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Essays in Public Economics

by

Wouter Leenders

A dissertation submitted in partial satisfaction of the
requirements for the degree of
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in
Economics
in the
Graduate Division
of the
University of California, Berkeley

Committee in charge:
Professor Gabriel Zucman, Chair
Professor Emmanuel Saez
Professor Danny Yagan

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Abstract

Essays in Public Economics

by

Wouter Leenders

Doctor of Philosophy in Economics

University of California, Berkeley

Professor Gabriel Zucman, Chair

This dissertation consists of three essays in public economics. The first essay studies offshore tax evasion and its implications for measuring wealth inequality. Using administrative microdata on participants in a Dutch tax amnesty and on households detected through other enforcement projects, the essay shows that tax evasion is concentrated among wealthy households, though less concentrated at the very top than in comparable evidence from other countries. It argues that the Dutch pattern reflects the interaction of geography, access to cross-border evasion opportunities, low effective tax rates for the very wealthy, and the availability of more sophisticated avoidance and evasion strategies.

The second essay studies inequality and redistribution in the Netherlands using linked administrative data. It combines income records, corporate ownership registries, and detailed data on taxes and government spending to measure pre-tax and post-tax income across the distribution. The essay shows that retained earnings are central to measuring top incomes and that the Dutch tax system is broadly flat overall, with declining effective tax rates at the very top. It also evaluates the redistributive role of cash and in-kind transfers and documents how redistribution varies across age, gender, and geography.

The third essay studies the incidence and behavioural effects of a temporary Dutch employer-side tax on high wages. Using linked employer-employee data and personal income tax records, it combines bunching, difference-in-differences, and triple-differences designs. The essay finds no evidence that employers shifted the tax onto regular employees through lower wages, implying that employers bore the burden. By contrast, owner-managers reduced their own wages sharply and persistently, while those constrained by minimum compensation rules did not. These findings show that behavioural responses to taxation at the top depend strongly on the legal and institutional design of the tax base.

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Introduction

This dissertation consists of three papers in the field of public economics. The first paper is co-authored with Arjan Lejour, Simon Rabaté, and Maarten van 't Riet. It investigates how the measurement of wealth inequality is affected by offshore tax evasion. Using data from a tax amnesty in the Netherlands, we find that this type of tax evasion is concentrated among the wealthy. Wealth hidden offshore is typically excluded from conventional estimates of inequality, implying that these estimates underestimate the true level of wealth inequality. The concentration of offshore wealth appears to be lower in the Netherlands than in other countries. We explore several explanations for this. One is the availability of low-cost evasion opportunities in neighbouring countries. Another is that the Netherlands' wealthiest households face low effective tax rates, implying that the incentive to evade taxes is low as well.

I further explore the topic of effective taxation in the second paper which is co-authored with Arjan Bruil, Céline van Essen, Arjan Lejour, Jan Möhlmann and Simon Rabaté. This paper uses rich administrative data to measure the level of inequality of income in the Netherlands before and after redistribution. We are able to link firms to their shareholders through a corporate ownership registry, allowing us to compute the first exact all-in effective tax rate for the super rich internationally, inclusive of individual-level as well as firm-level taxes. We find that the overall tax system is largely flat and regressive at the top. At the very top, income taxes make up a negligible share of income and corporate taxes only partially make up for this. We also have access to exceptionally detailed administrative data on government spending, both in cash and in-kind. While in-kind transfers reduce inequality, this effect is muted by the substantial degree of re-ranking they induce.

The analysis of the second paper is descriptive and does not answer the question how incomes and tax burdens change as a result of tax reforms. The third paper is co-authored with Egbert Jongen. It studies a tax reform in the Netherlands that levied a payroll tax on employers of employees earning at least €150,000 in 2012 and 2013. We use employer-employee data and tax returns to investigate how this tax affected wages. We find that the wages of regular employees did not respond, implying that their employers bore the full burden of the tax. In sharp contrast, owner-managers were able to lower their wages and thereby reduce their tax liability. Some owner-managers are constrained by anti-avoidance rules that set a minimum level of pay. These owner-managers are unable to avoid the tax, suggesting that such anti-avoidance rules can be effective.

Chapter 1

Offshore Tax Evasion and Wealth Inequality: Evidence from a Tax Amnesty in the Netherlands

Wouter Leenders Arjan Lejour Simon Rabaté Maarten van 't Riet

Abstract. Exploiting unique datasets covering over 29,000 tax evaders in the Netherlands, we investigate the distribution of tax evasion and its implications for the measurement of wealth inequality. Tax evasion is concentrated at the top of the wealth distribution with over 10% of the wealthiest 0.01% of households – the “super rich” – evading taxes. At the top, households evade around 8% of their true tax liability. The “merely rich” (P90-P99.9) own 67% of hidden wealth, while the “super rich” account for only 7%. Consequently, the correction for offshore wealth has a modest effect on top wealth shares. We describe a number of explanations for the distribution of tax evasion by Dutch households: low-cost tax evasion opportunities in neighbouring countries for the “merely rich”, sophisticated forms of tax evasion for, low effective tax rates on and migration to low tax jurisdictions by the “super rich”. Taken together, these explanations suggest that the distribution of tax evasion strongly depends on a country’s geographical and institutional settings.

1.1 Introduction

As long as there have been taxes, people have tried to avoid and evade them. Interest in these phenomena has been fuelled by their effects on public revenues, as well as on the distribution of wealth and income. One prominent example of tax evasion is hiding wealth and income in tax havens.¹ According to estimates by Zucman (2013), 8% of global financial wealth, or \$5.9 trillion, is held in tax havens. As hidden wealth is not evenly distributed in the population, it not only affects public revenues, but also wealth and income inequality and its measurement. Research on inequality increasingly relies on administrative tax data and statistics on inequality will be distorted

¹For general histories of offshore tax havens, see Palan, Murphy and Chavagneux (2009) and Ogle (2017).

if these data fail to capture wealth hidden abroad (Atkinson, Piketty and Saez, 2011; Zucman, 2019). In recent years, leaks containing confidential information from financial institutions as well as academic research investigating leaks and tax amnesties have confirmed the popular narrative that tax evasion is concentrated among the wealthiest in society (Alstadsæter, Johannesen and Zucman, 2019; Londoño-Vélez and Ávila-Mahecha, 2021*b*).

This paper uses unique microdata to study tax evasion and its distribution in the Netherlands. We have data on over 27,000 participants to the Dutch tax amnesty program between 2002 and 2018. In addition, we have data on almost 2,000 tax-evading households who were found through a number of different projects undertaken by the tax administration. We link these data to administrative data on income, wealth, and demographics covering the universe of the Dutch population.

The taxation of wealth in the Netherlands differs for different types of wealth. When a household owns financial wealth such as bank deposits, bonds or shares, the stock of wealth is typically taxed at a flat rate of 1.2%² with no additional tax on the income from this wealth. The exception is when a household owns at least 5% of a corporation’s shares, which is referred to as “substantial ownership”, a type of wealth particularly prevalent at the top of the wealth distribution. In this case, there is no tax on the stock of wealth, but instead there is a tax on dividends and realised capital gains. This tax system results in a low tax burden on capital compared to other European countries (European Commission, 2020).

We provide two sets of results. First, we document the distributional patterns of tax evasion in the Netherlands. Our main results are based on the tax amnesty, but these results are broadly robust to using alternative sets of tax evaders. We find that tax evasion is concentrated at the top of the wealth distribution, but to a smaller extent than previously found in the literature. The top 0.01%, whom we call the “super rich”, owns 7% of wealth declared through the Dutch amnesty, compared to around 50% in Alstadsæter, Johannesen and Zucman (2019) and Londoño-Vélez and Ávila-Mahecha (2021*b*). In the Netherlands, top 0.01% evade around 8% of their true tax liability, less than the 25% found in Scandinavia (Alstadsæter, Johannesen and Zucman, 2019). Instead, we find substantial evasion among the “merely rich” (P90-P99.9), who own around 67% of amnesty wealth. This pattern is consistent across a number of different projects that the tax administration has undertaken to combat offshore tax evasion. We provide a new estimate of wealth inequality in the Netherlands by correcting for wealth hidden offshore, relying on an estimate of the stock of Dutch households’ offshore wealth by Alstadsæter, Johannesen and Zucman (2018*a*). As evasion is not very concentrated at the top, the correction for hidden offshore wealth is correspondingly small.

The second set of results describes the mechanisms explaining the peculiar distributional patterns of tax evasion in the Netherlands. We are cautious about making causal claims and we take no strong stance on the relative importance of these mechanisms given the descriptive nature of this part of the analysis. We first show that a substantial amount of the tax evasion undertaken by the

²This rate was made progressive in 2017.

“merely rich” can be attributed to cross-border evasion opportunities in Germany and Belgium. We then explore three explanations for the relatively small share of offshore wealth held by the “super rich”: (i) the wealthiest households may engage in a more sophisticated form of tax evasion that escapes both the amnesty and other tax administration efforts, (ii) the incentive to evade might be small because of a low effective tax rate at the top of the wealth distribution in the Netherlands, (iii) wealthy households who particularly dislike paying taxes may have migrated to low-tax countries in the past.

This paper’s first contribution is to the literature on the measurement of inequality. While this measurement has improved substantially by using administrative data instead of surveys, an obvious drawback has always been the failure to capture wealth and income hidden from tax administrations. This issue has been recognised (e.g. by Atkinson, Piketty and Saez (2011)) and even tentatively addressed (e.g. by Roine and Waldenström (2008, 2009)), but the data necessary to properly account for tax evasion was unavailable until recently. Alstadsæter, Johannesen and Zucman (2019) and Londoño-Vélez and Ávila-Mahecha (2021*b*) document the distribution of hidden wealth by linking individuals found in the *Panama Papers* and the *Swiss Leaks*, as well as tax amnesty participants to population-wide administrative records.

The results in this paper represent a test of the methodology used in Alstadsæter, Johannesen and Zucman (2019) to assign hidden wealth to different households across the wealth distribution. We paint a less optimistic picture of the suitability of tax amnesties to gauge the entire distribution of wealth still hidden offshore. Even when a data source captures tax evasion by the “merely rich” well, it may paint an incomplete picture of evasion by the “super rich”. Moreover, the distribution of tax evasion depends on a country’s geographical and institutional setting. When this setting changes, for example through the automatic exchange of information between countries, the characteristics of amnesty participants, who evaded taxes in the past, may be different from those households that still engage in tax evasion today.

Our second contribution is to the research on the determinants of tax evasion. The seminal model of tax evasion is that by Allingham and Sandmo (1972) and we relate our results to this model as well as to recent theoretical contributions by Kleven et al. (2011), Alstadsæter, Johannesen and Zucman (2019) and Guyton et al. (2021). The empirical literature has been reviewed extensively by Slemrod and Yitzhaki (2002) and Slemrod (2007, 2019). Although mostly descriptive, this paper provides several important insights in what may drive tax evasion. First, we observe a strong response to the changes in the amnesty program’s penalty rate. This confirms that the policy environment can have a strong impact on compliance behaviour, as shown by Johannesen et al. (2020) for the US, Alstadsæter et al. (2022) for Norway, and Londoño-Vélez and Ávila-Mahecha (2021*b*) for Colombia.

Second, we demonstrate that the availability of relatively cheap evasion opportunities in neighbouring countries enables the spread of offshore evasion beyond the “super rich”. Wealth offshored to countries bordering the Netherlands (Belgium, Germany) is held almost entirely by households

hailing from the “merely rich” who live close to those borders. In contrast, there is no “border effect” for wealth offshored to Switzerland, which is predominantly held by households in the more affluent municipalities of the Netherlands. As emphasised by Alstadsæter, Johannesen and Zucman (2019), it is important to also consider the supply of tax evasion services. When third-party reporting requirements were introduced for domestic banks, a number of these banks opened subsidiaries in Luxembourg. At the same time, banks in Belgium and Germany advertised in Dutch newspapers, listing branches close to the Dutch border and highlighting their Dutch-speaking staff as well as the absence of a withholding tax.

