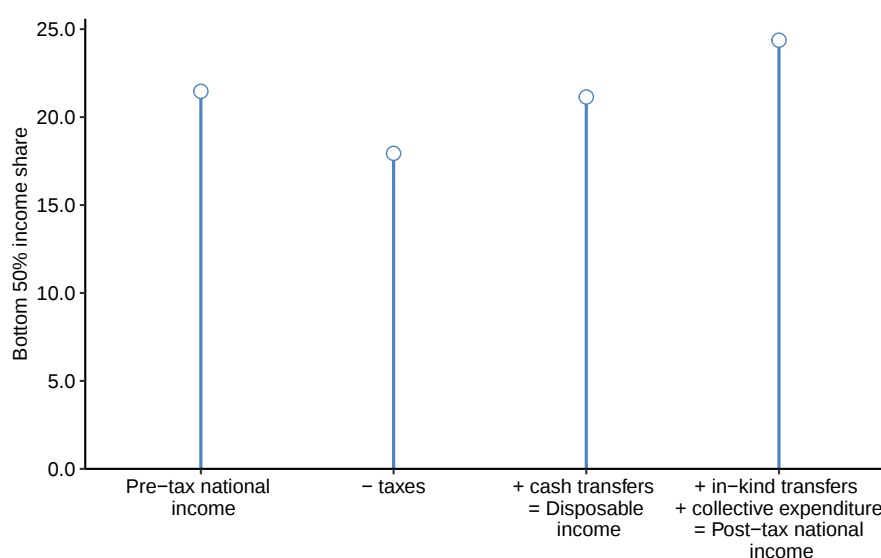
NOTE: This figure shows profits of closely-held corporations expressed as a percentage of corporate equity for different income groups in 2016. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income.

Figure A.8: Middle 40% income share under different income concepts



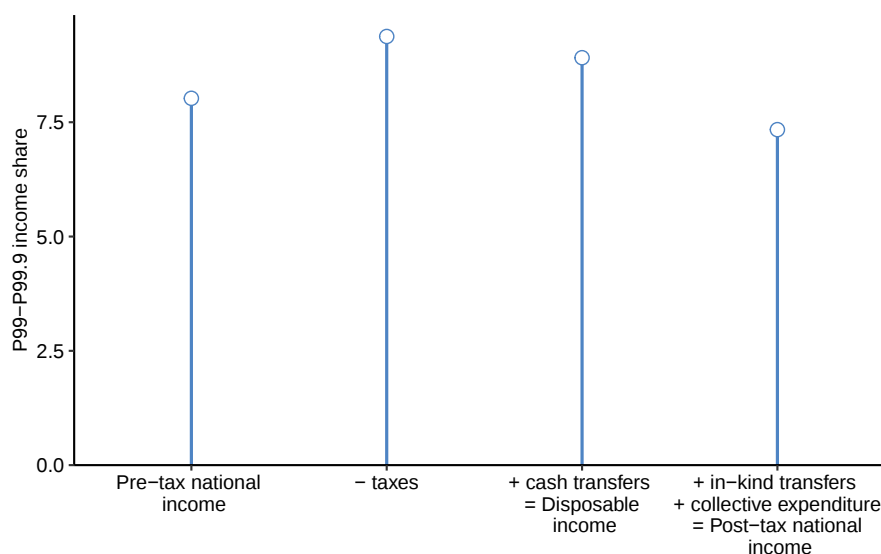
NOTE: This figure presents the middle 40% share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable income, or post-tax national income.

Figure A.9: Bottom 50% income share under different income concepts



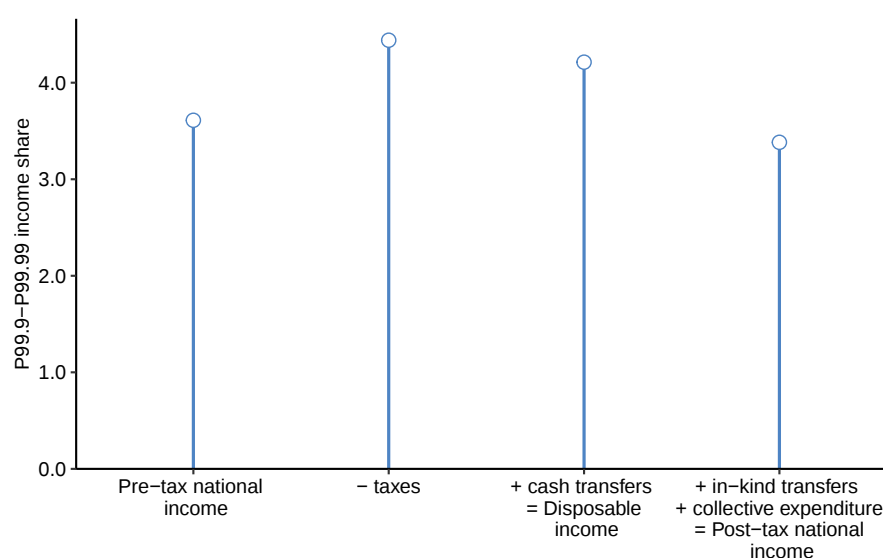
NOTE: This figure presents the bottom 50% share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable income, or post-tax national income.

Figure A.10: P99-P99.9 income share under different income concepts



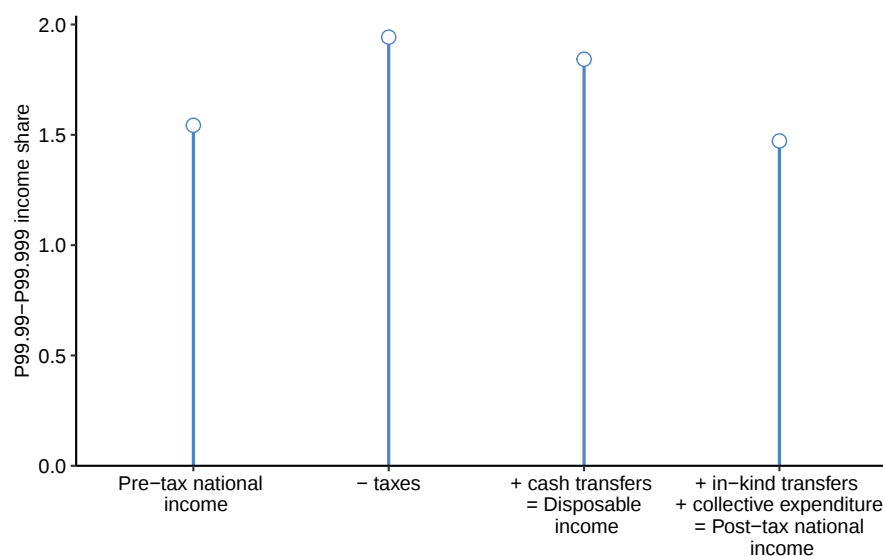
NOTE: This figure presents the P99-P99.9 share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable income, or post-tax national income.

Figure A.11: P99.9-P99.99 income share under different income concepts



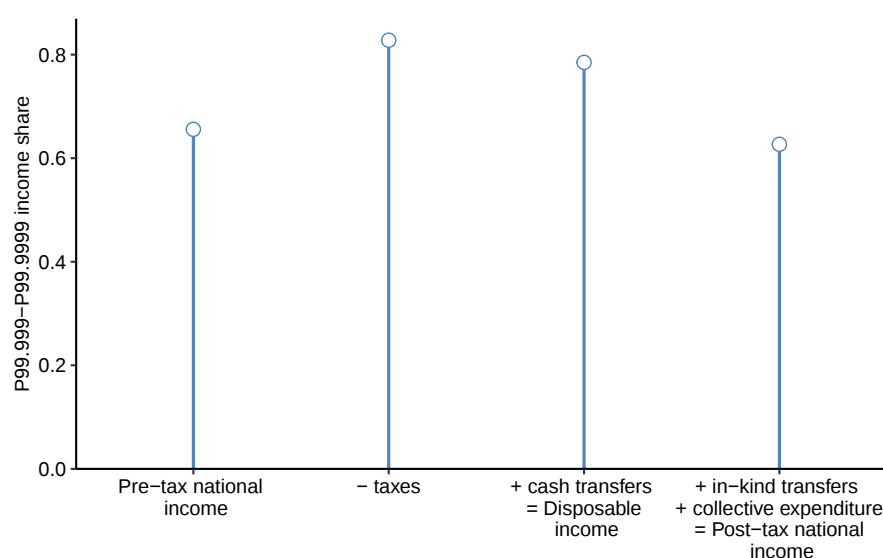
NOTE: This figure presents the P99.9-P99.99 share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable income, or post-tax national income.

Figure A.12: P99.99-P99.999 income share under different income concepts



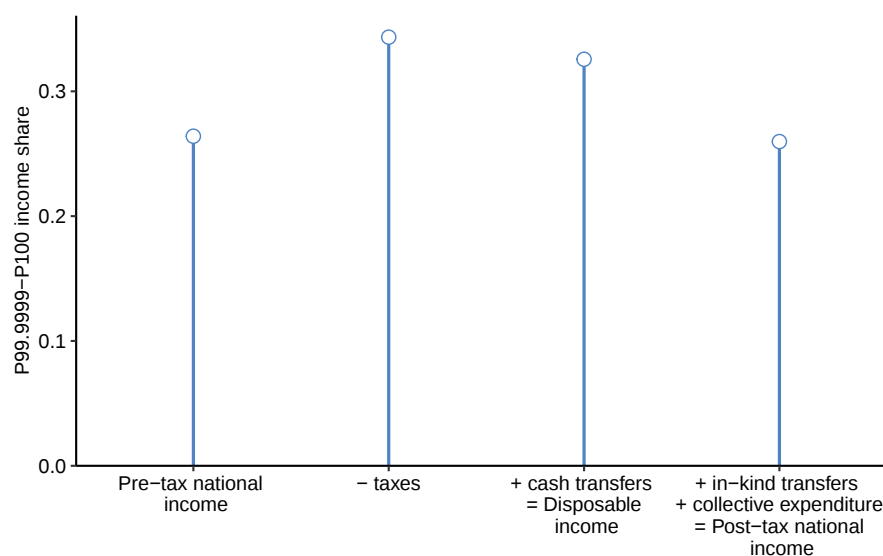
NOTE: This figure presents the P99.99-P99.999 share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable income, or post-tax national income.

Figure A.13: P99.999-P99.9999 income share under different income concepts



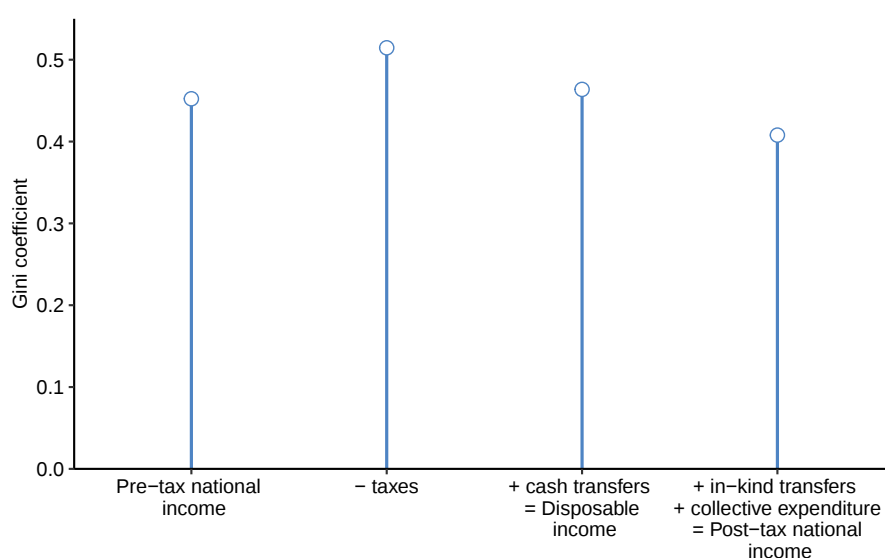
NOTE: This figure presents the P99.999-P99.999 share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable income, or post-tax national income.