Third, we explore different explanations for the relatively small role that the “super rich” appear to play in tax evasion in the Netherlands. Guyton et al. (2021) develop a model in which high-income individuals adopt more sophisticated evasion techniques. Our analysis confirms this prediction by showing that the wealthiest Dutch households are considerably more likely to evade taxes through complex webs of family trusts and private foundations than less wealthy households. We further show that the effective tax rate on wealth at the top may not be high enough to induce households to evade taxes, which relates to the work by Londoño-Vélez and Ávila-Mahecha (2021*a*) who show that offshore tax evasion increases in response to wealth tax hikes. Finally, we suggest that migration towards low-tax jurisdictions can be a substitute to evasion, in line with recent papers studying migration behaviour in response to wealth taxes (Agrawal, Foremny and Martínez-Toledano, 2022; Jakobsen et al., 2021).

Taken together, these results show that the geographical context in combination with the institutional setting – in the Dutch case: the free movement of capital and labour, (lack of) fiscal coordination, tax rates and rules – plays an important role in shaping the distributional pattern of tax evasion.

The remainder of this paper is organised as follows. In Section 1.2, we give an overview of the institutional context and describe the data we use in Section 1.3. Section 1.4 presents distributional patterns of tax evasion and how this affects the wealth distribution when offshore wealth is accounted for. We provide tentative explanations for these results in Section 1.5. Section 1.6 concludes.

1.2 Institutional background

1.2.1 Taxation of income and wealth

Table 1.1: Taxation of income and wealth in the Netherlands between 2001 and 2018

Box	Base	Tax rate (%)
Box 1	<i>Labour income and owner-occupied housing</i>	33-52 ^a
	Wages, salaries Self-employment income Imputed rent	
	Pension benefits Transfer income Mortgage interest (-)	
Box 2	<i>Substantial ownership</i>	25 ^b
	Dividends from substantial ownership	
	Realised capital gains from substantial ownership	
Box 3	<i>Household wealth</i>	1.2 ^c
	All assets other than 1) owner-occupied housing, 2) substantial ownership, 3) pension wealth, minus all liabilities other than mortgages	

Note: The rates shown here are for 2010. Tax brackets and rates vary slightly over the years, but these numbers are representative for the years that we study. This table is based on Cnossen and Bovenberg (2001).

^a Individuals above the retirement age face lower marginal tax rates in the first two brackets (out of a total of four).

^b This rate was temporarily reduced to 22% for income below €250,000 in 2007 and 2014.

^c As of 2017, an individual's marginal tax rate depends on their net wealth and ranges from 0.8 to 1.6% in 2017 and 0.6 to 1.6% in 2018.

The taxation of personal income and wealth in the Netherlands is governed by the 2001 Income Tax Law, which divides income into three separate “boxes” (See Table 1.1). Each box taxes a different type of income according to different tax rules. *Box 1* taxes labour income, self-employment income, pension benefits, transfer income and imputed rental income from owner-occupied housing at progressive rates varying from 33% to 52%. Mortgage interest payments related to the owner-occupied house can be deducted from taxable income in *Box 1*. *Box 2* taxes profits distributed to and capital gains realised by taxpayers who own at least 5% of a corporation, which we call a “substantial ownership” throughout this paper, at a 25% rate.³ As long as no dividends are paid out and capital gains are not realised, no income tax is due. *Box 3* covers all wealth with the exception of owner-occupied housing, substantial ownership and pension wealth. Among other types of wealth, the *Box 3* tax base thus includes bank deposits, bonds, non-substantial ownership of shares, and second homes. When a household owns at most 4.9% of a corporation's stock, this is included in the tax base of *Box 3*, while an ownership of 5% and over is covered by *Box 2*. Effectively, the taxation in *Box 3* corresponds to a 1.2% wealth tax, which was made progressive in 2017 with rates ranging from 0.8% to 1.6%. Neither pension wealth nor its return are taxed before disbursement to

³Manager directors are required to pay themselves a “competitive” salary which is taxed in *Box 1*.

retirees. Pension contributions are exempt from the income tax and are taxed at reduced rates in *Box 1* when paid out during retirement.⁴ Compared to other EU countries, this system of boxes results in a low tax burden on capital and an average burden on labour (European Commission, 2020).

When a household's ownership share in a company exceeds 5%, the investment is excluded from *Box 3* and is instead covered by *Box 2* which only taxes the dividends and realised capital gains associated with this investment. Incorporation of household wealth can therefore be an avoidance strategy for households who intend to accumulate wealth without distributing profits. Furthermore, until 2015 it was possible to distribute incorporated wealth tax-free by migrating abroad for at least 10 years.⁵ In addition, this strategy offers large benefits when the wealth is bequeathed, as described below.

Inheritances are taxed at progressive rates depending on the relationship to the deceased person. Since 2010, the tax rates for inheritances received by partners and children are between 10% and 20%.⁶ Inheritances received by others are taxed at rates between 30% and 40%. Wealth can be transferred tax free from parents to children, for any purpose (€25,000 a year) or for housing related expenditure (up to €50,000 before 2012, €100,000 from November 2013). The transfer of business wealth is largely untaxed: the first €1,071,987 is entirely exempt and 83% of the remainder is also exempt.⁷

1.2.2 Efforts to combat tax evasion

During the global financial crisis of the late 2000s, the G20 countries vowed to tackle offshore tax evasion and proclaimed the end of the “era of banking secrecy”. This determination resulted in hundreds of new tax information exchange agreements, America's Foreign Account Tax Compliance Act, the OECD's Common Reporting Standard, and voluntary disclosure programs, or tax amnesties. In this section we review the different programs implemented by the tax administration in the Netherlands.

Tax amnesty program At least since the Income Tax Act of 1914, tax payers have been able to avoid criminal prosecution by voluntarily declaring previously evaded taxes (Feenstra and Perdaems, 2017). Today, the tax administration can claim back taxes over a period of 12 years. Between 1998

⁴A substantial part of taxes in *Box 1* consist of social security contributions. Individuals above the statutory retirement age do not pay social security contributions and therefore face lower rates.

⁵Upon emigration, a provisional tax claim was imposed on undistributed profits. If the emigrant remained abroad for at least 10 years, the tax claim would be cancelled and profits could be distributed without having to pay taxes. This loophole was closed in 2015.

⁶The size of the exemptions also depends on the relationship with the deceased and can amount to about €600,000 for spouses.

⁷For this, certain conditions have to be met. The company must engage in business activities that exceed the mere management of wealth. In addition, the business must have been owned by the previous owner for at least one year. The new owners should remain owners for at least five years.

and 2009, the penalty rate was 0% of evaded taxes in the case of voluntary disclosure of tax evasion (see Table 1.2). In July 2009, the government announced an increase of the penalty rate to 15% of the evaded tax liability as of January 1st, 2010, while also raising the maximum penalty rate on involuntarily disclosed tax evasion from 100% to 300%. At all times tax inspectors consider personal circumstances that may justify a penalty reduction (e.g. if the taxpayer is functionally illiterate or suffers from dementia). In February 2010, the government decided to further increase the rate applied in the amnesty to 30% in July 2010. In September 2013 the penalty was temporarily set to zero in order to attract more amnesty participants. At the same moment, penalty rates of 30% in 2014, and 60% in 2015 were announced. In 2016 the penalty rate was raised to 120%, before the amnesty program was abolished altogether on January 1st, 2018.⁸ As of this date, voluntary disclosure does no longer guarantee lower penalty rates and the avoidance of criminal prosecution.

Table 1.2: Penalty rates

From	Until	Announcement	Amnesty penalty rate
January 1st, 1998	December 31st, 2009		0%
January 1st, 2010	June 30th, 2010	July 2nd, 2009	15%
July 1st, 2010	September 1st, 2013	February 16th, 2010	30%
September 2nd, 2013	June 30th, 2014	September 2nd, 2013	0%
July 1st, 2014	June 30th, 2015	September 2nd, 2013	30%
July 1st, 2015	June 30th, 2016	September 2nd, 2013	60%
July 1st, 2016	December 31st, 2017	April 2nd, 2016	120%
January 1st, 2018		September 19th, 2017	300%

Note: This table shows the penalty rates in the amnesty program. The information is taken from Feenstra and Perdaems (2017) and official government sources.

Information exchange and tax treaties The changes in the amnesty rules reflect the changing international environment. Until the beginning of the 2000s, the detection probability for offshore wealth was essentially zero as offshore centres did not exchange information with tax authorities.⁹ While a number of offshore centres ultimately conceded to provide financial information upon request, strict requirements for such requests seriously limited their effectiveness. In 2013, the Dutch tax authority requested information from Switzerland 554 times and received such information only

⁸It remains possible to make use of the amnesty program when disclosing wealth and income on pre-2018 tax returns.

⁹Before 1987, even domestic banks did not exchange information with the Dutch tax authority, unless explicitly requested on a case-by-case basis. Kazemier (1990) finds that between 1977 and 1981 households concealed almost half of their interest income. When banks were required to report interest income automatically in 1987, the secular growth in savings deposits came to a halt as households withdrew their deposits in cash and shifted deposits abroad (Swank, 1988).

11 times (Ministerie van Financiën, 2014).¹⁰ Most of the few cases of detected offshore evasion occurred after data leaks at financial institutions, such as those at the Luxembourg bank *KB Lux* in 2000 or the more famous HSBC case known as *Swiss Leaks*.

In July 2005, the member states of the European Union (EU) implemented the Savings Directive to support the taxation of foreign-held savings and associated interest payments. Under the Savings Directive, which covered all EU member states and a number of offshore centres, countries could comply by either 1) automatically exchanging information on foreign households with the home country, or 2) levying a withholding tax on foreign households, which is then remitted to tax authorities without revealing households' identities. The Savings Directive suffered from important limitations in the sense that it could easily be circumvented by 1) moving assets to countries not covered by the Directive, 2) transferring the ownership of the assets to an intermediate corporation or trust, and 3) converting the savings account into an asset type not covered by the Directive (Johannesen, 2014).

The Savings Directive was repealed in 2015 as it had become obsolete due to the adoption of a directive on the mandatory automatic exchange of information between tax administrations.¹¹ Under the new directive, EU member states are required to implement the OECD's Common Reporting Standard (CRS), which covers a larger number of countries and assets than the Savings Directive. The most relevant dates for the Netherlands are 2010, when Belgium switched from levying a withholding tax on interest payments to exchanging information; 2015, when Luxembourg did the same; and 2016 when both countries committed to the CRS. Switzerland started exchanging information under the CRS for the first time in 2018.

During 2015-2018, the Dutch tax administration requested information from 4 Swiss banks, based on the Dutch-Swiss tax treaty. After an unsuccessful legal appeal by a UBS client in Switzerland, information about direct account holders with a residence in the Netherlands was transmitted to the Dutch tax administration. Offshore tax evasion appears to have become more risky for tax evaders. This may have been partially offset by evaders setting up even more opaque structures involving countries not yet committed to the exchange of information (Johannesen, 2014; Johannesen and Zucman, 2014).

Tax unit for offshore evasion The Dutch tax administrations recent efforts to tackle offshore tax evasion can be traced back to the moment when the Belgian government shared information on account holders at *Kredietbank Luxembourg* in 2001. From then onwards, all efforts related to offshore tax evasion were grouped under one unit named "Concealed Wealth" (*Verhuld Vermogen*). This unit has grown considerably over time, in terms of budget, number of employees and variety of information sources. These sources range from foreign governments to financial institutions and

¹⁰This already represented a large increase over the number of information requests sent out in 2011 and 2012: 5 and 31 respectively (Ministerie van Financiën, 2013).

¹¹Council Directive 2014/107/EU

whistleblowers. As of 2020, the unit has raised over €4 billion in revenues from around 60.000 taxpayers.¹² We discuss the projects that we study in more detail in section 1.3.2.

1.3 Data

1.3.1 Administrative registers

We use administrative data on income, wealth, residency and demographic variables maintained by Statistics Netherlands. These data are available for the entire population of the Netherlands and can be linked with other datasets through unique anonymised identifiers at the individual or household level. Appendix D describes the various datasets we use in more detail.

The wealth data are recorded at the household level and make use of a wide variety of sources. These sources include the income tax (which includes a tax on household wealth, see Table 1.1), the corporate tax (which records wealth held in corporations)¹³, the Dutch cadastre (for real estate), and data collected by financial institutions (required to provide this information to the Dutch tax administration). The wealth data do not cover all wealth in the national accounts. In particular, it leaves out most pension wealth, which amounts to 40% of all assets in the Netherlands. Although concerns remain regarding the potential undervaluation of closely-held assets by relying mostly on book values in the absence of market values, the measurement of these assets has improved considerably in recent years.

An important issue in all studies of wealth inequality, including this paper, concerns the valuation of shares in unlisted businesses.¹⁴ These shares are not traded publicly and therefore not priced on the market. Quite often these shares are booked at a historical cost price. To circumvent this problem, some papers multiply business profits by some capitalisation factor to obtain a more adequate valuation for unlisted shares (see e.g. Saez and Zucman (2016); Alstadsæter, Johannesen and Zucman (2019)). Statistics Netherlands has recently improved its methodology to value shares in unlisted businesses. Instead of solely relying on book-value, closely-held businesses' ownership of real estate and shares in other businesses are valued at market prices or prices that are supposed to reflect market prices. However, this improved methodology does not address all potential issues with the valuation of unlisted businesses, in particular those related to the valuation of intellectual property and other intangible assets. We therefore interpret the resulting wealth measures with this

¹²These numbers are taken from a number of online publications by the Dutch tax administration: (1) “*Belastingopbrengst verhoudt vermogen opgelopen tot boven de 4 miljard*”, (2) “*Internationale gegevens bij 620.000 personen vooraf ingevuld*”, (3) “*190 miljoen aan verhoudt vermogen in 2020*”, all accessed on 28 June 2021.

¹³A corporation's commercial profit can be established by comparing its opening and closing balance sheets. Commercial profit corresponds to the increase in a corporation's equity, after accounting for dividends and capital investments. Commercial profits are used to determine taxable profits. For this reason, the Dutch tax administration has records on corporate wealth.

¹⁴This issue lies behind some of the discrepancies between recent estimates of wealth inequality in the United States (Saez and Zucman, 2016; Smith, Zidar and Zwick, 2020; Saez and Zucman, 2020; Smith, Zidar and Zwick, 2021, 2023; Saez and Zucman, 2022).

limitation in mind.

1.3.2 Data on tax evaders

Amnesty data We have access to unique data on the Dutch tax amnesty program. It covers all the participants to the program between 2002 and 2018. We observe the following variables: date of participation to the amnesty program, the amount of previously undeclared wealth (self-declared) and the amount of revenue that is recovered through taxes, interest and fines. The amount of hidden wealth is measured imprecisely: the self-declared amount is not always reported and missing for all participants before 2011. In practice, the self-declared amount does not carry any legal meaning: during the amnesty process the tax authority will calculate an individual’s tax liability based on the documentation provided by and requested from the amnesty participant as well as any additional information the tax authority possesses. We use an alternative approach to verify the amount of hidden wealth that relies on the amount of tax recovered through the amnesty. By applying the tax code in reverse and making some assumptions regarding the duration of tax evasion, we are able to approximate the amount of hidden wealth. In particular, we assume that individuals had hidden their wealth for at least 12 years, which corresponds to the period over which the tax authority can recover evaded taxes. In the case of the Swiss information request (discussed below) we observe both the account balances of individuals with Swiss bank accounts and the amount of taxes they had evaded. This allows us to verify the accuracy of our imputation procedure (see Appendix A).

We restrict the initial sample of participants in the analysis from Section 1.4 onwards. First, we consider only participants from year 2008 onward, as we want at least one year with pre-amnesty wealth and we cannot observe wealth before 2007. Second, we consider only amnesty participants who have in fact evaded taxes.¹⁵

Panel A of Table 1.3 presents descriptive statistics on the amnesty data. We observe a total of 27,680 amnesty participants over the years 2002-2018. Participants are predominantly male (68%) and are 65 years old on average. The average amount of hidden wealth is €438,000, while the median is only €144,000. There are no major differences across years, except for 2012 when the mean hidden wealth is €1.5 million, due to a small number of very large hidden wealth holdings. In panel B, we differentiate between amnesty participants who declare “APV” (*Afgezonderd Particulier Vermogen*) and those who do not. APV is a category of wealth that is entrusted to a separate legal entity and includes family trusts, private foundations, *Stiftungen* and *Anstalten*. Participants who declare APV wealth through the amnesty report considerably higher concealed wealth holdings: on average almost €1.9 million, compared to just over €400,000 for participants without concealed APV wealth.

¹⁵A number of individuals participated in the amnesty program but did not have to pay any additional taxes. This may be due to the fact that their wealth was already reported (through third-party reporting) or was not subject to taxation (through a bilateral tax treaty).

The number of participants varies a lot from year to year. This is illustrated in Figure 1.1, showing the timing of participation to the amnesty program. Before 2011, we do not observe the precise date when participants first register for the amnesty. Instead, we observe the date when the tax administration starts the amnesty process. When we observe both, the average difference between the registry date and the process start date is less than 2 months (mean: 56 days, median: 24 days). On average, the entire process lasts 230 days (median: 178 days). Interestingly, the number of participants by date exhibits large spikes just before the increases in the penalty rate. This behavioural response to the change in penalty rates is particularly pronounced in 2009 and 2014, just before the end of amnesty periods with 0% penalty rates. In Figure 1.2, we decompose wealth declared through the amnesty program into different countries of origin. In all years, Switzerland accounts for the bulk of amnesty wealth, with Belgium and Luxembourg accounting for most of the remainder.

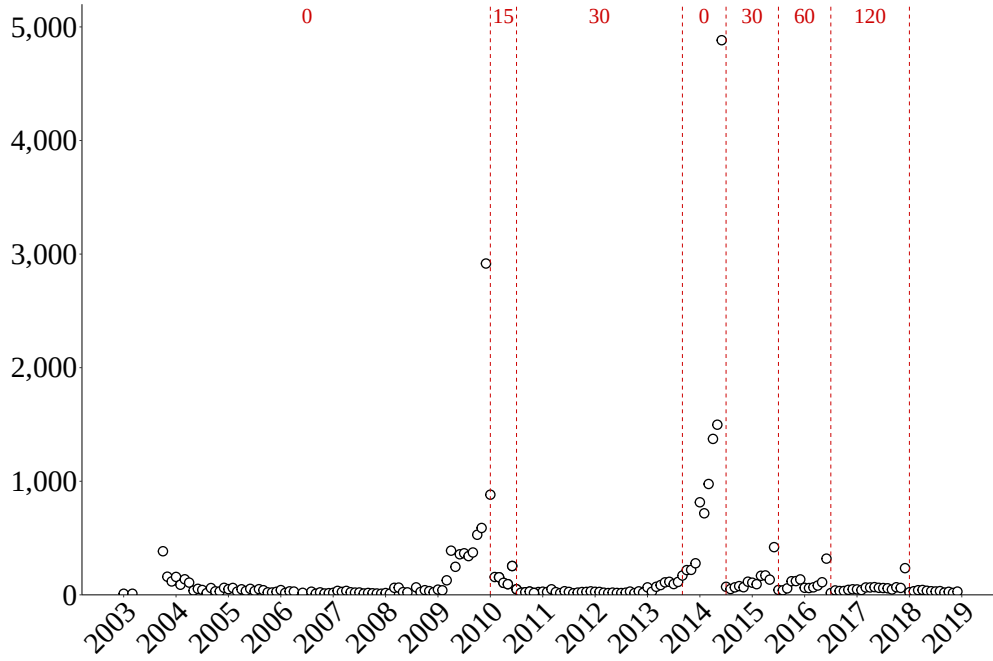
An important feature of the amnesty is that the declaration of hidden wealth is voluntary. This may affect the type of evaders that are found through this program. We have also received access to data on a number of different projects undertaken by the offshore unit at the tax administration where the hidden wealth was uncovered involuntarily from the perspective of the evader. In section 1.4.3, we explore the extent to which the distributional patterns of tax evasion in the projects that we describe below differ from that found in the tax amnesty.

Table 1.3: Descriptive statistics on tax amnesty

Year	Observations	Demographics		Hidden wealth				Reported wealth			
		Mean age	Women (%)	Mean	Q1	Median	Q3	Mean	Q1	Median	Q3
A. Amnesty program											
All	27,680	65	32	437,550	48,995	144,108	406,554	1,577,161	326,933	654,684	1,376,409
2002	20	65	5	286,017	75,197	166,420	364,720	-	-	-	-
2003	709	63	25	222,401	21,000	62,741	207,075	-	-	-	-
2004	823	62	29	271,145	19,995	68,325	215,870	-	-	-	-
2005	469	65	29	412,796	41,775	117,666	358,758	-	-	-	-
2006	233	66	34	533,161	46,941	121,966	451,558	915,409	208,951	517,680	978,525
2007	243	67	26	575,773	65,750	168,133	453,408	1,000,720	293,987	607,677	1,099,452
2008	396	66	28	556,549	62,104	188,862	500,054	1,298,707	307,970	630,090	1,256,807
2009	6,322	64	32	493,886	58,852	170,575	469,316	1,145,367	297,602	578,874	1,115,710
2010	1,813	64	31	547,804	45,425	149,450	434,750	1,640,681	351,676	672,165	1,345,470
2011	348	65	39	450,267	43,387	142,841	420,387	1,199,177	268,170	613,557	1,423,765
2012	255	67	37	1,477,926	68,854	244,725	658,537	2,827,555	400,982	789,533	2,027,432
2013	1,570	66	31	647,881	95,614	281,287	674,810	2,087,199	456,883	943,041	2,149,332
2014	10,711	65	33	415,323	57,158	157,258	412,195	1,790,882	346,503	703,711	1,514,993
2015	1,611	65	37	300,115	40,212	105,700	264,400	1,550,792	279,211	590,267	1,320,930
2016	916	64	33	231,851	33,204	89,112	212,870	1,474,668	290,646	596,716	1,209,804
2017	878	63	36	194,866	20,039	53,220	161,756	1,277,900	281,080	545,058	1,153,374
2018	363	63	35	178,981	20,366	50,950	143,433	1,948,411	332,916	669,654	1,336,290
B. Amnesty program, APV											
APV	554	65	37	1,869,566	328,197	867,562	1,838,366	4,323,943	674,161	1,730,159	3,926,209
No APV	27,126	65	32	408,304	47,968	140,050	390,106	1,517,727	322,872	645,839	1,341,041

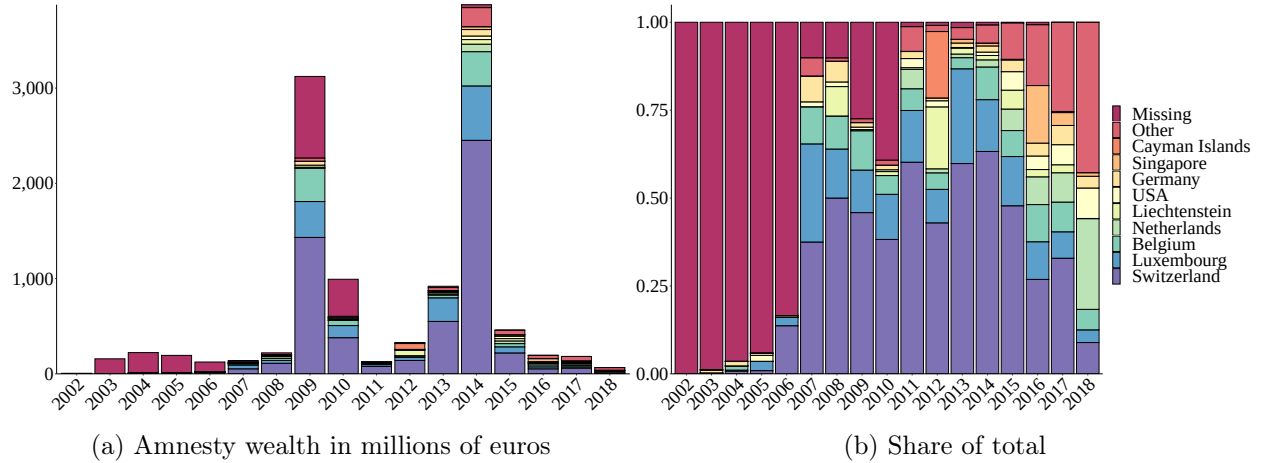
Note: The amnesty dataset contains all the participants to the amnesty program. Hidden wealth is imputed on the basis of the amount of tax recovered by the tax administration (see Appendix A). Panel B distinguishes amnesty participants with and without “APV” (“*Afgezonderd Particulier Vermogen*”, such as family trusts, private foundations, *Stichtingen* and *Anstalten*).