Figure A.14: P99.9999-P100 income share under different income concepts



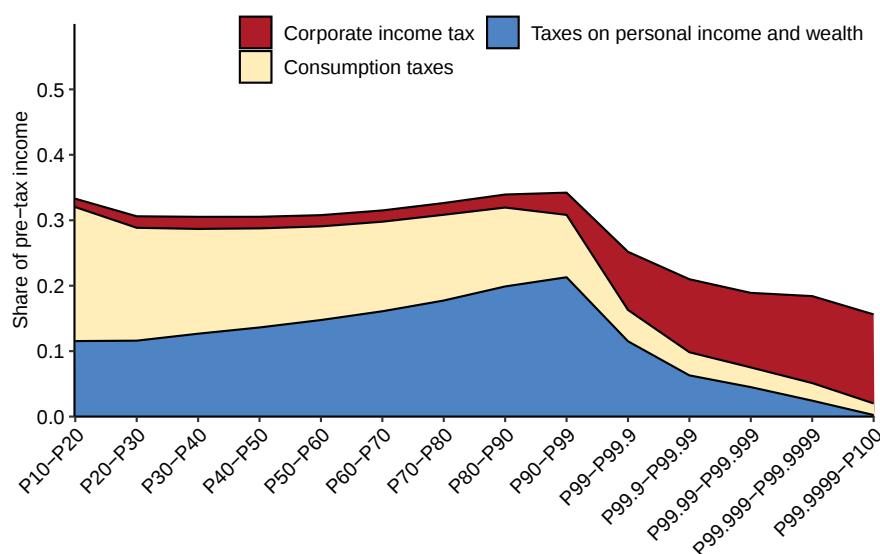
NOTE: This figure presents the P99.9999-P100 share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable income, or post-tax national income.

Figure A.15: Overall redistribution: The Gini coefficient for different income concepts



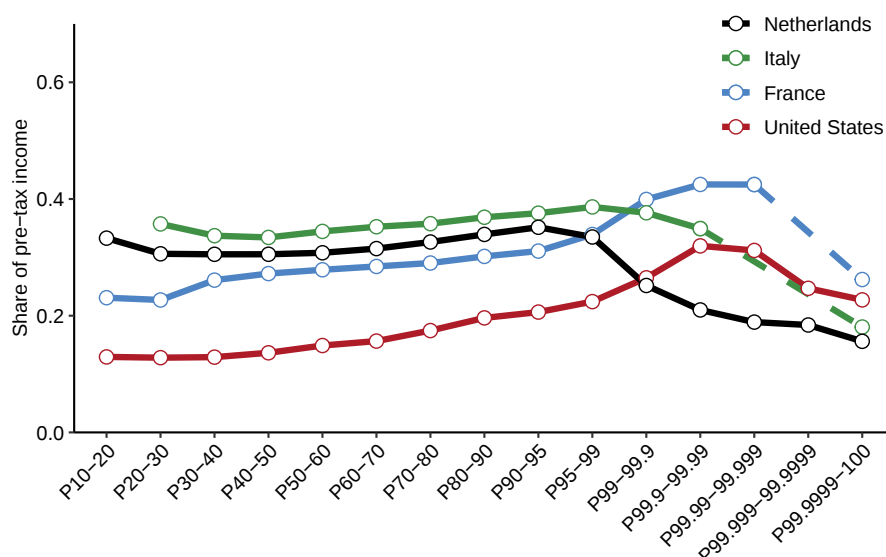
NOTE: This figure presents the Gini coefficient of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable income, or post-tax national income.

Figure A.16: The effective tax rate by tax type, excluding payroll taxes



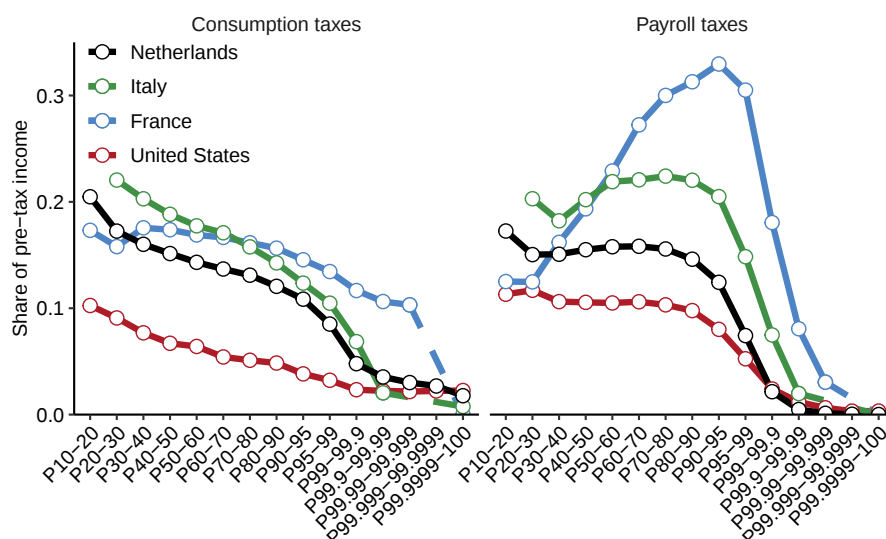
NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands in 2016, decomposed by type of tax, excluding payroll taxes. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. The effective tax rate is obtained by adding up all taxes paid by each income group and dividing by the pre-tax national income of that group.

Figure A.17: The effective tax rate excluding payroll taxes in the Netherlands, Italy, France and the United States



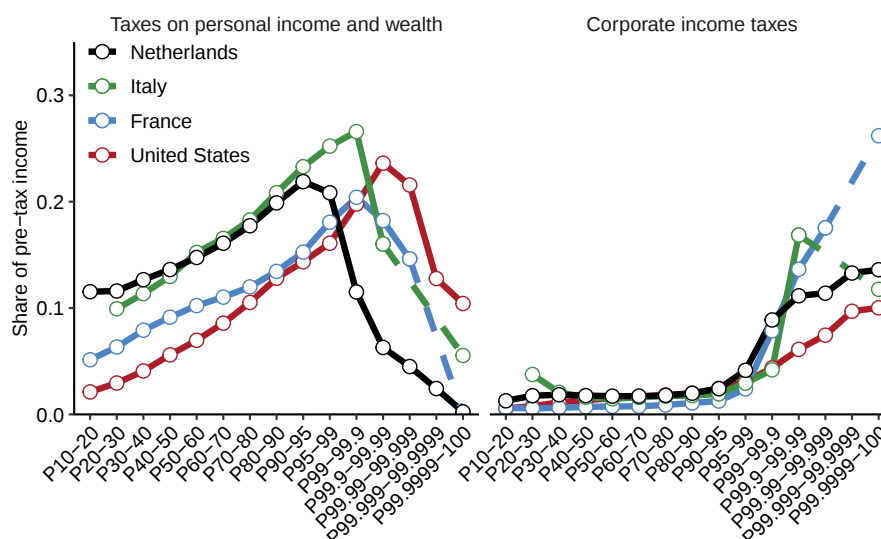
NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands, Italy, France and the United States, excluding payroll taxes. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. The effective tax rate is obtained by adding up all taxes paid by each income group and dividing by the pre-tax national income of that group.

Figure A.18: The effective consumption and payroll tax rate in the Netherlands, Italy, France and the United States



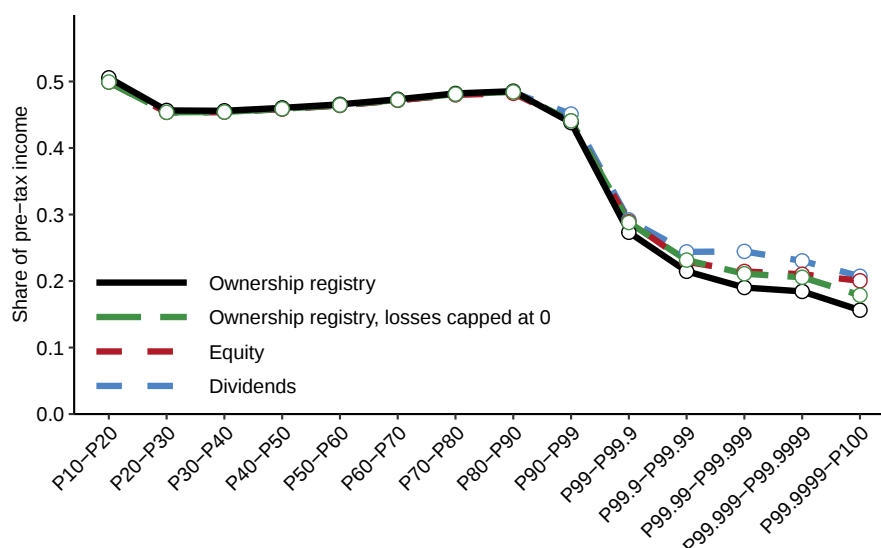
NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands, Italy, France and the United States, for consumption and payroll taxes. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. The left panel shows the sum of consumption taxes as a percentage of pre-tax national income for each income group. The right panel does the same, but for payroll taxes.

Figure A.19: The effective corporate and personal income tax rate in the Netherlands, Italy, France and the United States



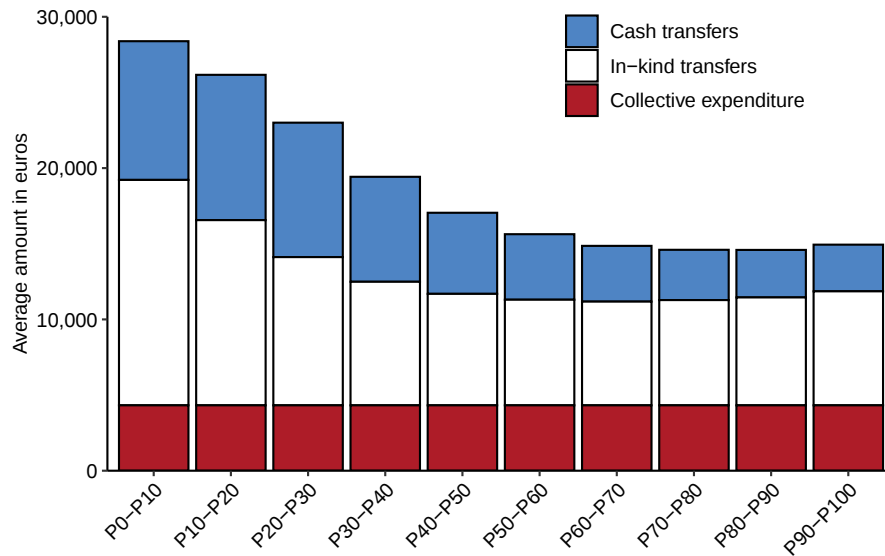
NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands, Italy, France and the United States, for corporate income taxes and taxes on income and wealth. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. The left panel shows the sum of corporate income taxes as a percentage of pre-tax national income for each income group. The right panel does the same, but for taxes on income and wealth.

Figure A.20: The effective tax rate under different assumptions



NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands in 2016, under different distribution assumption regarding retained earnings. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. The effective tax rate is obtained by adding up all taxes paid by each income group and dividing by the pre-tax national income of that group.

Figure A.21: The average amount of government spending received by each income group



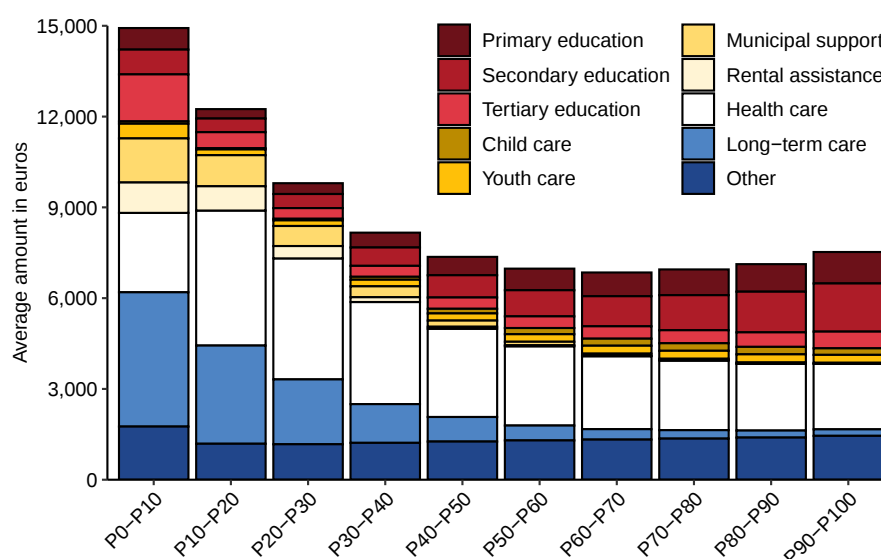
NOTE: This figure shows the amount of government spending received by each income group in 2016. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Cash and in-kind transfers are assigned to the individuals who receive them or, in the case of individuals below the age of 20, their parents. Collective expenditure is assigned to individuals on a lump-sum basis.