Figure 1.1: Amnesty participation by month



Note: This figure shows the number of declarations of offshore wealth for each month between January 2003 and December 2018. This number is identical to the number of amnesty participants, except for a small number of participants who enter the program multiple times. Due to output restrictions, we cannot disclose the precise number of declarations for months when this number lies below 10. The penalty rates are denoted in red (see Table 1.2).

Figure 1.2: Origin of amnesty wealth by year



Note: This figure shows the amount of wealth declared through the amnesty program, by origin country. Before 2011, the category “Missing” includes cases with multiple origin countries.

Swiss information request Between 2015 and 2018, the Dutch tax administration requested information on households with a Dutch residency from four Swiss banks (UBS, Credit Suisse, Julius Bär and BNP Paribas) on the basis of the bilateral tax treaty between the Netherlands and

Switzerland. Households covered by the information requests had previously been sent a letter by their Swiss bank asking for a confirmation that their wealth had been declared to the relevant tax authorities. The data consist of the account balance on February 1, 2013, December 31, 2013, December 31, 2014, December 31, 2015 and December 31, 2016, taxes, fines and interest payments recovered. These data differ crucially from the amnesty data in that tax evasion was uncovered involuntarily. As such, it may be more representative of undeclared wealth that has not yet been detected by the Dutch tax administration. On the other hand, the information request covers only direct owners of Swiss bank accounts, a relatively unsophisticated type of tax evasion.

Table 1.4 presents descriptive statistics on the Swiss information request. We observe 616 individual accounts, which corresponds to a very small share of Swiss accounts held by Dutch citizens.¹⁶ The average amount hidden is significantly lower than in the amnesty data (€144,000). There appear to be fewer very large wealth holdings, which could be because banks may not have sent letters to account holders with more sophisticated tax evasion structures, involving offshore companies or trusts.

Foreign banks The tax administration has received information on Dutch citizens with bank accounts in Belgium, Luxembourg, Austria and Switzerland from a number of foreign tax administrations, covering the years 2003-2015. In total, this concerns 842 individuals who evaded taxes with an average concealed wealth of just over €100,000. As shown in Table 1.4, the average is considerably higher for wealth held in Austria (€166,000) and Switzerland (€197,000) than in Belgium (€42,000) and Luxembourg (€101,000).

Debit-Creditcards The tax administration has received data on all transactions conducted with foreign payment cards in the Netherlands between 2009 and 2011. These transactions were used to identify Dutch citizens who use foreign payment cards to consume out of their wealth hidden abroad. On average, the 192 individuals identified in this way hid over €745,000 (see Table 1.4).

HSBC In September 2010, the tax administration started “Project Paris” after receiving the so-called “Lagarde List”. This list contains information on account holders at HSBC’s Geneva branch. Our sample includes only direct account holders, in contrast to Alstadsæter, Johannesen and Zucman (2019) whose sample also includes corporate accounts with beneficiary owners in Scandinavia. Dutch individuals with HSBC accounts who were found to have evaded taxes had hidden over €365,000 on average (see Table 1.4).

¹⁶ Around 15,000 Swiss accounts are declared to the tax authority each year.

Table 1.4: Descriptive statistics on tax authority projects

Project	Country	Observations	Demographics		Hidden wealth			
			Mean age	Share women	Mean	Q1	Median	Q3
Swiss information request	Switzerland	616	65	40	143,561	40,968	84,716	190,012
Foreign banks	All	842	68	29	101,745	18,010	36,858	90,952
Foreign banks	Belgium	157	65	38	41,653	16,533	28,933	49,625
Foreign banks	Luxembourg	564	69	28	100,665	17,272	36,370	93,697
Foreign banks	Austria	47	65	21	166,211	35,962	72,800	129,237
Foreign banks	Switzerland	74	69	25	196,525	25,770	62,966	181,750
Debit-Creditcards		192	65	25	745,073	65,183	164,850	534,817
HSBC	Switzerland	34	64	26	365,788	71,725	298,404	415,822

Note: Hidden wealth is imputed on the basis of the amount of tax recovered by the tax administration (see Appendix A), except for the HSBC project for which precise account balances are available.

1.4 Wealth inequality and tax evasion

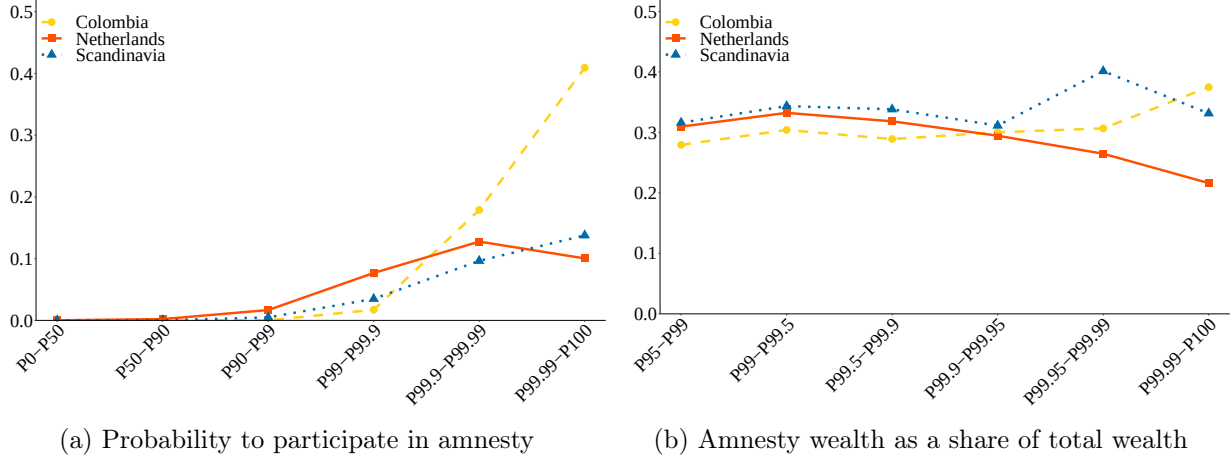
1.4.1 Who evades taxes?

We first describe the characteristics of tax evaders based on the participation to the amnesty program. We consider the universe of Dutch households in 2007, and identify households as evaders if at least one household member participated in the amnesty between 2007 and 2017. In order to rank households in terms of their wealth, we obtain the total of reported wealth, wealth declared through the amnesty, and wealth found by the tax administration through the projects described in section 1.3.2. In all rankings, we consider household wealth at the start of 2007. In Appendix B we show that these results are robust to changing the year of analysis.

In Figure 1.3, we report the likelihood of participating in the amnesty by wealth group. This likelihood increases strongly with wealth, from essentially 0 for the bottom 90% to over 10% for the highest wealth groups. Interestingly, the likelihood drops slightly for the highest wealth group. Among amnesty participants in the top wealth groups, wealth declared through the amnesty makes up around 30% of their total wealth. This share falls to just over 21% for the highest wealth group, as reported in Figure 1.3b.

These results differ in some respects from the earlier literature on Colombian and Scandinavian tax amnesties (Alstadsæter, Johannesen and Zucman, 2019; Londoño-Vélez and Ávila-Mahecha, 2021b). While offshore tax evasion is concentrated at the top in all countries, its prevalence is considerably higher among the Dutch “merely rich” compared to Colombia and Scandinavia. Furthermore, wealth declared through the amnesty falls as a share of total wealth to a level far below that in the other countries.

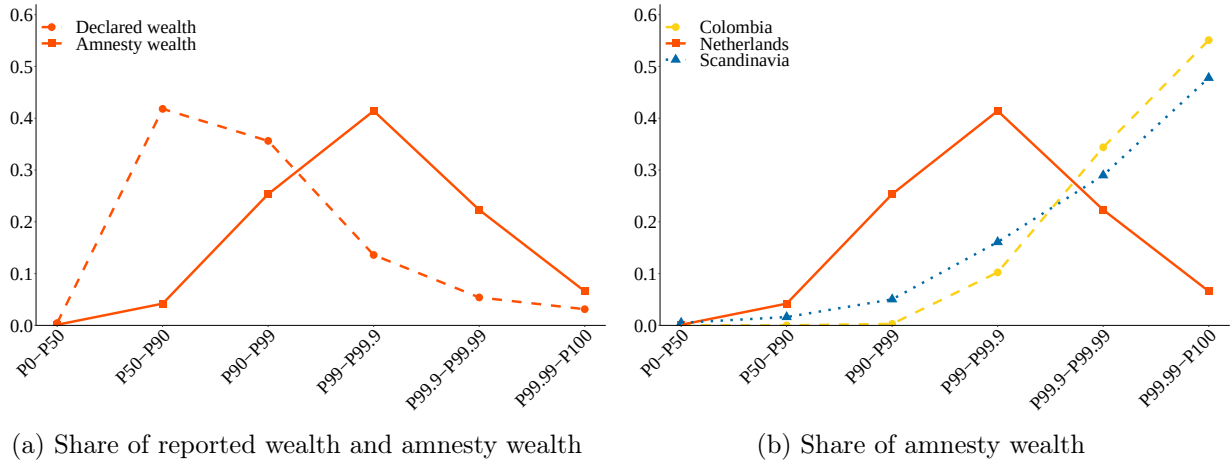
Figure 1.3: Amnesty program: intensive versus extensive margin



Note: Panel A shows the fraction of households in each wealth group who participated in the tax amnesty over the period 2008 to 2018 (extensive margin). Wealth groups are defined in terms of 2007 wealth. For Scandinavia, the data are taken from Alstadsæter, Johannesen and Zucman (2019), Appendix G, Table 2. The Colombian data are taken from Londoño-Vélez and Ávila-Mahecha (2021b), Table A.1. Panel B shows wealth declared through the amnesty as a share of total wealth, including amnesty wealth, conditional on amnesty participation (intensive margin). For Scandinavia, the data are taken from Alstadsæter, Johannesen and Zucman (2019), Appendix G, Table 4. The Colombian data are taken from Londoño-Vélez and Ávila-Mahecha (2021b), Table A.1.

Ultimately, we are interested in the distribution of hidden wealth. Figure 1.4 reports the share of reported wealth and the share of amnesty wealth owned by each wealth group. Amnesty wealth is markedly more concentrated than reported wealth, with the top 10% accounting for the bulk of amnesty wealth and the top 0.01%, the “super rich”, owning 7%. However, offshore tax evasion appears to be much more of a “merely rich” phenomenon in the Netherlands, as they own 67% of amnesty wealth, whereas most amnesty wealth is held by the “super rich” in Colombia and Scandinavia.