Figure A.22: The cash transfers rate for each income group



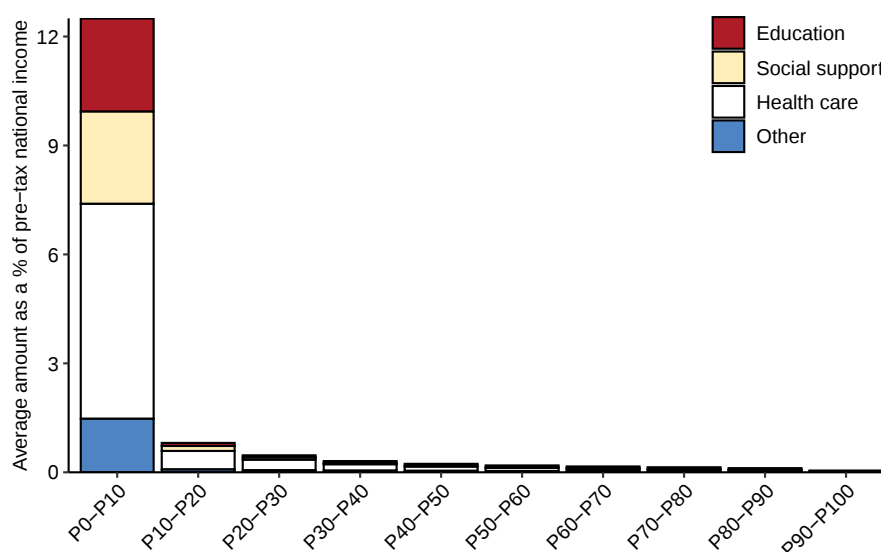
NOTE: This figure shows the amount of cash transfers received by each income group in 2016 divided by pre-tax national income, with more detailed categories than in Figure 11. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Transfers are assigned to the individuals who receive them or, in the case of individuals below the age of 20, their parents.

Figure A.23: The average amount of in-kind transfers received by each income group



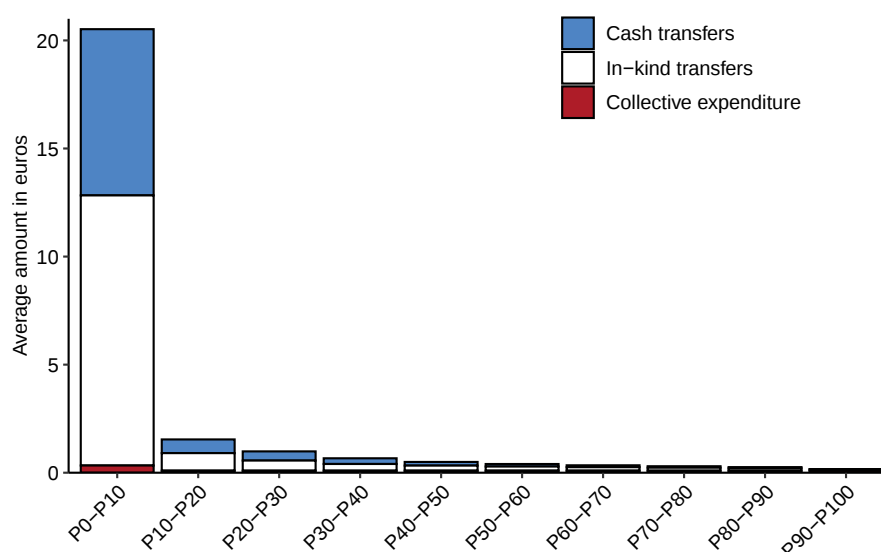
NOTE: This figure shows the amount of in-kind transfers received by each income group in 2016, with more detailed categories than in Figure 10. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Transfers are assigned to the individuals who receive them or, in the case of individuals below the age of 20, their parents.

Figure A.24: The in-kind transfers rate for each income group



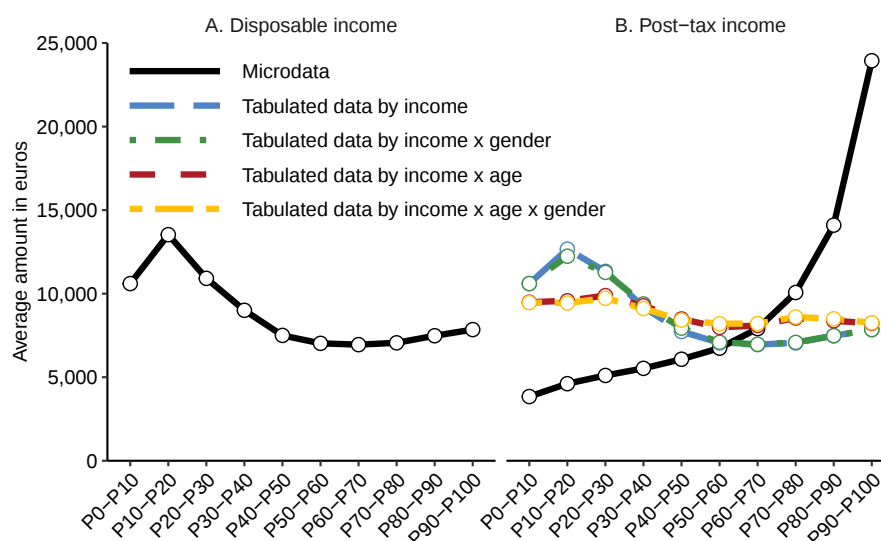
NOTE: This figure shows the amount of in-kind transfers received by each income group in 2016 divided by pre-tax national income, with more detailed categories than in Figure 11. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Transfers are assigned to the individuals who receive them or, in the case of individuals below the age of 20, their parents.

Figure A.25: The government spending rate for each income group



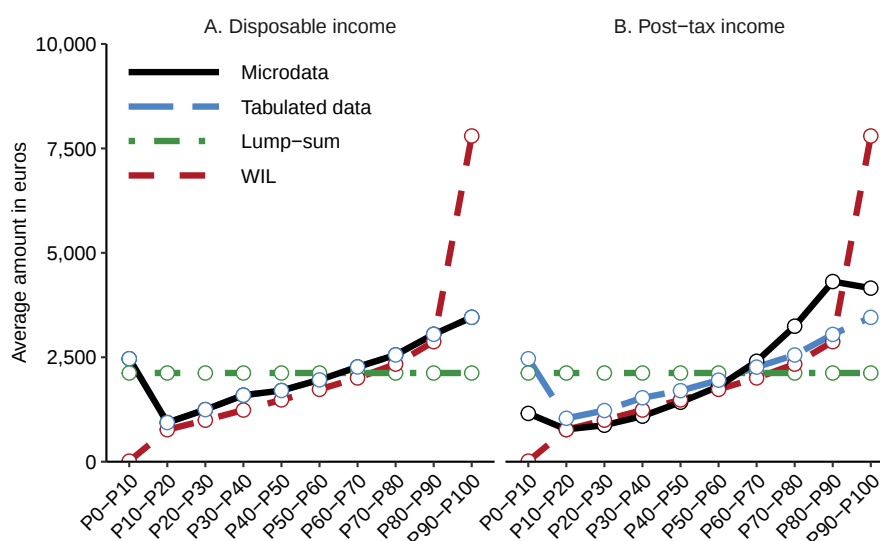
NOTE: This figure shows the amount of government spending received by each income group in 2016 divided by pre-tax national income. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Cash and in-kind transfers are assigned to the individuals who receive them or, in the case of individuals below the age of 20, their parents. Collective expenditure is assigned to individuals in proportion to their disposable income.

Figure A.26: In-kind transfers received by income group under different assumptions



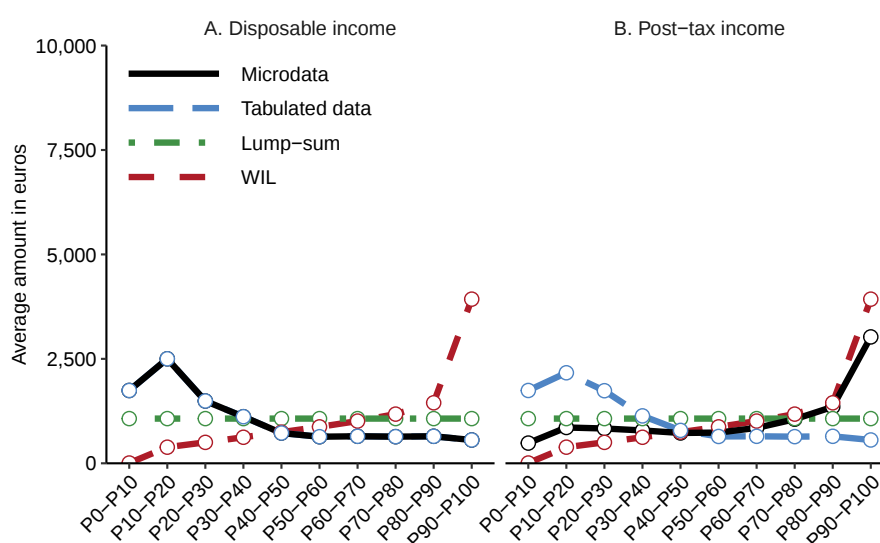
NOTE: This figure shows the average amount of other in-kind transfers received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. Adults are ranked by their disposable income in the left and by their post-tax national income in the right panel.

Figure A.27: Education spending received by income group under different assumptions



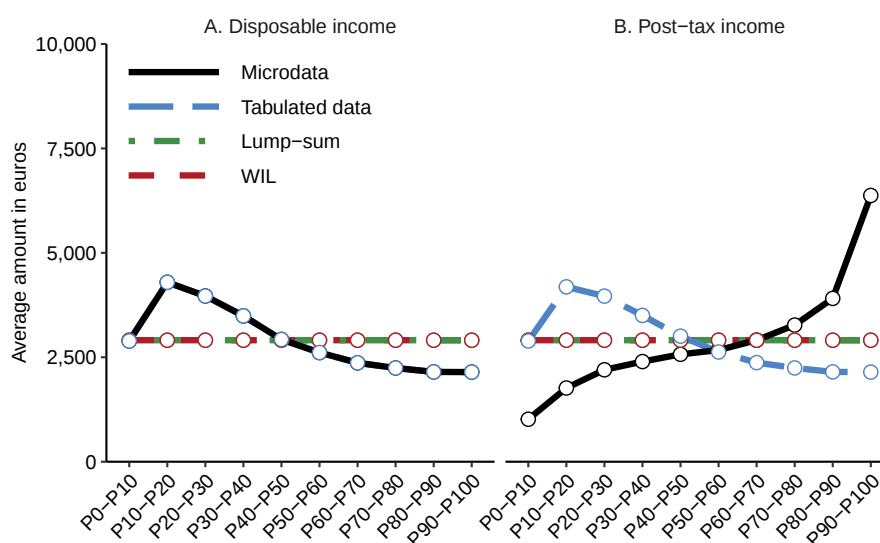
NOTE: This figure shows the average amount of education spending received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. Adults are ranked by their disposable income in the left and by their post-tax national income in the right panel.

Figure A.28: Social support received by income group under different assumptions



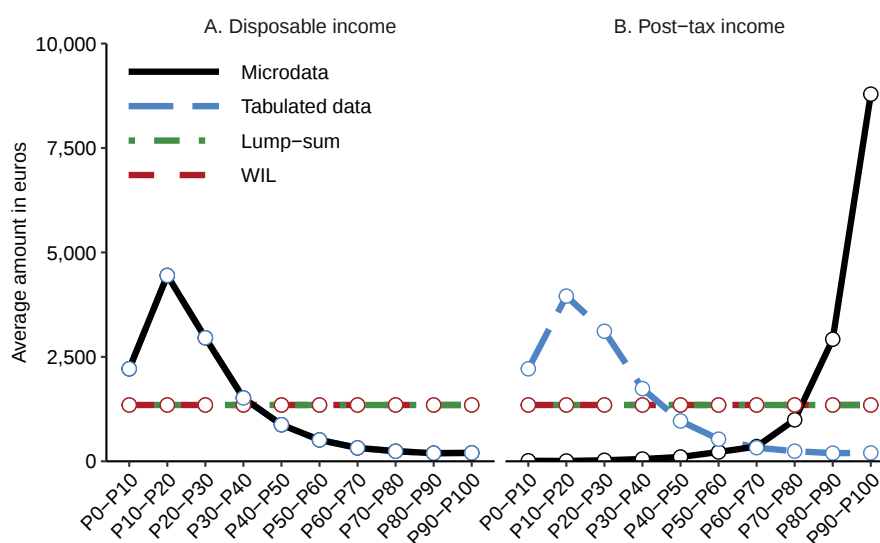
NOTE: This figure shows the average amount of social support received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. Adults are ranked by their disposable income in the left and by their post-tax national income in the right panel.

Figure A.29: Health care spending received by income group under different assumptions



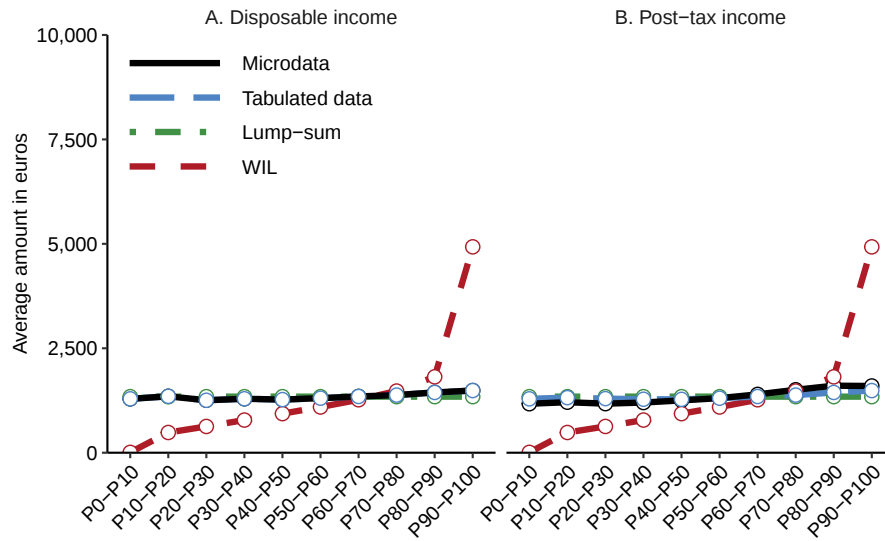
NOTE: This figure shows the average amount of health care spending received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. Adults are ranked by their disposable income in the left and by their post-tax national income in the right panel.

Figure A.30: Long-term care spending received by income group under different assumptions



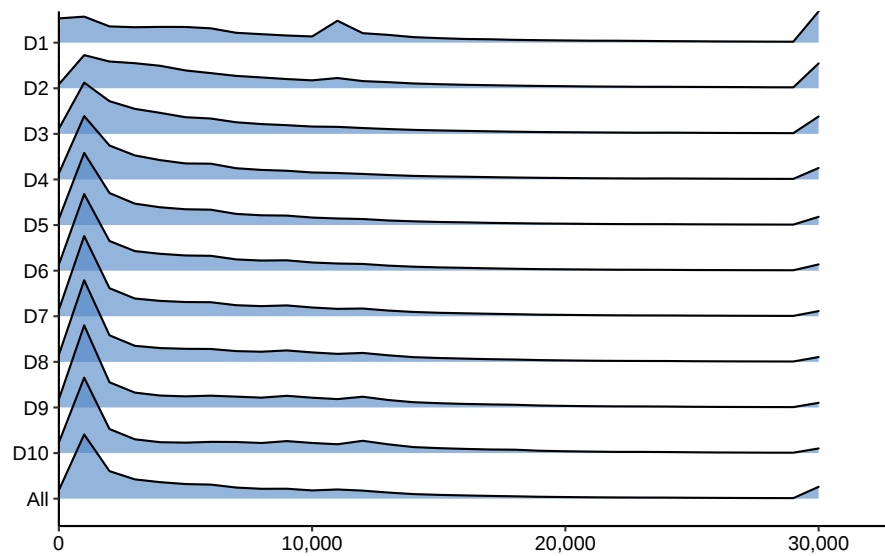
NOTE: This figure shows the average amount of long-term care spending received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. Adults are ranked by their disposable income in the left and by their post-tax national income in the right panel.

Figure A.31: Other in-kind transfers received by income group under different assumptions



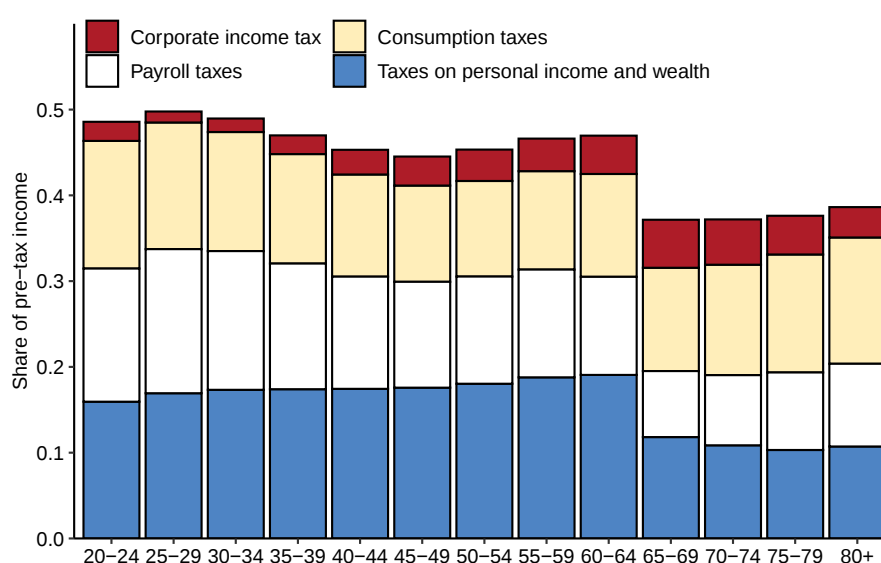
NOTE: This figure shows the average amount of other in-kind transfers received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. Adults are ranked by their disposable income in the left and by their post-tax national income in the right panel.

Figure A.32: The distribution of in-kind transfers received within each income group



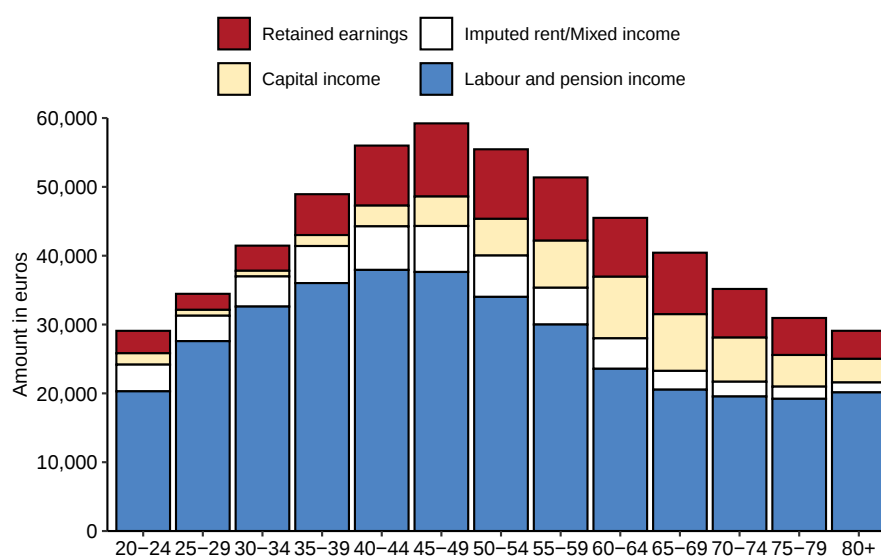
NOTE: This figure shows the distribution of in-kind transfers received by each income group in the Netherlands in 2016. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income.

Figure A.33: The payment of taxes by age



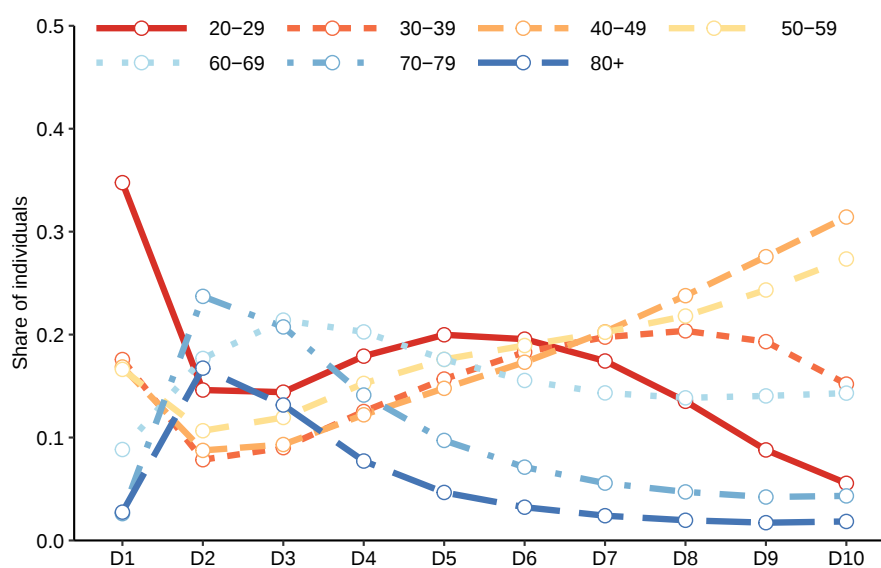
NOTE: This figure shows the amount of taxes paid expressed as a share of pre-tax national income for different age groups in 2016. The unit of analysis is the individual adult. Taxes on labour are assigned to workers. Taxes on capital are assigned to the owners of capital. Consumption taxes are assigned in proportion to the consumption of taxed goods and services.

Figure A.34: Average pre-tax national income by age



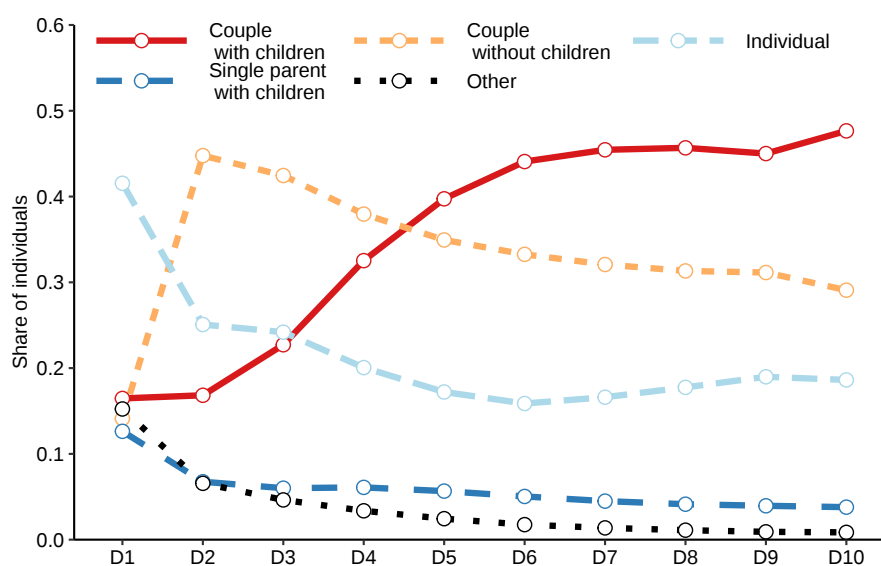
NOTE: This figure shows the average level of pre-tax national income for different age groups in 2016. The unit of analysis is the individual adult and income is split equally among the adult members of a household.

Figure A.35: Share of different age groups in each income group



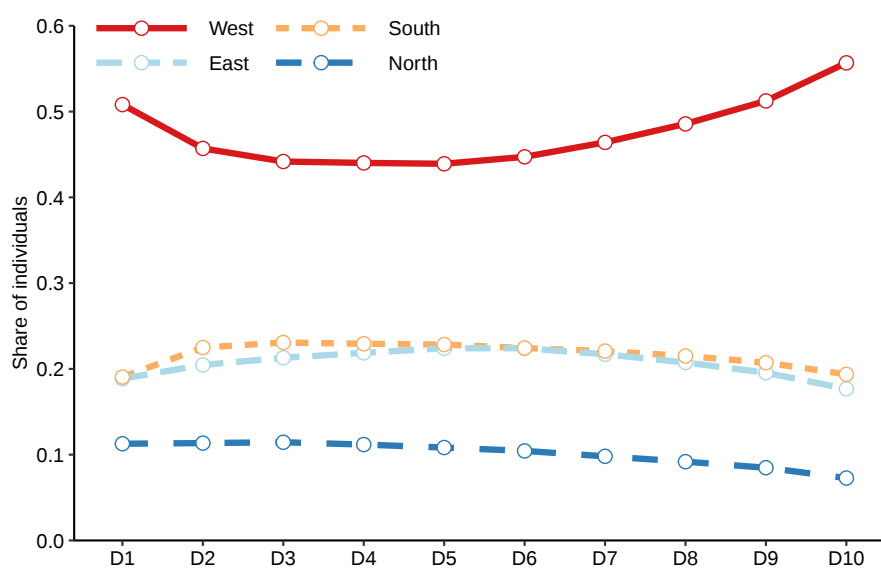
NOTE: This figure shows the share of different age groups in each income decile. The unit of analysis is the individual adult and income is split equally among the adult members of a household.