Figure 1.4: Distribution of wealth and amnesty wealth



Note: Panel A of this figure shows the share of reported wealth and amnesty wealth held by each of the wealth groups. Panel B shows the share of amnesty wealth held by each of the wealth groups for the Netherlands, Colombia and Scandinavia. The data for Scandinavia are taken from Alstadsæter, Johannesen and Zucman (2019), Appendix J, Table 1. The Colombian data are taken from Londoño-Vélez and Ávila-Mahecha (2021b), Table A.1.

1.4.2 Evasion-adjusted wealth distribution

Statistics Netherlands has published consistent series of wealth inequality for the universe of Dutch households for the period 2011-2017 (Van Den Brakel and Pouwels-Urlings, 2019). According to these estimates, the top 10% accounts for 64% of wealth in 2017. However, pension assets are not included in this definition of wealth. In more recent work, Statistics Netherlands has estimated wealth inequality in a manner consistent with the national accounts for the years 2015 and 2016 (Bruil, 2019). By including pension assets, the top 10% wealth share falls to the mid-40s. As such, wealth inequality appears to be relatively low in international comparison; the top 10% share is equal to 73% in the US and 55.3% in France (data from 2014, [wid.world](#)).

An important shortcoming of traditional wealth inequality estimates is that they ignore offshore wealth, as it is observed in neither survey nor administrative data. This issue has been addressed first by Roine and Waldenström (2008, 2009) for the case of Sweden and most recently by Alstadsæter, Johannesen and Zucman (2018a, 2019) for a larger number of countries. The exercise typically starts by taking an estimate of total offshore wealth that belongs to a country and assigning this amount to different wealth groups.

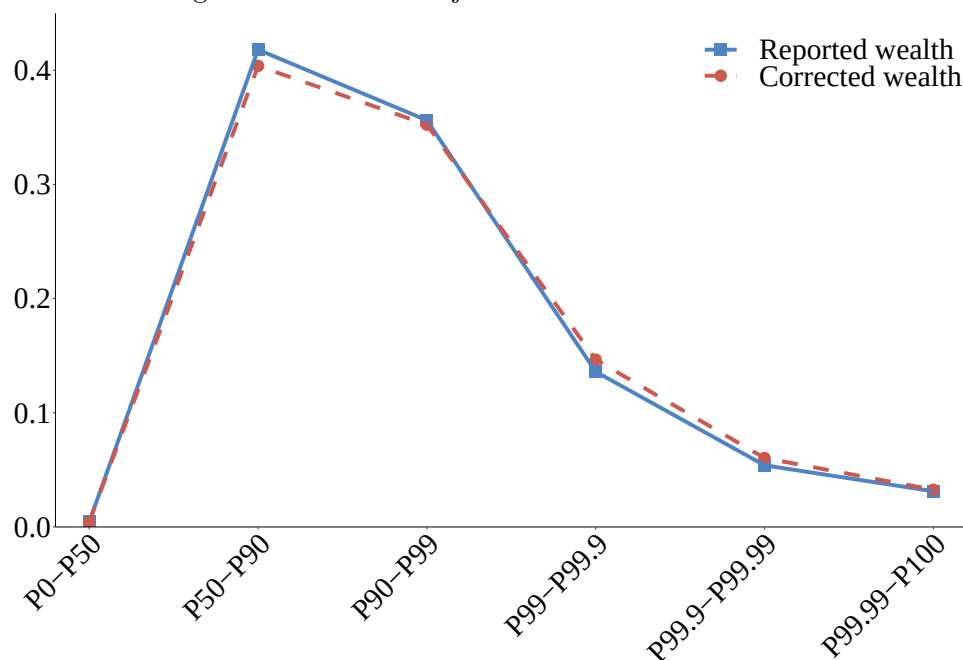
Zucman (2013) estimates that 8% of global financial wealth or \$5.6 trillion is held in tax havens, most of it undeclared to tax authorities. Alstadsæter, Johannesen and Zucman (2018a) assign this total to individual countries using statistics collected by the Bank for International Settlements regarding the owners of deposits held in tax havens. According to this method, the Netherlands' offshore wealth is equal to 6% of GDP in 2007, less than the international average of 9.8%. This could be related to the fact that almost 80% of Dutch assets are real estate or pension assets, neither of which can be offshored easily.

The effect of offshore tax evasion on inequality statistics depends on (i) the amount of offshore wealth and (ii) the concentration of offshore wealth. Alstadsæter, Johannesen and Zucman (2019) and Londoño-Vélez and Ávila-Mahecha (2021*b*) find that offshore tax evasion in Norway and Colombia is almost entirely concentrated among the top 0.1%. In Norway, the share in total wealth owned by the top 0.1% increases from 8.4% to 9.8%. The impact in Colombia is even higher: the top 0.1% wealth share increases from 15.9% to 19.1% when unreported offshore wealth is taken into account.

Performing this exercise for the Netherlands results in a small adjustment of top wealth shares as can be seen in Figure 1.5: the top 0.1% increases from 8.7% to 9.3%, less than half the adjustment for Norway and below a fifth of that in Colombia. Mechanically, the difference can be explained by the fact that wealth declared through amnesties is substantially less concentrated in the Netherlands.

Table 1.5 displays the distribution of wealth for different wealth concepts. On average, the top 0.01% report wealth holdings equal to over €53 million. This amount rises to €54 million when we include wealth declared through the amnesty or otherwise found by the tax administration. By assigning the aggregate stock of offshore wealth, the average amount further increases to over €57 million for the highest wealth group.

Figure 1.5: Evasion-adjusted wealth distribution



Note: This figure shows the share of wealth that is held by each wealth group, before and after assigning offshore wealth using the amount of offshore wealth held by Dutch households reported by Alstadsæter, Johannesen and Zucman (2018*a*) and the distribution of wealth declared through the tax amnesty.

Table 1.5: Distribution of wealth

Group	Observations	Minimum reported, discovered and assigned wealth	Average reported wealth	Average reported and discovered wealth	Average reported, discovered and assigned wealth
P0-P50	3,631,296	-	1,514	1,518	1,531
P50-P60	726,277	37,000	61,508	61,553	61,688
P60-P70	726,261	91,000	125,883	125,983	126,292
P70-P80	726,263	162,000	203,511	203,665	204,146
P80-P90	726,263	250,000	318,752	319,138	320,360
P90-P95	363,132	412,000	496,853	498,219	502,570
P95-P99	290,505	619,000	890,625	898,982	925,967
P99-P99.5	36,313	1,567,000	1,858,018	1,900,245	2,038,482
P99.5-P99.9	29,051	2,381,000	3,448,759	3,558,272	3,915,155
P99.9-P99.95	3,631	6,295,000	7,332,806	7,614,567	8,539,992
P99.95-P99.99	2,905	9,627,000	13,750,672	14,263,566	15,959,620
P99.99-P100	727	25,073,000	53,036,517	54,050,505	57,423,045

Note: This table reports the minimum and average wealth amounts for different wealth concepts: 1) Wealth reported to the tax administration, 2) Wealth reported to the tax administration plus wealth found by the tax administration through the tax amnesty or otherwise, 3) Reported wealth, plus wealth found by the tax administration, plus offshore wealth that has not yet been found. For the stock of offshore wealth, we use the estimate reported by Alstadsæter, Johannesen and Zucman (2018a).

After assigning the total of offshore wealth to different wealth groups, we can calculate the amount of taxes evaded and compare this to the amount of taxes paid by each wealth group. In almost all cases, offshore wealth should have been taxed in *Box 3*, which in 2017 had a top marginal tax rate equal to 1.62% of net wealth. For 2017, we also observe the amount paid in personal income tax (*Box 1, 2* and *3*) by each household. Assuming that all hidden wealth would have been taxed at 1.62%, we find that the top 0.01% wealthiest households evade around 8% of their true tax liability (i.e. evaded plus paid taxes). This percentage is substantially lower than the 25% found for the Scandinavian “super rich” (Alstadsæter, Johannesen and Zucman, 2019) and reflects that wealth hidden by Scandinavian households is more concentrated among the “super rich”.

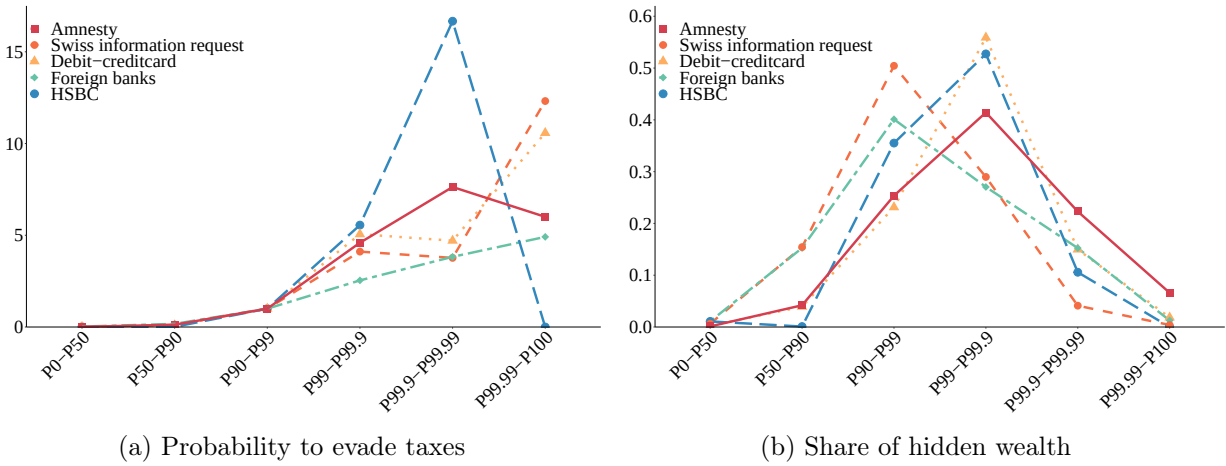
1.4.3 Representativeness of the amnesty

A key assumption for assigning offshore wealth to wealth groups is that the distribution of amnesty wealth is representative of the distribution of hidden wealth. Testing this assumption is complicated by the fact that hidden wealth is, in fact, hidden. Still, we investigate how the distributional patterns found in the amnesty compare to other tax evaders discovered by the tax administration through a number of different projects. These projects are the 1) Swiss information request, 2) Debit-creditcard project, 3) information on foreign banks, and the 4) HSBC leak. In all of these projects and in contrast to the tax amnesty, the discovery of tax evasion was involuntary from the perspective of the evaders. However, the discovery cannot be considered random as it is the result of a specific

enforcement action and legal context, e.g. the Dutch-Swiss bilateral tax treaty.

As can be seen in Table 1.3 and 1.4, the number of households involved in these projects is substantially lower than the number of amnesty participants and so we caution for drawing strong conclusions on the basis of single data points in the figures below. Still, Figure 1.6 shows that the distributional patterns of tax evasion are strikingly similar for all of the different projects. In all cases, the bulk of hidden wealth is accounted for by the “merely rich” rather than the “super rich”. This could signal that tax evasion is simply not very prevalent among the Dutch “super rich” or, perhaps more plausibly, that they find alternative ways to reduce their tax liability, either through legal means or through sophisticated structures that are difficult to detect. This hypothesis is discussed in more detail in section 1.5.2.

Figure 1.6: Distributional patterns of tax evasion



Note: Panel A of this figure shows likelihood of being found to have evaded taxes through the different projects. To compare the projects, which differ in size, we have normalised the likelihood to that for the wealth group P90-P99. Thus the top wealth group is more than 10 times as likely to appear in the Swiss information request as is the P90-P99 wealth group. Panel B shows the share in hidden wealth for each project by wealth group.

1.5 Explaining tax evasion

As shown in Figure 1.3, our results differ from the earlier literature in two important ways: 1) evasion is more prevalent among the “merely rich”, and 2) it is less prevalent among the “super rich”. In this section, we combine insights from models of tax evasion (e.g. Allingham and Sandmo (1972), Kleven et al. (2011), Alstadsæter, Johannesen and Zucman (2019), and Guyton et al. (2021)) and descriptive evidence to help explain these differences. We are cautious about making causal claims given the descriptive nature of these analyses.