Figure A.36: Share of different household types in each income group



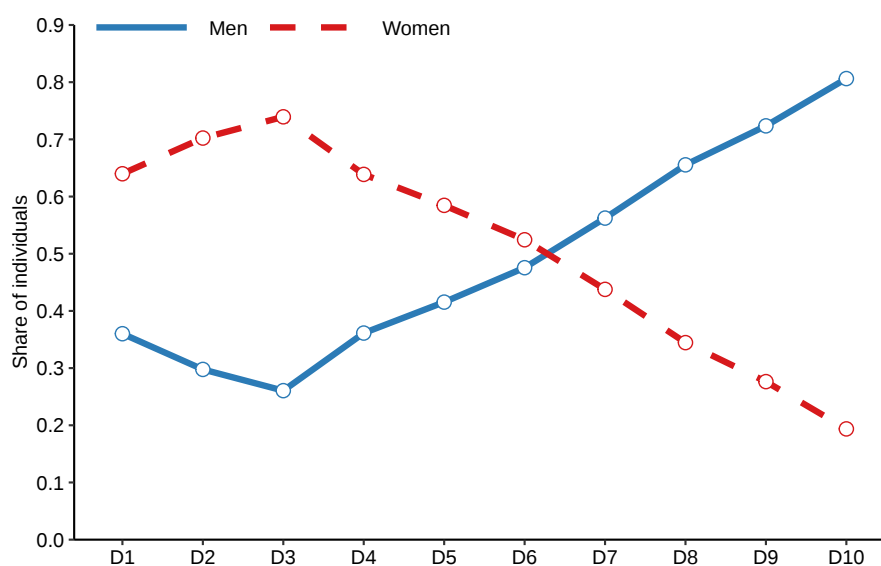
NOTE: This figure shows the share of different household types in each income decile. The unit of analysis is the individual adult and income is split equally among the adult members of a household.

Figure A.37: Share of different regions in each income group



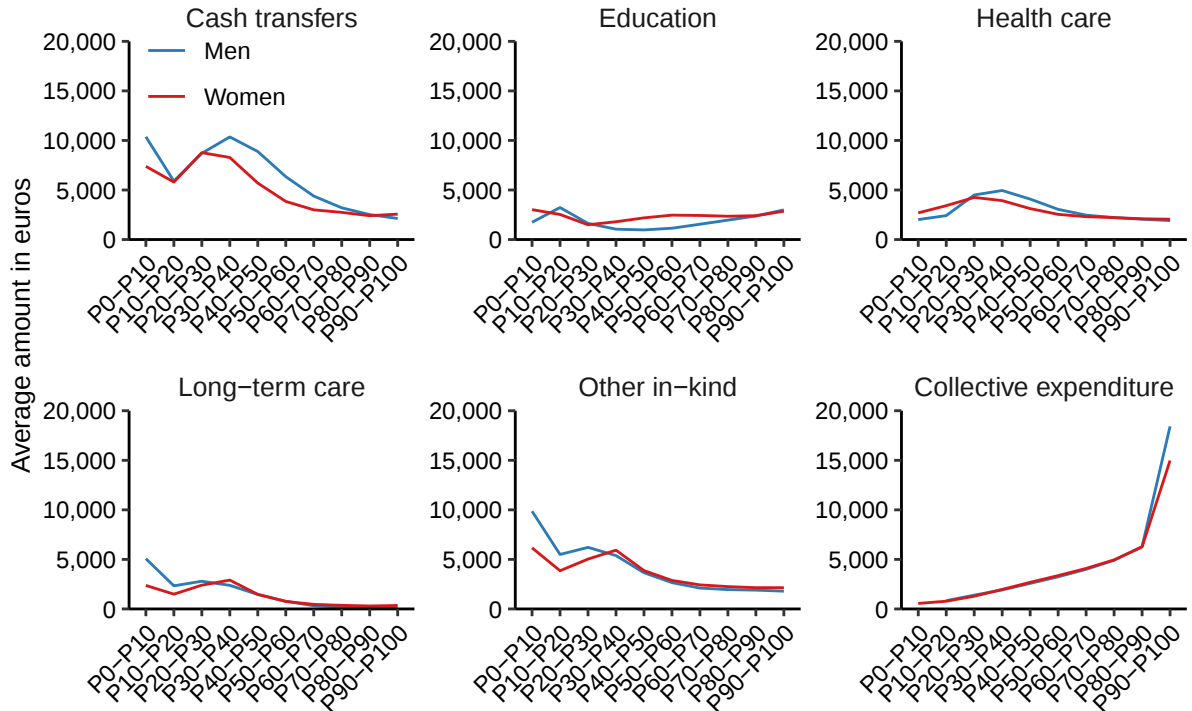
NOTE: This figure shows the share of different regions of residence in each income decile. The unit of analysis is the individual adult and income is split equally among the adult members of a household.

Figure A.38: Share of each gender in each income group



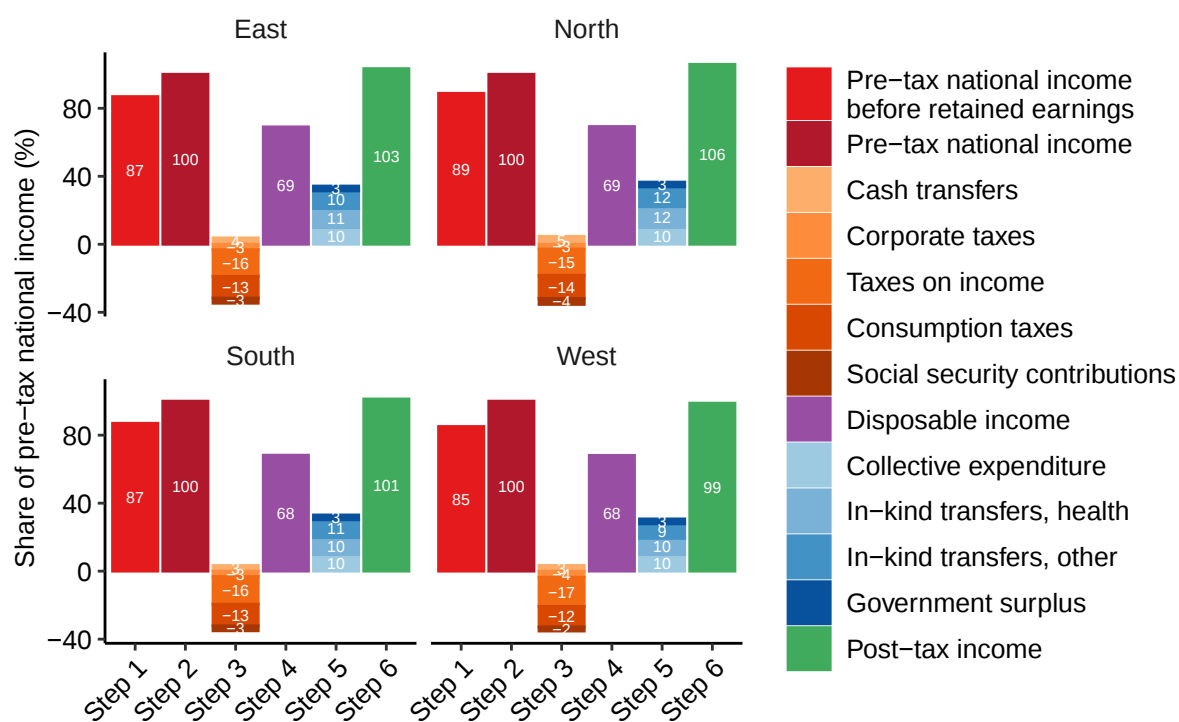
NOTE: This figure shows the share of men and women in each income decile. The unit of analysis is the individual adult and income is assigned to the individual who nominally earns it.

Figure A.39: The receipt of government spending by pretax income and gender



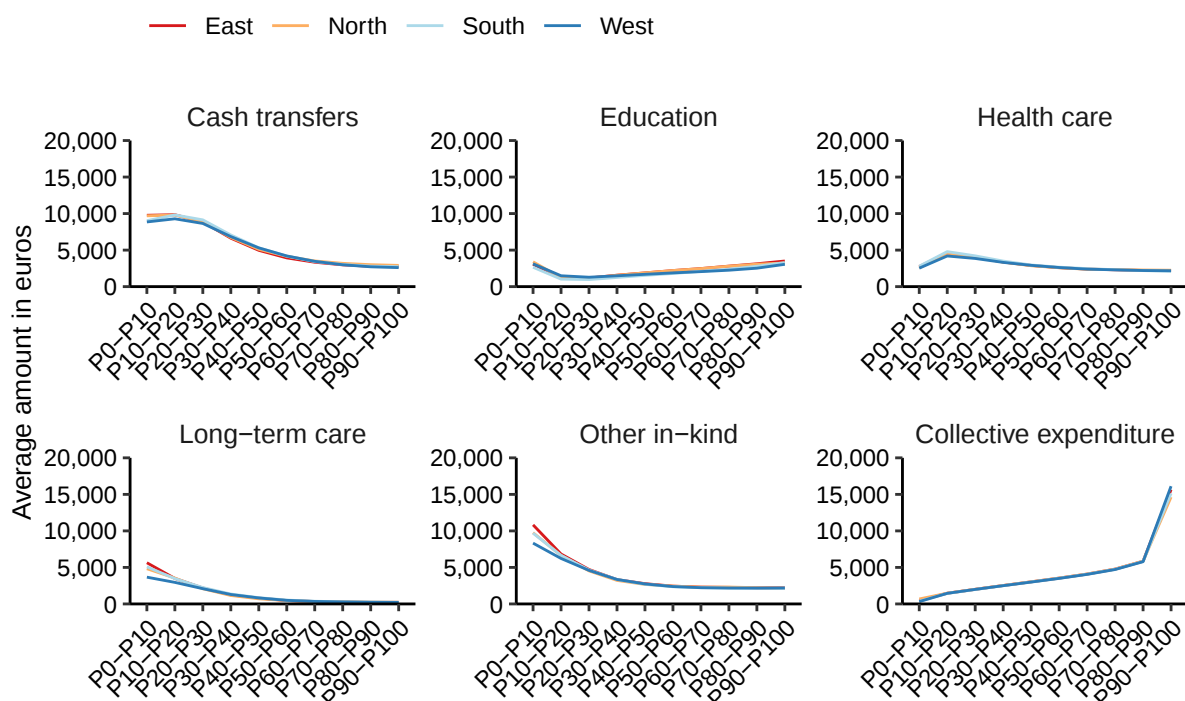
NOTE: This figure shows the amount of in-kind transfers received by each income group in 2016, for men and women separately. The unit of analysis is the individual adult, but, exceptionally, income is assigned to the individual who nominally earns it. Adults are ranked by their pre-tax national income. Transfers are assigned to the individuals who receive them or, in the case of individuals below the age of 20, their parents.

Figure A.40: Transition from pretax to post-tax income, by region



NOTE: This figure presents the transition from pre-tax national income before retained earnings to post-tax income for different NUTS1 regions. Each income component is expressed as a share of each region's pre-tax national income. The unit of analysis is the individual adult and income is split equally among the adult members of a household.

Figure A.41: The receipt of government spending by pretax income and region



NOTE: This figure shows the amount of in-kind transfers received by each income group in 2016, for the different regions separately. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Transfers are assigned to the individuals who receive them or, in the case of individuals below the age of 20, their parents.

Table A.1: Pre-tax factor income of the households sector, part 1

Income concept	Macro total (% of national income)	Macro total (million €)	Micro total (million €)	Difference (% of national income)	Microdata source	Allocation of micro-macro gap proportional to
National income, gross	78	462,351	466,880			
Operating surplus, gross	2	12,125				
Imputed rents of owner-occupied dwellings	7	43,680	38,888	0.8	Cadastral registry	Imputed rents
Intermediate use and taxes on owner-occupied dwellings	5	31,554				Imputed rents
Mixed income, gross	11	66,085				
Self-employed and rental income	9	55,365	53,363	0.3	Tax records	Self-employed and rental income
Other income, including from non-observed economic activities	2	10,720				Self-employed and rental income
Compensation of employees	56	333,541	332,275	0.2	Tax records	Compensation of employees

NOTE: This table presents the decomposition of pre-tax factor income of the households sector in 2016.

Table A.2: Pre-tax factor income of the households sector, part 2

Income concept	Macro total (% of national income)	Macro total (million €)	Micro total (million €)	Difference (% of national income)	Microdata source	Allocation of micro-macro gap proportional to
Property income, received	10	56,995				
Interest, received	0	2,550				
Actual interest received	1	4,803	2,978	0.3	Tax records; Information from financial institutions	Interest income
Financial intermediation services indirectly measured	-0	-2,253				Interest income
Distributed income of corporations	2	14,158	8,778	0.9	Tax records; Information from financial institutions	Dividend income
Other investment income	7	40,283				Pension entitlements
Rents	0	4				Other real estate
Property income, paid	1	6,394				
Interest, paid	1	6,127				
Actual interest paid	5	31,575	30,522	0.2	Tax records; Information from financial institutions	Interest expenditure
Financial intermediation services indirectly measured	-4	-25,448				Interest expenditure
Rents	0	273	74	0.0	Tax records	Rents on land

NOTE: This table presents the decomposition of pre-tax factor income of the households sector in 2016.