Allingham and Sandmo (1972) provided the canonical model that explains tax evasion in terms of the tax rate, the audit probability, and the penalty rate. While a higher audit probability and penalty rate deter tax evasion, the effect of tax rates is theoretically ambiguous. This model has been extended by Kleven et al. (2011) to incorporate the effect of third-party reporting on the probability

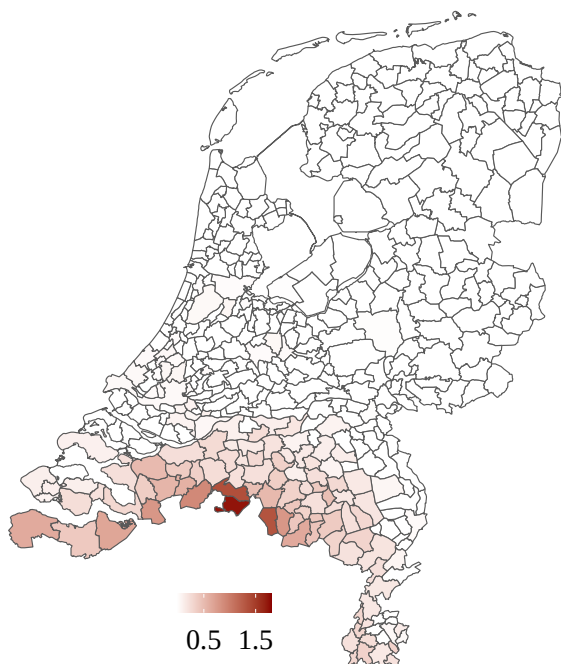
that evasion is detected conditional on being audited. Alstadsæter, Johannesen and Zucman (2019) emphasise the importance of suppliers of tax evasion in shaping the ultimate distribution of tax evasion. Most recently, Guyton et al. (2021) model tax evasion by allowing individuals to invest in a costly technology that better conceals their wealth and thus reduces the associated detection probability.

1.5.1 High evasion among the “merely rich”

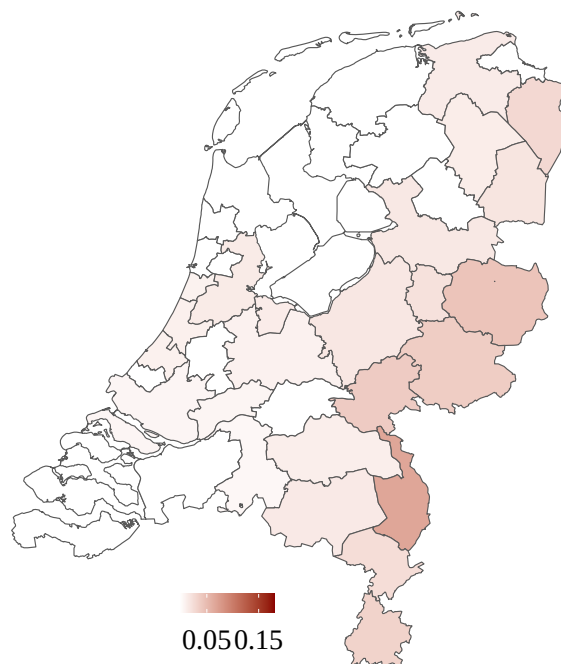
In the 1980s, when politicians debated the desirability of third-party reporting by domestic banks, some of these banks created subsidiaries in Luxembourg. Furthermore, foreign banks (mostly Belgian and German, but also Austrian, and Luxembourgish banks) started advertising in Dutch national and regional newspapers. In these advertisements, some of which we have included in Appendix C, banks listed branches close to the Dutch borders, while highlighting the presence of Dutch-speaking staff and the absence of a withholding tax. This highlights the importance of suppliers of tax evasion, as emphasised by Alstadsæter, Johannesen and Zucman (2019). Until the late 2000s, there was little information sharing among European tax administrations. The Savings Directive was implemented in 2005 and Belgium did not exchange information on savings deposits until 2010, Luxembourg only started doing so in 2015. This lack of coordination implied that Dutch households could hide their wealth abroad with limited fear of being detected by domestic tax authorities.

The geographical distribution of amnesty wealth suggests that proximity does indeed matter. In Figure 1.7 we show the number of amnesty participants who hid wealth in Belgium, Germany and Switzerland as a share of each municipality’s population. Tax evasion through Belgium is concentrated almost entirely along the Dutch-Belgian border and we find a similar pattern along the Dutch-German border for German amnesty wealth. Such border effects are absent for Swiss amnesty wealth, which simply mirrors the distribution of overall wealth across Dutch municipalities.

Figure 1.7: Amnesty participation (% of municipal population) by offshore country



(a) Belgium



(b) Germany



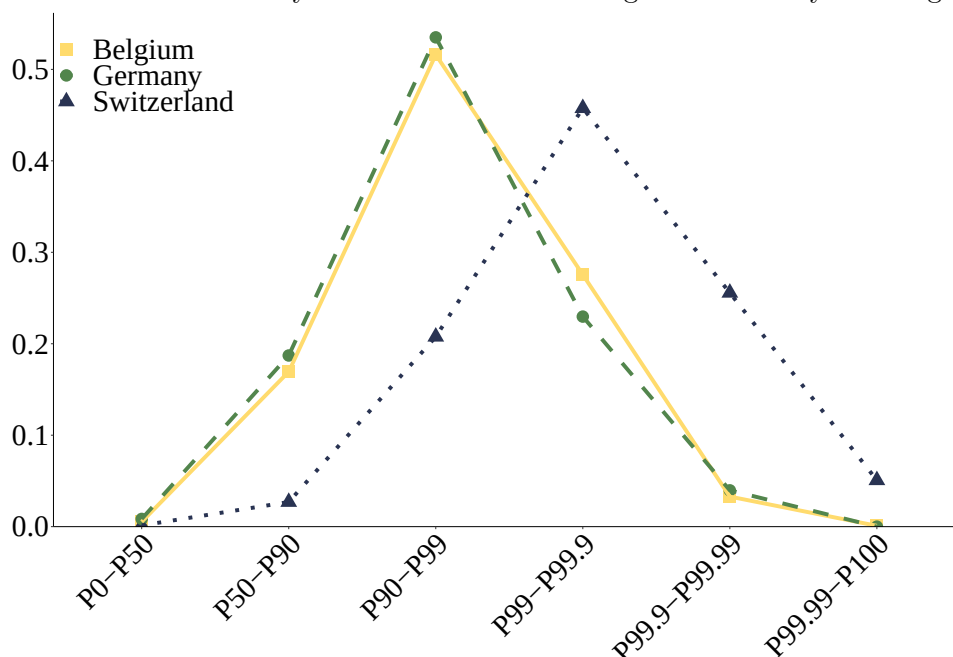
(c) Switzerland



(d) Other

Figure 1.8 shows the distribution of amnesty wealth concealed in Belgium, Germany and Switzerland over different wealth groups. The concentration of amnesty wealth increases with distance: most Belgian and German amnesty wealth is held by the bottom 99%, while the reverse is true for amnesty wealth hidden in Switzerland. This result can be rationalised by modifying the model in Guyton et al. (2021) only slightly: instead of a concealment technology with fixed cost, the cost depends on the physical distance between the household and the bank. By not sharing information with Dutch authorities, Belgium and Germany enabled the “merely rich” near the border to evade income and wealth taxes in a rather uncomplicated manner. Tax havens can thus undermine the fiscal capacity of countries in its proximity. This is particularly pressing if such countries have collectively agreed to guarantee the free movement of capital and people, which makes it possible to set up bank accounts abroad and conduct international transactions with relative ease.

Figure 1.8: Share of amnesty wealth with different origin countries by wealth group



Note: This figure shows the share of amnesty wealth originating from Belgium, Germany, and Switzerland held by each of the wealth groups.

1.5.2 Low evasion among the “super rich”

Sophisticated tax evasion

In the model by Guyton et al. (2021), wealthier households engage in more sophisticated forms of tax evasion. In our analysis of tax evasion, we rely on tax evaders found by the tax administration, either through the tax amnesty or through other projects. To the extent that wealthier taxpayers rely on more sophisticated concealment technologies, we may underestimate evasion at the top of the

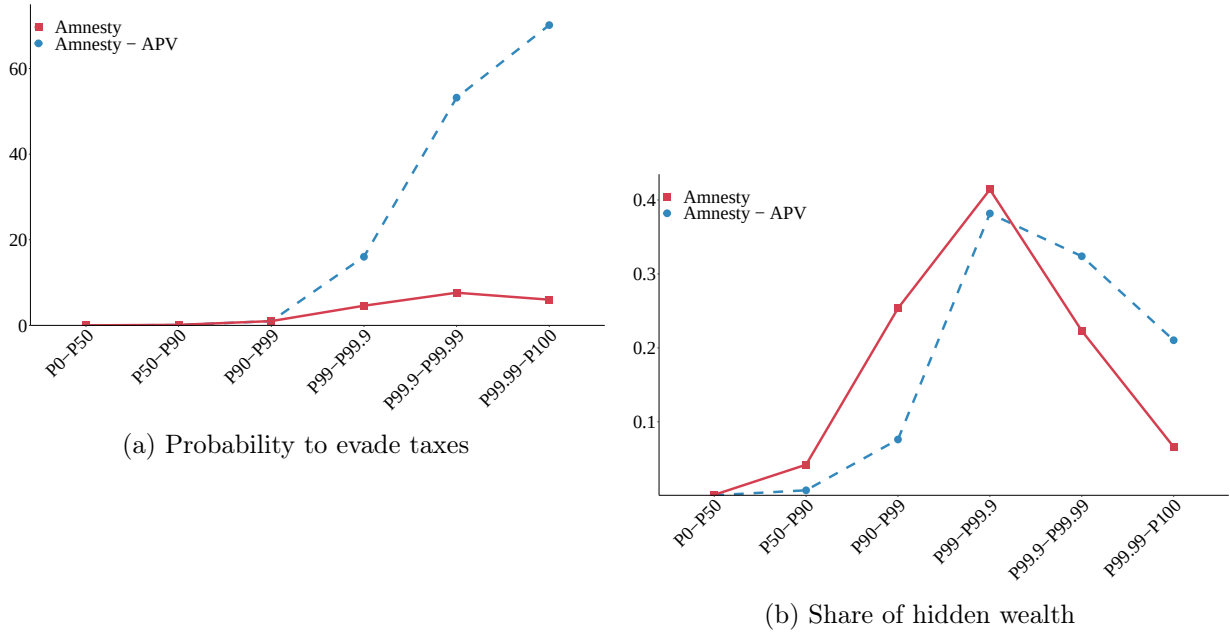
wealth distribution. While the Netherlands is often used as a conduit country for profit shifting by multinational corporations (Lejour, Möhlmann and Van 't Riet, 2022; Tørsløv, Wier and Zucman, 2020), it is unclear whether wealthy Dutch households can access the same resources.¹⁷

The evidence presented in Figure 1.8 is consistent with the Guyton et al. (2021)'s prediction as it shows that top wealth groups are more likely to channel their wealth through Switzerland, which at least since 2010 can be considered as more secretive than Belgium. This same pattern can be found in the tax administration's projects in Table 1.4: the average amount hidden through Swiss banks (€144,000, €197,000 and €366,000 respectively) is substantially higher than the average amount hidden through Belgian banks (€42,000).

A final piece of evidence that supports this notion is the distribution of "APV" wealth declared through the amnesty. APV refers to wealth that is entrusted to a separate legal entity such as a family trust, private foundation, *Anstalt* or a *Stiftung*. As such, evasion through APV is a far more sophisticated type of evasion than the use of a simple bank account. Table 1.3 shows that on average amnesty participants who declared APV structures declare over 4 times as much as amnesty participants who declared non-APV wealth (€1,870,000 vs. €408,000). Furthermore, Figure 1.9 shows that APV amnesty wealth is by far the most concentrated form of hidden wealth: the top 1% accounts for over 90% of APV amnesty wealth. Thus, complex tax evasion is concentrated at the top of the Dutch wealth distribution. To the extent that such complex cases are underrepresented in our samples of tax evaders, this could help explain the relatively small share of the "super rich" in tax evasion.

¹⁷Anecdotally, there does seem to be some overlap. The Netherlands's 2nd richest family Van Der Vorm, who made their fortune after the sale of the cruise line *Holland America Line*, based their holding company HAL Holding N.V. in Curaçao, one of the former Netherlands Antilles. The corporate structure also includes an office in Monaco and a Bermuda trust. In 2016, a number of Van Der Vorm family members appeared in the Panama Papers with undeclared Bermuda trusts.

Figure 1.9: Distributional patterns of tax evasion

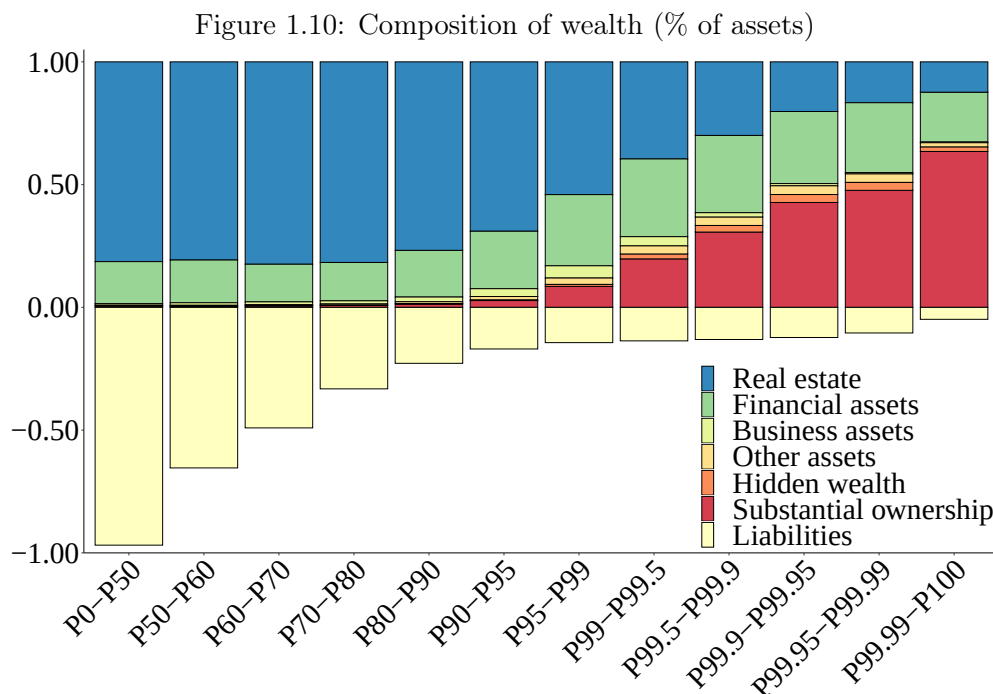


Note: Panel A of this figure shows likelihood of being found to have evaded taxes through the different projects. To compare the different group of amnesty participants, which differ in size, we have normalised the likelihood of participation to that for the wealth group P90-P99. Thus the top wealth group is more than 60 times as likely to participate in the amnesty with APV wealth as is the P90-P99 wealth group. Panel B shows the share in amnesty wealth held by wealth group for amnesty wealth and amnesty wealth that is qualified as APV.

Effective tax rate at the top of the wealth distribution

While the effect of the tax rate on tax evasion is theoretically ambiguous (Allingham and Sandmo, 1972), empirical evidence suggests that tax evasion is higher when tax rates are higher (Kleven et al., 2011; Londoño-Vélez and Ávila-Mahecha, 2021a). It is therefore possible that low evasion at the top is the result of low effective tax rates on the highest wealth groups. As explained in section 1.2.1, capital income is only lightly taxed in the Netherlands. Furthermore, as we show in Figure 1.10, the wealth composition of different wealth groups differs considerably, which affects the tax treatment of each wealth group's income. In particular, the share of real estate in wealth falls with wealth, while substantial ownership accounts for the bulk of wealth at the top. To obtain a comprehensive picture, we compute each household's tax liability, excluding taxes paid over labour income, using a wide array of economic and demographic variables from administrative datasets. In Figure 1.11, we divide the capital tax liability by net wealth for each wealth group for 2011. Box 1 refers to the net subsidy on owner-occupied housing wealth. Box 2 is a flat tax on dividends and realised capital gains from substantial ownership (defined as cases where a person owns at least 5% of a company's shares). A business owner can avoid taxes by simply not paying out dividends and not realising capital gains. Box 3 is a tax on the stock of household wealth (excluding owner-occupied housing, pension assets and substantial ownership in companies). The effective tax rate on capital

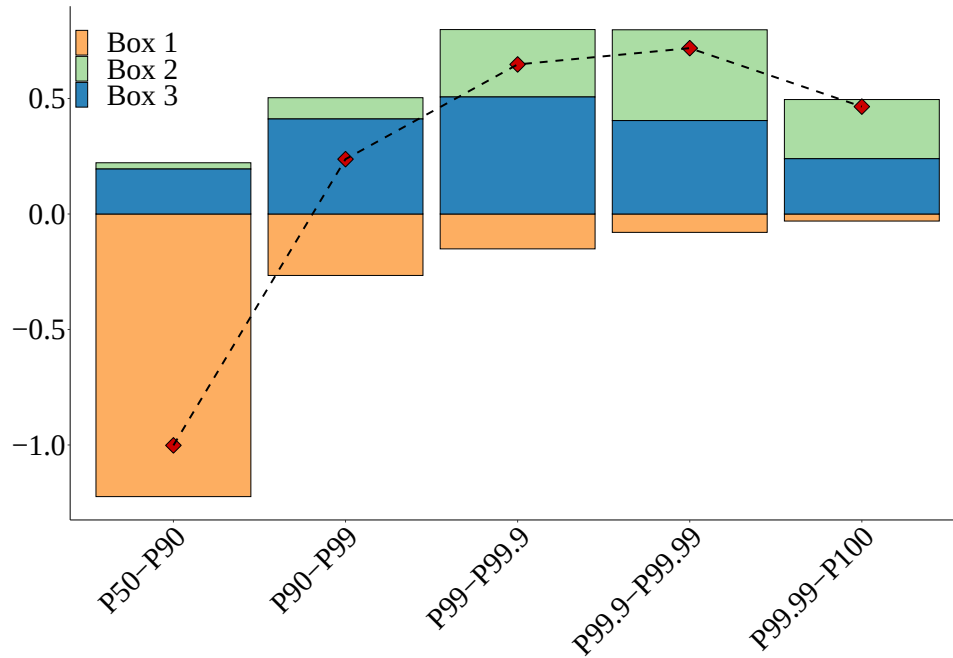
income is low and progressive until the top 0.01%, in most part because housing accounts for a decreasing share of overall wealth at the top of the wealth distribution. This confirms statistics compiled by European Commission (2020) that show that the Netherlands has a low tax burden on capital compared to other EU countries.¹⁸ Interestingly, the effective tax rate (expressed as a % of net wealth) falls for the highest wealth group to less than half a percent of net wealth, which reflects the fact that most wealth at the very top is held in the form of substantial ownership of firms. This could help explain why evasion at the top appears to be so low.



Note: This figure shows the composition of wealth for different wealth groups, ranked by 2007 wealth. Each wealth component is expressed as a share of total assets for that wealth group.

¹⁸Bruil et al. (2022) compute the effective tax rate for different income groups and find that the effective tax rate falls with income.

Figure 1.11: Capital taxes as a share of net wealth (%)



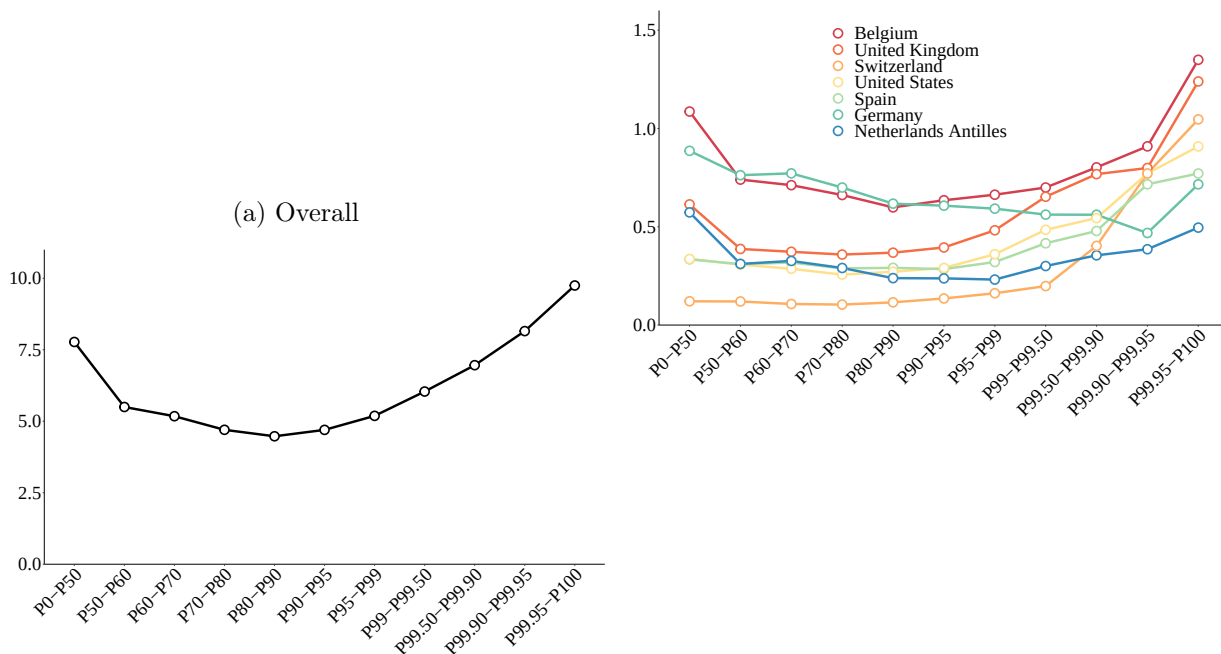
Note: This figure shows the effective tax rate in 2011, expressed as a percentage of net wealth, by wealth group. Box 1 refers to the net subsidy on owner-occupied housing. Box 2 refers to taxes paid over dividends from substantial ownerships. Box 3 refers to taxes paid over household wealth (excluding owner-occupied housing, pension wealth and substantial ownerships).

Migration

A radical alternative to tax evasion that is not yet incorporated in most models of tax evasion is migration. Rather than breaking the law, households can escape the law entirely by moving one's residence. Kleven et al. (2020) reviews a growing body of research that studies the interaction of taxation and migration and points to an increasing number of favourable tax schemes for wealthy foreigners. Agrawal, Foremny and Martínez-Toledano (2022) and Jakobsen et al. (2021) study migration behaviour in response to wealth taxes. As explained in section 1.2.1, emigration makes it possible, under some circumstances, to distribute profits without having to pay taxes. Geographical and cultural proximity to countries such as Belgium, the United Kingdom and Switzerland make it less costly for the wealthiest Dutch households to emigrate. An individual who emigrates has to deregister from their municipality in the Netherlands, but does not lose their Dutch citizenship. While the exact tax consequences depend on the bilateral tax treaty between the Netherlands and the emigration destination, income or wealth outside of the Netherlands will not be taxed by the Netherlands. As an illustration of this potential channel, panel A of Figure 1.12 presents overall emigration rates, defined as the probability of a household member to emigrate at least once between 2007 and 2021, for different wealth groups (defined by 2007 wealth). The overall emigration gradient is U-shaped, but this masks substantial heterogeneity by destination country which we show in panel B. We present gradients for the most common emigration destinations in

addition to Switzerland which is particularly popular at the top of the distribution.¹⁹ The wealth gradient of migration depends on the destination country: it is U-shaped for Belgium, the United Kingdom, and Netherlands Antilles, mostly decreasing for Germany, and increasing for Spain and the United States. The gradient is most pronounced for Switzerland, with a rate increasing from virtually 0 to a fairly high level of 1% for the top 0.05%. To the extent that migration can be an alternative to tax evasion, this could partly explain the result we observe. If we do not observe a lot of very rich evaders today, it may be because they may have legally migrated in the past.²⁰

Figure 1.12: Emigration rate (%) by wealth group and destination country
(b) By country



Note: Panel A shows the overall probability to emigrate between 2007 and 2021 by wealth group, defined by wealth in 2007. Panel B shows the probability to emigrate between 2007 and 2021 to specific countries, by wealth group defined by wealth in 2007.