Table A.3: Social contributions and benefits, part 1

Income concept	Macro total (% of national income)	Macro total (million €)	Micro total (million €)	Difference (% of national income)	Microdata source	Allocation of micro-macro gap proportional to
Social insurance surplus	3	14,874				Factor income
Net social contributions	30	174,659				
Net social contributions minus contributions for health care	20	119,015				
Employers' actual pension contributions	4	22,213	26,622	-0.7	Tax records, social security records.	Employers' pension contributions
Employers' actual non-pension contributions	6	36,543	36,469	0.0	Tax records, social security records.	Employers' non-pension contributions
Employers' actual health contributions	2	14,086	14,028	0.0	Tax records, social security records.	Employers' health contributions
Employers' imputed pension contributions	0	1,101	0	0.2	-	Employers' social contributions
Employers' imputed non-pension contributions	2	11,069	8,690	0.4	Tax records, social security records.	Employers' imputed non-pension contributions

NOTE: This table presents the decomposition of net social contributions and social security and insurance benefits in 2016.

Table A.4: Social contributions and benefits, part 2

Income concept	Macro total (% of national income)	Macro total (million €)	Micro total (million €)	Difference (% of national income)	Microdata source	Allocation of micro-macro gap proportional to
Households' actual pension contributions	2	12,931	8,844	0.7	Tax records, social security records.	Households' pension contributions
Households' actual non-pension contributions	11	66,187	64,900	0.2	Tax records, social security records.	Households' non-pension contributions
Contributions for long-term care	2	14,275	14,016	0.0	Tax records.	Contributions for long-term care
Health insurance premiums	5	27,282	26,052	0.2	Tax records.	Health insurance premiums
Households' imputed pension contributions	6	33,716				Pension entitlements
Households' imputed non-pension contributions	0	501				Pension entitlements
Social security and insurance benefits	18	104,141	107,708	-0.6		
Social security benefits in cash	9	53,300	55,674	-0.4	Tax records, social security records.	Social security benefits in cash
Other social insurance benefits	9	50,841	52,034	-0.2	Tax records, social security records.	Other social insurance benefits

NOTE: This table presents the decomposition of net social contributions and social security and insurance benefits in 2016.

Table A.5: Taxes, part 1

Income concept	Macro total (% of national income)	Macro total (million €)	Micro total (million €)	Difference (% of national income)	Microdata source	Allocation of micro-macro gap proportional to
Taxes	44	258,411				
Taxes, excluding social insurance contributions	35	207,742				
Indirect taxes	12	73,733				Indirect taxes in budget survey
Corporate taxes	3	19,754				
Corporate taxes paid by closely held corporations owned by Dutch shareholders	1	6,951	6,951	0.0	Tax records	No gap by construction
Corporate taxes paid by Dutch corporations owned by portfolio investors, the government, central bank and pension funds	1	4,570				Equity wealth, factor income, pension entitlements
Corporate taxes paid by foreign corporations owned by Dutch shareholders	1	8,212				Equity wealth, factor income, pension entitlements
Taxes paid by the government	0	20				Factor income
Income taxes	16	95,659				
Taxes on income, wealth, etc.	10	56,755	65,212	-1.4	Tax records	Taxes on income, wealth, etc.
Households' actual non-pension contributions	11	66,187	64,900	0.2	Tax records	Households' actual non-pension contributions
Contributions for long-term care	2	14,275	14,016	0.0	Tax records	Contributions for long-term care

NOTE: This table presents the decomposition of taxes in 2016.

Table A.6: Taxes, part 2

Income concept	Macro total (% of national income)	Macro total (million €)	Micro total (million €)	Difference (% of national income)	Microdata source	Allocation of micro-macro gap proportional to
Payroll taxes and health insurance premiums	11	67,409				
Employers' actual pension contributions	0	0				
Employers' actual non-pension contributions	6	36,543	36,469	0.0	Tax records, social security records	Employers' imputed non-pension contributions
Employers' imputed pension contributions	0	1,101	0	0.2	-	Employers' social contributions
Employers' imputed non-pension contributions	0	2,483	0	0.4	-	Employers' social contributions
Payroll taxes for health care	2	14,086	14,028	0.0	Tax records, social security records	Employers' health contributions
Health insurance premiums	5	27,282	26,052	0.2	Tax records	Health insurance premiums
Inheritance and gift taxes	0	1,855	1,563	0.0	Tax records	Inheritance and gift taxes
Net taxes paid by foreigners	1	5,056				

NOTE: This table presents the decomposition of taxes in 2016.

Table A.7: Government spending

Income concept	Macro total (% of national income)	Macro total (million €)	Micro total (million €)	Difference (% of national income)	Microdata source	Allocation of micro-macro gap proportional to
Spending	43	252,617				
Spending, excluding social insurance	33	195,733				
Cash transfers	13	77,775	79,986	-0.4		
Social security benefits in cash	9	53,300	55,674	-0.4	Tax records, social security records	Social security benefits in cash
Other social insurance benefits	1	3,584	3,668	-0.0	Tax records, social security records	Other social insurance benefits
Social assistance benefits in cash	4	20,891	20,643	0.0	Tax records	Social assistance benefits in cash
In-kind transfers	20	117,217				
Education	5	28,311			Administrative records	Enrolment by education type
Long-term care	3	17,972	17,617	0.1	Administrative records	Long-term care transfers
Health care	7	38,777	34,062	0.8	Insurance records	Health care transfers
Child care	0	2,095	1,989	0.0	Administrative records	Child care transfers
Youth care	1	3,494	2,285	0.2	Administrative records	Youth care transfers
Municipal support	1	5,338	4,523	0.1	Administrative records	Municipal support
Rental assistance	1	3,339	3,244	0.0	Administrative records	Rental assistance
Other in-kind transfers	3	17,891				
Collective expenditure	10	57,624				Disposable income
Government surplus	3	17,064				Factor income

NOTE: This table presents the decomposition of government spending in 2016.

Table A.8: The distribution of income in 2016

Income group	Number of adults	Pre-tax national income excluding retained earnings			Post-tax, pre-spending national income			Disposable income		
		Income threshold	Average income	Income share	Income threshold	Average income	Income share	Income threshold	Average income	Income share
Full population	13,332,368		€38,226	100.0		€28,789	100.0		€30,356	100.0
Bottom 50%	6,666,184		€18,365	24.0		€10,329	17.9		€12,837	21.1
Middle 40%	5,332,947	€32,073	€44,769	46.8	€22,183	€31,349	43.6	€22,916	€31,975	42.1
Top 10%	1,333,237	€65,768	€111,365	29.1	€46,629	€110,849	38.5	€47,238	€111,473	36.7
Top 1%	133,324	€154,625	€325,847	8.5	€163,627	€487,376	16.9	€164,223	€488,035	16.1
Top 0.1%	13,333	€502,561	€1,194,153	3.1	€803,387	€2,174,535	7.6	€804,171	€2,175,178	7.2
Top 0.01%	1,334	€1,993,323	€4,417,744	1.2	€3,527,095	€8,959,092	3.1	€3,527,406	€8,959,708	3.0
Top 0.001%	134	€7,932,265	€14,752,033	0.4	€15,728,910	€33,547,210	1.2	€15,729,308	€33,547,777	1.1
Top 0.0001%	14	€26,424,388	€31,473,562	0.1	€77,230,127	€94,143,977	0.3	€77,230,557	€94,144,284	0.3

NOTE: This table presents statistics on the distribution of additional intermediate income concepts compared to Table 2, namely pre-tax factor income, pre-tax national income and post-tax national income in the Netherlands in 2016. The unit of analysis is the adult (20+ years old) and income is split among all adult members of a household equally. Income groups are defined in terms of all adults in the population. Adults are ranked according to the income concept that is studied such that they may belong to different income groups depending on the concept of income.

Table A.9: The distribution of income in 2016, not equally split

Income group	Number of adults	Pre-tax factor income		Pre-tax national income		Post-tax national income	
		Average income	Income share	Average income	Income share	Average income	Income share
Full population	13,332,368	€44,371	100.0	€44,371	100.0	€44,747	100.0
Bottom 50%	6,666,184	€6,683	7.5	€13,170	14.8	€17,749	19.8
Middle 40%	5,332,947	€53,539	48.3	€49,410	44.5	€48,682	43.5
Top 10%	1,333,237	€196,134	44.2	€180,218	40.6	€163,995	36.6
Top 1%	133,324	€746,771	16.8	€743,995	16.8	€686,509	15.3
Top 0.1%	13,333	€3,285,973	7.4	€3,348,115	7.5	€3,177,671	7.1
Top 0.01%	1,334	€13,528,064	3.1	€13,844,030	3.1	€13,352,624	3.0
Top 0.001%	134	€52,392,529	1.2	€53,667,655	1.2	€52,218,348	1.2
Top 0.0001%	14	€161,595,026	0.4	€165,615,351	0.4	€161,785,379	0.4

NOTE: This table presents statistics on the distribution of income in the Netherlands in 2016. The unit of analysis is the adult (20+ years old) and income is assigned to the individual who nominally earns it. Income groups are defined in terms of all adults in the population. Adults are ranked according to the income concept that is studied such that they may belong to different income groups depending on the concept of income.

Table A.10: Transition matrices between pretax and post-tax income ranks

A. Microdata						
	P0-P1	P1-P10	P10-P50	P50-P90	P90-P99	P99-P100
P0-P1	40	23	24	10	3	0
P1-P10	5	45	34	9	7	0
P10-P50	0	12	72	14	2	0
P50-P90	0	0	20	77	3	0
P90-P99	0	0	0	30	69	1
P99-P100	0	0	0	0	9	91
B. Lump-sum						
	P0-P1	P1-P10	P10-P50	P50-P90	P90-P99	P99-P100
P0-P1	39	23	38	0	0	0
P1-P10	5	60	35	0	0	0
P10-P50	0	8	86	6	0	0
P50-P90	0	0	5	93	2	0
P90-P99	0	0	0	8	91	1
P99-P100	0	0	0	0	7	92
C. WIL						
	P0-P1	P1-P10	P10-P50	P50-P90	P90-P99	P99-P100
P0-P1	39	23	38	0	0	0
P1-P10	5	60	35	0	0	0
P10-P50	0	8	86	6	0	0
P50-P90	0	0	5	93	2	0
P90-P99	0	0	0	8	91	1
P99-P100	0	0	0	0	7	92
D. Tabulated data						
	P0-P1	P1-P10	P10-P50	P50-P90	P90-P99	P99-P100
P0-P1	39	23	38	0	0	0
P1-P10	5	60	35	0	0	0
P10-P50	0	8	86	6	0	0
P50-P90	0	0	5	92	2	0
P90-P99	0	0	0	8	91	1
P99-P100	0	0	0	0	7	92

NOTE: This table presents the transition matrices between pre- and post-tax groups, for different imputation methods regarding the distribution of in-kind transfers (see Section 5.3 for details). For each group of pre-tax income in columns, the tables present the share of the individual ending-up in corresponding groups of post-tax income. For example, in the *lump-sum* imputation method, 38% of individuals in the first percentile of the pre-tax income distribution end up in the income group P10-P50 of the post-tax income distribution.

Online Appendix

A Institutional details

A.1 Taxation

Personal income taxes The Income Tax Act of 2001 provides the legal framework for the taxation of personal income in the Netherlands.⁴⁷ It categorises income into three separate “boxes”.⁴⁸ The first box, *Box 1*, taxes labour income, self-employment income, imputed rent, pension benefits and other cash transfers. The largest deduction is that for mortgage interest payments related to owner-occupied housing. These forms of income are taxed according to a progressive schedule consisting of four brackets with marginal tax rates starting at 36.55% and reaching 52% for taxable income in excess of €66,422 in 2016. Retired individuals face lower marginal tax rates in the first two brackets, since they do not pay the portion of the income tax earmarked for the pay-as-you-go state pension. *Box 2* taxes dividends received and capital gains realised by individuals who own shares in closely-held businesses at a 25% rate. Formally, these forms of income are taxed in Box 2 when a taxpayer’s ownership share (and that of his fiscal partner) in a business exceeds 5%. When the ownership share lies below 5%, the shares are taxed in *Box 3*. In addition to these shares, *Box 3* covers savings deposits, bonds, non-owner-occupied real estate, and debt unrelated to mortgages on owner-occupied housing. The net value of these assets and debts is taxed at a flat 1.2% rate, with no further taxation of the associated income.

Indirect taxes The largest indirect tax is the Value Added Tax (VAT), which is codified in the Value Added Tax Act of 1968.⁴⁹ The standard rate is 21%, while the reduced rate that applies to specific product categories is 6% in 2016.⁵⁰ A 0% rate applies to yet another set of goods and services, partly related to cross-border transactions.⁵¹ A second category of indirect taxes are excise duties, which are imposed on tobacco products, alcoholic drinks and mineral oils, such as petrol and diesel.⁵² There are various other taxes such as a motor vehicles tax, a purchase tax on new cars and motor vehicles, environmental taxes, an insurance tax, a real estate transfer tax, a tax on housing corporations, and a bank levy.

Local taxes The most important local tax is a property tax, the rate of which varies by municipality. For residential properties, the rate ranged between 0.0453% and 0.2636% of the

⁴⁷The description of institutions in this section reflects their status as of 2016. Sections of this appendix follow the institutional background section in Leenders et al. (2023).

⁴⁸The full text of the Income Tax Act of 2001, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0011353/2016-01-01>.

⁴⁹The full text of the Value Added Tax Act of 1968, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0002629/2016-01-01>.

⁵⁰These product categories are listed in Table I of the Value Added Tax Act of 1968.

⁵¹Product categories that face a 0% rate are listed in Table II of the Value Added Tax Act of 1968.

⁵²The full text of the Excise Act, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0005251/2016-01-01>.

property value. The rate for non-residential property ranged between 0.075% and 0.6895% for property owners, and between 0% and 0.1994% for the property occupier (Allers et al., 2016). There are also tourist taxes, waste levies and sewerage charges.

Payroll taxes and mandatory health insurance premiums Payroll taxes are intended to fund health care, as well as to contribute to insurance funds against disability, unemployment and smaller social risks. Employers pay a flat 6.75% payroll tax on wages up to €52,763 under the Health Insurance Act.⁵³ The rate and threshold are set by ministerial decree.

The general unemployment insurance contribution rate is 2.44%, while the sector-specific contribution rate is 1.78% on average. The general contribution rate is set by ministerial decree, and the sector-specific contribution rates are set by the government agency responsible for administering employee insurance schemes.⁵⁴ The contribution rate for disability insurance is 5.88%. The rate is set by ministerial decree.⁵⁵ These different social contributions all face the same ceiling of €52,763. There are a few smaller payroll taxes related to specific cases of unemployment, child care, and sickness.

Another source of funding health care spending are mandatory health insurance premiums for curative care. The premium level is set by private insurers and in 2016 amounted to an average of €1,199 (Nederlandse Zorgautoriteit, 2016). To compensate individuals with low incomes for this expense, there is a health insurance allowance.

Corporate tax The corporate income tax imposes a progressive schedule on taxable profits, with a 20% rate below €200,000 and a 25% rate on profits in excess of that.⁵⁶ A special regime exists for profits related to R&D which are taxed at a 5% rate. Dividends received from subsidiaries as well as capital gains realised through the sale of subsidiaries are, under some conditions, fully exempt. There are various deductions such as one for general investment, for energy and environmental investment, as well as the possibility of deducting foreign losses from the corporate tax base in the Netherlands. In general, for (domestic) losses there is a one year carry-back and nine years of carry-forward provision. Finally, the Dutch tax authority may provide advance rulings on the specific application of the corporate income tax.

Inheritance tax Inheritances and bequests are taxed according to a progressive schedule where the rates depend on the relationship between the two individuals involved.⁵⁷ For parents transferring wealth to their children, the schedule has two rates of 10% and 20%. In this case,

⁵³The full text of the Health Insurance Act, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0018450/2016-01-01>.

⁵⁴The full text of the Unemployment Act, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0004045/2016-01-01>. The full text of the Funding Social Insurance Act, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0017745/2016-01-01>.

⁵⁵The full text of the Disability Insurance Act, effective on 1 January, 2016, is available at <https://wetten.overheid.nl/BWBR0002524/2016-01-01>

⁵⁶The full text of the Corporate Tax Act of 1969, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0002672/2016-01-01>.

⁵⁷The full text of the Inheritance Tax Law, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0002226/2016-01-01>.

the exempted share of wealth is €20,148 in the case of an inheritance and €5,304 in the case of a bequest. In addition, there is an exemption for one-off bequests to children between the age of 18 and 39 years old of €25,449 for general bequests and €53,016 for bequests spent on the child's house. The transfer of closely-held businesses is, under some conditions, treated differently for the purposes of the inheritance tax. The first €1,060,298 is entirely exempt and only 17% of the remainder is taxable.

A.2 Government spending

Health care and long term care Health care and long term care represent the largest public spending category. This type of spending is funded through payroll taxes, insurance premiums, deductibles and, finally, general government revenue. From an international perspective, private contributions are relatively low. A large share of public health spending is allocated to long-term care, around 24% of spending, while outpatient care and inpatient care account for 20% and 18%, respectively (OECD, 2024). Pharmaceuticals, medical goods, day-case, home-care and preventive care make up the rest of spending.

Education Education spending is divided between primary (32%), secondary (43%) and tertiary education (25%). Schooling is compulsory for children between the ages of 5 and 16, but most children start school at the age of 4 and a substantial share of children under the age of 4 attends kindergarten and pre-kindergarten facilities (OECD, 2016). The duration of primary education is 8 years. Secondary education is split between 4-year pre-vocational education, followed by upper secondary vocational education, 5-year senior general education and 6-year pre-university education. For those between the ages of 16 and 18, schooling is compulsory until a basic qualification is attained. Tertiary education takes place at universities and universities of applied sciences.

Social support Social support covers different types of expenditure, ranging from allowances for child care to rental support. The allowances for child care depend on income, the number of children, the type of childcare and the number of hours worked. Rental support follows a similar structure of allowances, but depends on income, wealth and rental expenditures. Youth care is available for children and families who experience social or psychological problems. For families with children there are additional benefits called the “child budget” and the “child benefit”. The child budget falls with income but amounts to at most €1,038 for the first child. The amount is increased, at a decreasing rate, for each additional child. The child benefit depends on the age of the child, but does not depend on income. In 2016, the benefit for a child between the ages of 12 and 18 amounted to €273.89 per quarter. Finally, there exists social support at the municipal level, organised through the Social Support Act (*Wet Maatschappelijke Ondersteuning*), targeted at individuals who are unable to independently arrange their own care and support.

Cash transfers The largest cash transfer is the pay-as-you-go state pension, which is paid to all individuals above the retirement age. In 2016, the retirement age increased to 65 and 6 months. The benefit amount is determined by the number of years spent in the Netherlands as well as by one’s household type. For a single household, the amount could at most be €1,138.15 per month. For a couple, where both have reached the retirement age, the maximum amount was €783.87 per person. A second important cash transfer is a minimum income scheme that provides benefits to individuals who have insufficient means to support themselves and who cannot claim other types of income support. As of July 1st, 2016, the minimum income, net of taxes, amounted to €977.15 per month for single-person households, and €1,395.15 for couples. There are a few smaller cash transfers such as disability insurance, unemployment insurance, and sickness benefits.

B Description of datasets

All datasets are provided by Statistics Netherlands (CBS). The household dataset from Bruil (2023) and the ownership registry known as “SZO AB+” are specifically made available for this project. More information about the sources and methodology of the other datasets can also be found online.⁵⁸

Household dataset from Bruil (2023) We have access to the data sets used in Bruil (2023). For the purpose of our study, the dataset from Bruil (2023) was updated with more recent microdata whenever available and expanded to provide more detail on a number of variables, in particular employers’ social contributions, dividends and household wealth. It contains all personal income, along with taxes paid and in-cash and in-kind benefits received for each member of the Dutch population in 2015 and 2016. The totals of the individuals are consistent with the national accounts. Details on the data sources and the distributional assumptions used to construct this data set are in the appendix section of Bruil (2023).

SZO AB+ We obtain the corporate income and tax data from the Satelliet Zelfstandig Ondernemers Aanmerkelijk Belanghouders (SZO AB+), a dataset that is custom-made for this research project by Statistics Netherlands (CBS). SZO AB+ links financial firm data, like balance sheets and profit and loss accounts, to the shareholders of those firms. The dataset covers all shareholders with an interest of at least 5% in a Dutch corporation.

The dataset consists of three files providing (1) financial firm data, (2) ownership links and (3) personal shareholder data. The first two files are based on corporate income tax returns. In corporate income tax returns, there are two types of declarants: individual and fiscal units. For the former, the declaration originates from a single legal entity that is required to file the return. For fiscal units, the declaration is consolidated, which means fiscal information from

⁵⁸<https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/catalogus-microdata> (available in Dutch only).

more than one legal entity (at least two) are combined in one declaration, and those entities are treated as if they are one firm. The first file gives us detailed insight into the calculation of fiscal profit based on the tax return of each firm (both individual and fiscal units), allowing us to precisely determine the amount of corporate tax due, taking into account any type of deductions, exemptions, carry-forward losses or withholding taxes.

The ‘ownership links’ in the second file allow us to link any firm-level variable such as (retained) profit or corporate income tax to the ultimate natural shareholders. In this file we observe for each firm the percentage of share ownership that is held by its shareholder(s). A shareholder can be either a natural person or a legal entity, and in the latter case we can keep using file 2 to trace back the ownership links just as long as the shareholder is a natural person. Any dividends or capital gains received by those persons are recorded in file 3, which is based on personal income tax declarations.

Gbapersoontab and **Gbahuishoudensbus** These datasets contains demographic background information on all individuals and households in the Netherlands, such as age, gender and household type.

Inpatab and **Inhatab** These datasets contain information about income and work, such as labour market status, for all Dutch residents, both at individual and at household level. It is based on administrative records, mostly from the Dutch Tax Administration.

Hoogsteopltab This dataset records the highest educational levels of the Dutch population, covering nearly 11 million individuals in 2016. The records are derived from diverse registers and the Labour Force Survey (EBB).

Budget survey The Budget Survey is a survey on household expenditure among 15 thousand households in 2015. During four weeks, participants record all expenditure on articles and services of 20 euro. During one of those weeks, participants also record expenses on goods and services below 20 euro. The survey distinguishes between 135 types of goods.

Gebwlztab This dataset contains registries of all persons of 18 years and up who have made use of long-term care for which a personal contribution must be paid.

Gebwmotab This dataset contains registries of all individuals aged 18 and up who have made use of social support facilities for which a personal contribution must be paid.

Zvwzorgkostentab This dataset contains, for each Dutch resident who is insured through the basic insurance, their annual costs for health care covered by the basic insurance. The costs refer to those expenses that have actually been reimbursed by health insurers.

Jgdhulpbus This dataset contains all provided trajectories for youth care in a given year, excluding youth protection and juvenile probation.

Kinderopvang This dataset contains all the beneficiaries of childcare allowance, along with the corresponding amount received.

Vrktab This dataset contains for all inheritances for which tax returns have been filed, the inheritance amount, the inheritance tax and the relation between the testator and the recipient.

Schtab This dataset contains for all donations for which tax returns have been filed, the donation amount, the gift tax and the relation between the donor and the recipient.

C Methodological appendix

C.1 Retained earnings and corporate taxes

For the purposes of this study, we are interested in the earnings retained by firms to the extent that Dutch households own shares in these firms. If a firm is located in the Netherlands but has no Dutch shareholders, we want to disregard their retained earnings. Conversely, we do want to include earnings retained by firms abroad if the firm’s shareholders are Dutch citizens. The same holds true for the taxes paid by corporations.

First, we focus on earnings retained by domestic firms. In 2016, the primary income of the corporate sector in the Netherlands (B.5n of S.11 and S.12) amounted to €70.3 billion (12% of national income). This amount includes the earnings retained by Dutch corporations as well as the earnings retained by corporations abroad owned by Dutch households as part of their “foreign direct investment” (D.43m of S.11 and S.12, €0.7 billion (0.1%)). It also includes corporate taxes associated with foreign direct investment in the Netherlands (the part of D.5b of S.11 and S.12 associated with D.43b). To estimate the size of these taxes we rely on disaggregated national accounts that divide the corporate sector in four categories: 1) Dutch-controlled non-financial corporations, 2) foreign-controlled non-financial corporations, 3) Captive financial institutions and money lenders (S.127), and 4) other financial corporations. For each of these subsectors, we observe net primary income (B.5n), reinvested earnings on foreign direct investment (D.43, both incoming and outgoing), and current taxes on income, wealth, etc. (D.5b). We assume that the ratio between corporate taxes and gross retained earnings is the same for foreign direct investment and all other investment within each subsector, but may differ considerably across subsectors. For example, the ratio is equal to 22.4% for Dutch-controlled foreign firms, but 2.7% for captive financial institutions and money lenders which are often used as conduits for multinational profit shifting. This procedure yields an estimate of €8 billion for corporate taxes associated with reinvested earnings on foreign investment in the Netherlands.

Put simply, this says that firms based in the Netherlands but owned by foreign households as “foreign direct investment” paid €8 billion in corporate taxes in the Netherlands, a considerable portion of the €23 billion that firms based in the Netherlands paid as corporate taxes.

The remainder, $70.3 - 0.7 - 8 = €61.5$ billion contains earnings retained by Dutch corporations attributable to foreign portfolio investors. The crucial distinction between direct and portfolio investment is whether an investor owns at least 10% of the shares of a corporation. The Dutch central bank has estimated that the earnings associated with foreign portfolio investment in the Netherlands is equal to €35.5 billion.⁵⁹ Of this, €24.9 billion was paid out in dividends, leaving €10.6 billion in retained earnings, net of taxes. To retrieve the gross amount we assume that the ratio between taxes and gross retained earnings is the same for foreign portfolio investment and domestic retained earnings that accrue to Dutch households. This yields a total of €13.9 billion in gross retained earnings associated with foreign portfolio investment, €3.4 billion of which are taxes. This leaves €47.6 billion for the portion of domestic retained earnings that accrues to Dutch households. Of this, taxes account for €11.5 billion.

The above has dealt with earnings retained by domestic firms. Almost as important are earnings retained by firms abroad in which Dutch households hold shares. According to the national accounts, earnings retained by foreign corporations attributable to direct shareholders amount to €0.7 billion. This amount is net of taxes. We assume that the ratio between corporate taxes and gross retained earnings is the same for incoming and outgoing foreign direct investment. This yields gross retained earnings on outgoing foreign direct investment equal to €0.8 billion, of which €0.1 billion are corporate taxes.

More important are earnings retained by foreign corporations attributable to Dutch portfolio shareholders. Again, we rely on an estimate by the Dutch central bank that earnings on portfolio investment shares abroad equal €38.2 billion.⁶⁰ Of this, €12.7 billion was paid out in dividends and €25.4 billion was retained. Again this amount is net of taxes. We assume that the ratio between corporate taxes and gross retained earnings is the same for incoming and outgoing foreign portfolio investment. This yields gross retained earnings on outgoing foreign portfolio investment equal to €33.6 billion, of which €8.1 billion are corporate taxes.

C.2 Production taxes

We impute indirect taxes using the 2015 Budget Survey from Statistics Netherlands and the 2016 statutory VAT and excise rates. The Budget Survey is only available in 2015, so we assume consumption patterns remain unchanged in 2016.

In a first stage we simulate the VAT and excise taxes using the Budget Survey data (see Online Appendix B). Since excise taxes are levied per unit, we infer the quantity consumed by dividing the expenditures by the average price of the goods subject to excises. We use the unique identifier to link the households from the Budget Survey to the disposable household

⁵⁹This estimate is part of an internal update of a report on the Dutch current account (De Nederlandsche Bank, 2013).

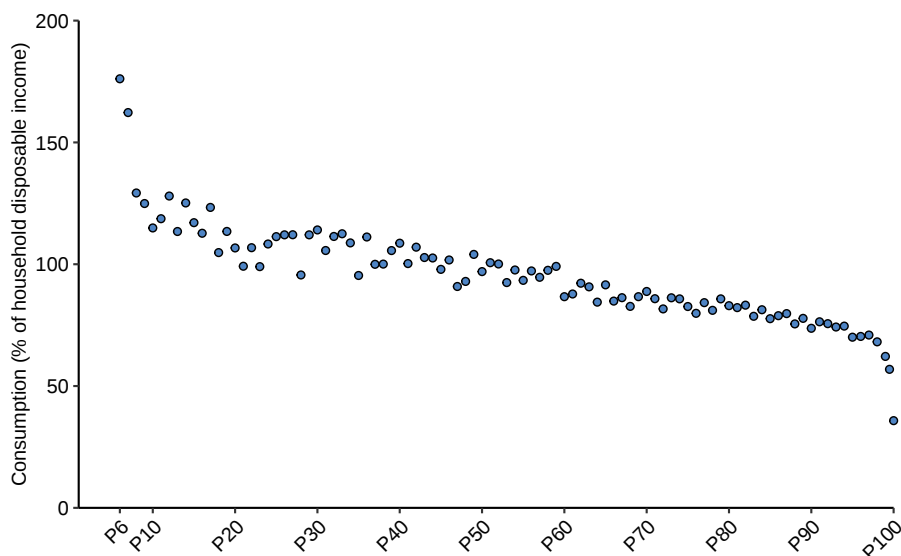
⁶⁰This estimate is part of an internal update of a report on the Dutch current account (De Nederlandsche Bank, 2013).

income from the INHATAB income dataset. In a second stage we use the INHATAB income dataset to determine the percentiles of the distribution of disposable household income (variable *inhbestinkh*) for the whole Dutch population. Figure C.1 shows how the share of consumption by different income groups defines the regressive pattern of consumption taxes observed in Figure A.18: on average, lower-income groups consume (more than) their entire income, while households with higher incomes are able to save and spend a smaller portion of their income on consumption,

In a third stage we calculate the implicit tax rates per income group. To this end, we group the households in the Budget Survey using the percentile values for the household disposable incomes from stage 2 and sum the indirect taxes and disposable incomes. Dividing the former by the latter yields us a tax rate at the level of each income group. In a fourth stage we impute the indirect tax rates into the DINA target dataset, whereby all households within each of the income groups of stage 1 receive the tax rate from the matching income group in the Budget Survey. We then calculate the indirect taxes at the household level by multiplying the tax rate by the disposable household income concept used in the DINA frame, *b6g*. We set a lower limit of zero (applicable when *b6g* is negative).

In a final stage, as is done for all other monetary variables, the difference between the indirect taxes in the data and the national accounts aggregate is proportionally allocated.

Figure C.1: Consumption as a share of household disposable income



NOTE: This figure shows per income group the average share of disposable income spent on consumption. The unit of analysis is the household. Their consumption shares are estimated based on recorded expenses in the Budget Survey.

C.3 In-kind transfers

Health care In dataset *Zvwzorgkostentab* we observe the costs of health care residents received via their basic health insurance. The national government determines what is covered by the basic insurance, and since the basic insurance is legally required under the The Health Care

Insurance Act (Zvw) for almost all Dutch residents, we observe the health care expenses for nearly the entire Dutch population. The difference with the national account aggregate is proportionally allocated.

Education All levels of education are funded by the government. Primary and (general) secondary education is free, secondary vocational and tertiary education institutions do require tuition fees from students. The Education Administration (DUO) provided an administrative data source covering education enrolment. The available information includes a unique student number, type of education enrolled in, institution where education is followed, and the encrypted social security number. We use the enrolment as a proxy for the distribution of the macro total per type of education (nearly 11, 14 and 8 billion euros for primary, secondary and tertiary education respectively), assuming that within each type of education, every student is equally costly.

Long-term care The LTC system in the Netherlands is targeted at people who constantly need (intensive) care, such as the chronically ill, vulnerable elderly or people with a severe mental or physical disability. In *Gebwlztab* we observe whether adults have received any long-term care by means of the Long-term care Act (Wlz) and if so, which type of care. The national accounts aggregate is allocated to all registered users, taking into account cost differences between different types of long-term care on open data.⁶¹

Social support The Social Support Act (Wmo) requires municipalities to assist people who are unable to independently arrange the care and support they need. This includes services like companionship, day activities and sheltered accommodation for people with psychiatric disorders. In the dataset *Gebwmotab* individuals aged 18 and up who have made use of such facilities are observed.⁶² The amount of social support transfers are calculated as follows. Open data⁶³ on social support expenditure at the national level are linked to all registered individuals who have received some kind of social support. By doing so we obtain an estimation of average cost per type of support, per four weeks. This estimation is used to calculate the costs per individual. The difference with the national account aggregate is proportionally allocated.

Youth care Various forms of youth care exist for individuals up to 18 years old. The Youth Act requires municipalities to ensure access to youth care and for granting it to young people and their parents.⁶⁴ The dataset *Jgdhulpbus* contains all provided trajectories for youth care in

⁶¹<https://opendata.cbs.nl/statline/#/CBS/nl/dataset/82789NED/table>

⁶²Only the facilities for which a personal contribution must be paid are registered. In 2016, municipalities could determine the height of personal contribution themselves, but were also free to grant exemptions, for example for low incomes. As a result, those individuals do not show up in the microdata. We do not know at which scale such exemptions are given. One possible consequence is that we underestimate the average in-kind transfer for lower incomes, since unregistered individuals that did receive support are more likely to be at the lower end of the income distribution.

⁶³<https://opendata.cbs.nl/#/CBS/nl/dataset/84580NED/table>

⁶⁴We do not take local differences into account, since we aim to show the redistributive effects of in-kind transfers at the national level. In practice however, important redistributive effects at the local level might arise

a given year, excluding youth protection and juvenile probation. We group all forms of youth care into care with and without residence, after which the average costs for each care type are estimated. Due to lack of expenditure data at the national level, we make use of open data on youth care expenditure of municipalities.⁶⁵ Selecting only those municipalities that have registered their expenditure on the two types of care leaves us with data of 52 municipalities, out of 393. By linking these data to registered users of youth care in those municipalities, we estimate the average cost per day for each care type, which we impute to all observed individuals - hence assuming equal average costs for the missing municipalities. The difference with the national account aggregate is proportionally allocated.

Child care The childcare allowance depends on income, the number of children, the type of childcare and the number of hours worked. In the microdata we directly observe the amount of childcare allowance received per household, which we use to allocate the national accounts aggregate.

References

- Allers, Maarten, Corine Hoeben, Klaas Kwakkel, and Jacob Veenstra.** 2016. “Atlas van de lokale lasten 2016.” Centrum voor Onderzoek van de Economie van de Lagere Overheden.
- Assouad, Lydia.** 2023. “Rethinking The Lebanese Economic Miracle: The Extreme Concentration of Income and Wealth in Lebanon, 2005–2014.” *Journal of Development Economics*, 161: 103003.
- Bach, Stefan, Charlotte Bartels, and Theresa Neef.** 2023. “Distributional National Accounts (DINA) for Germany, 1992-2016.” Available at SSRN: <https://ssrn.com/abstract=4487665>.
- Bozio, Antoine, Bertrand Garbinti, Jonathan Goupille-Lebret, Malka Guillot, and Thomas Piketty.** 2024. “Predistribution vs. Redistribution: Evidence from France and the U.S.” *American Economic Journal: Applied Economics*, 16: 31–65.
- Bruil, Arjan.** 2023. “Distributional National Accounts for the Netherlands and a Comparison with 12 Other Countries.” *Review of Income and Wealth*, 69(4): 886–906.
- Chatterjee, Aroop, Léo Czajka, and Amory Gethin.** 2023. “Redistribution Without Inclusion? Inequality in South Africa Since the End of Apartheid.” Available at <https://amory-gethin.fr/files/pdf/ChatterjeeCzajkaGethin2023.pdf>.

when in-kind transfers differ strongly between municipalities. Since municipalities to some extent are free to shape their social policy, it is likely such local effects do exist.

⁶⁵<https://opendata.cbs.nl/#/CBS/nl/dataset/83454NED/table?ts=1630489418255>

- De Nederlandsche Bank.** 2013. “Nederlands lopende rekeningoverschot gevoelig voor dividenduitkeringen.” Accessed on: 27 October 2023.
- Guzzardi, Demetrio, Elisa Palagi, Andrea Roventini, and Alessandro Santoro.** 2024. “Reconstructing Income Inequality in Italy: New Evidence and Tax System Implications from Distributional National Accounts.” *Journal of the European Economic Association*, 22(5): 2180–2224.
- Jestl, Stefan, and Emanuel List.** 2022. “Inequality, Redistribution, and the Financial Crisis: Evidence from Distributional National Accounts for Austria.” *The Review of Income and Wealth*, 69(1): 195–227.
- Khalid, Muhammed Abdul, and Li Yang.** 2021. “Income inequality and ethnic cleavages in Malaysia: Evidence from distributional national accounts (1984–2014).” *Journal of Asian Economics*, 72: 101252.
- Leenders, Wouter, Arjan Lejour, Simon Rabaté, and Maarten Van ’t Riet.** 2023. “Offshore Tax Evasion and Wealth Inequality: Evidence from a Tax Amnesty in the Netherlands.” *Journal of Public Economics*, 217: 104785.
- Nederlandse Zorgautoriteit.** 2016. “Zorgverzekeringsmarkt 2016.” Nederlandse Zorgautoriteit.
- Novokmet, Filip, Thomas Piketty, and Gabriel Zucman.** 2018. “From Soviets to oligarchs: inequality and property in Russia 1905–2016.” *Journal of Economic Inequality*, 16: 189–223.
- OECD.** 2016. “The Dutch education system.” In *Netherlands 2016: Foundations for the Future*. OECD Publishing.
- OECD.** 2024. “Health expenditure and financing.” <https://www.oecd.org/health/health-data.htm>, Accessed on January 29, 2024.
- Piketty, Thomas, Emmanuel Saez, and Gabriel Zucman.** 2018. “Distributional National Accounts: Methods and Estimates for the United States.” *Quarterly Journal of Economics*, 133(2): 553–609.
- Piketty, Thomas, Li Yang, and Gabriel Zucman.** 2019. “Capital Accumulation, Private Property, and Rising Inequality in China, 1978–2015.” *American Economic Review*, 109(7): 2469–2496.