1.6 Conclusion

While tax administrations have made considerable progress in fighting it, tax evasion remains a seemingly inextricable part of our world. The measurement of inequality has to account for this fact and this paper attempts to do so for the Netherlands. We apply the same methodology as

¹⁹Since we use administrative data from Statistics Netherlands, we can only show data points that represent at least 10 observations. This is why the smallest wealth group is P99.95-P100 instead of P99.99-P100 as this would leave us with too few observations when focusing on specific countries.

²⁰Migration among the highest wealth groups was sufficiently common for the Dutch rich list *Quote 500* to introduce a separate ranking for wealthy Dutch individuals living abroad in 2014. In earlier years, the Belgian town Brasschaat with a population of less than 40,000 and located fewer than 10 kilometres from the Dutch border accounted for 18 of the list's 500 members.

Alstadsæter, Johannesen and Zucman (2019), which leads to only a small adjustment of top wealth shares. More so than in other countries, tax evasion in the Netherlands appears to be an activity for the “merely rich”, at least in part enabled by ample evasion opportunities in neighbouring countries.

Our finding emphasises the importance of the assumed distribution of hidden wealth. As we have shown in this paper, the distribution of specific types of tax evasion depends on the geographical and institutional setting, in particular as it pertains to taxation and information sharing, at home as well as abroad. In essence, distributional patterns of tax evasion are context-dependent. Current developments in fiscal coordination across the globe will in turn reshape the distribution of tax evasion as households and industries adapt to new rules as well as their enhanced enforcement.

Tax amnesties can structurally raise taxes paid by amnesty participants. For a comprehensive evaluation of tax amnesties, however, it would be necessary to compare this revenue gain to a potential loss of revenue as tax amnesties may induce households to start evading taxes (Langenmayr, 2017).

In any case, our results suggest that current compliance actions, which are ultimately the source of our data, leave the Netherlands’ wealthiest households relatively unaffected. Our analysis does not allow us to conclusively distinguish between explanations that rely on tax incentives, the sophistication of tax evasion or a higher desire to comply with tax laws among the very rich. Future research could explore these competing explanations, which in turn could inform the compliance actions undertaken by tax administrations. By expanding the study of amnesties, leaks and information exchange to more countries and cases, we can reach a better understanding of the different types of tax evasion and their distinct distributional patterns.

Chapter 2

Inequality and Redistribution in the Netherlands

Arjan Bruil Céline van Essen Wouter Leenders Arjan Lejour Jan Möhlmann Simon Rabaté

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, for a single country, of the overall tax rate faced by the super-rich. 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.

2.1 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 top 10% of income earners, 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 pays the taxes and who benefits from government spending are among the most important in democratic societies.

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).

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 an 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 giving 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 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 top incomes. 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

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 profits not distributed but instead retained within corporations (Fesseau and Mattonetti, 2013; Zwijnenburg et al., 2021).

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 incomes at the top. Studies that ignore earnings retained within firms miss the predominant income source 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 results 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 negligible 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 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

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.

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 its 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 more 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 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 therefore 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

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).

other method. 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 2.2 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 2.3. Section 2.4 presents the results on the distribution of pre-tax income, while Section 2.5 does so for redistribution and post-tax income. Section 2.6 concludes.

2.2 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 (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

⁶As we will explain in Section 2.3, this comparison excludes redistribution that occurs through the pension system.

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>.

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 that 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 of cash transfers is almost fully made up of transfers paid by social security funds (9%) and 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 B.2 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 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

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 is a means-tested cash benefit that is nominally related to health insurance.

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 D.

2.3 Methodology and data

2.3.1 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 2.1. 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 the income that remains 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 2.1: 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.

2.3.2 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 2.4.2.

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' 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.3.

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 among 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 (2018b) 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.

2.4 Inequality of pre-tax income

2.4.1 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

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 are programmes to support schools with a higher proportion of disadvantaged students, these programmes are quantitatively small and public funding 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, 2024a).

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

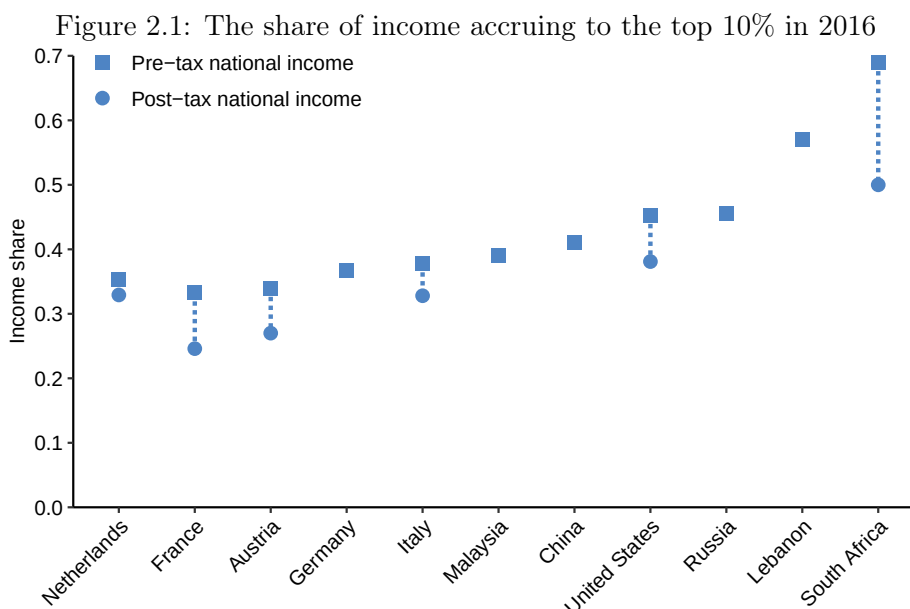
spending takes place. This income concept is composed of labour income, capital income earned by households, earnings retained by corporations, imputed rent, and mixed income. Note that some forms of income, such as capital income and retained earnings, can be negative. The more than 13 million adults 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 2.2. As discussed in Section 2.3.1, individuals who depend on pension benefits or unemployment insurance earn near-zero amounts of pre-tax factor income, explaining the 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 2.2: 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	21.5
Middle 40%	5,332,947	€33,466	€53,467	48.2	€34,158	€47,982	43.3	€34,900	€47,772	43.3
Top 10%	1,333,237	€84,222	€168,083	37.9	€72,164	€156,533	35.3	€70,234	€147,326	35.3
Top 1%	133,324	€235,145	€623,221	14.0	€226,162	€625,482	14.1	€205,568	€585,255	14.1
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	6.1
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	2.5
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 2.1 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



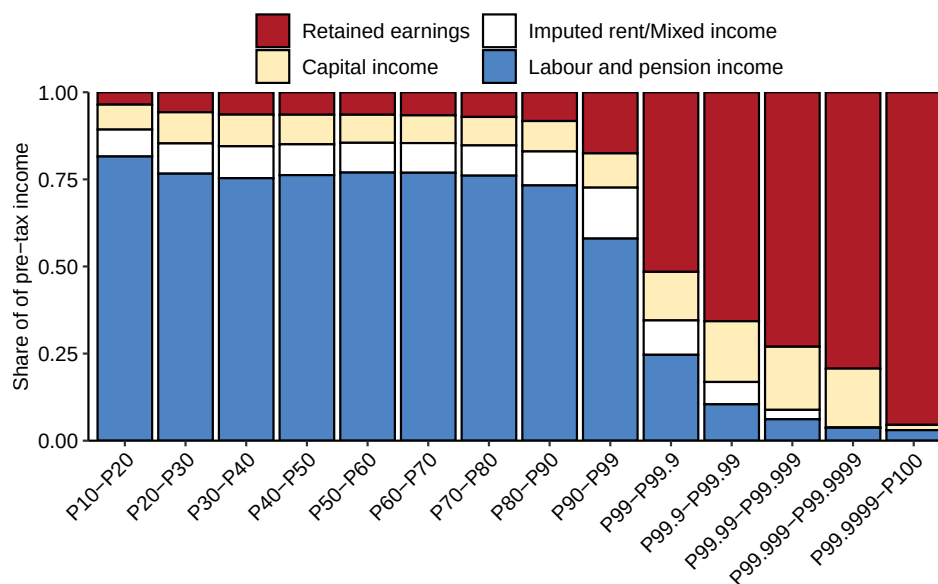
NOTE: This figure shows the share of pre-tax national income and post-tax national income accruing to the 10% income group, for a set of countries for which comparable estimates are available. We use our results for the Netherlands, Bozio et al. (2024) for France, Jestl and List (2022) for Austria, Bach, 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.

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.

In addition to the obvious differences in the level of income across the income distribution, there are striking differences in the source of income. We show in Figure 2.2 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 2.2: 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.

2.4.2 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

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

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 corporate taxes received by the government because 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%.

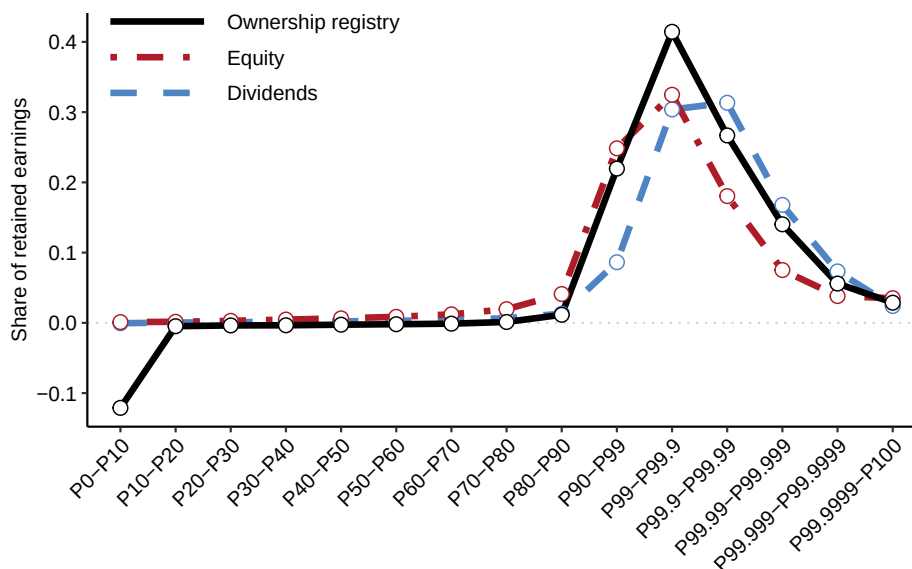
The use of the ownership registry to precisely trace retained earnings to shareholders is an important contribution of our study. In the absence of such a registry, other studies have allocated retained earnings in proportion to either equity wealth or dividends. We find that the use of either of these 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 2.3, 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

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).

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).

Figure 2.3: 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,

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

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

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 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 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 report 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.

2.5 Redistribution

2.5.1 From pre-tax to post-tax national income

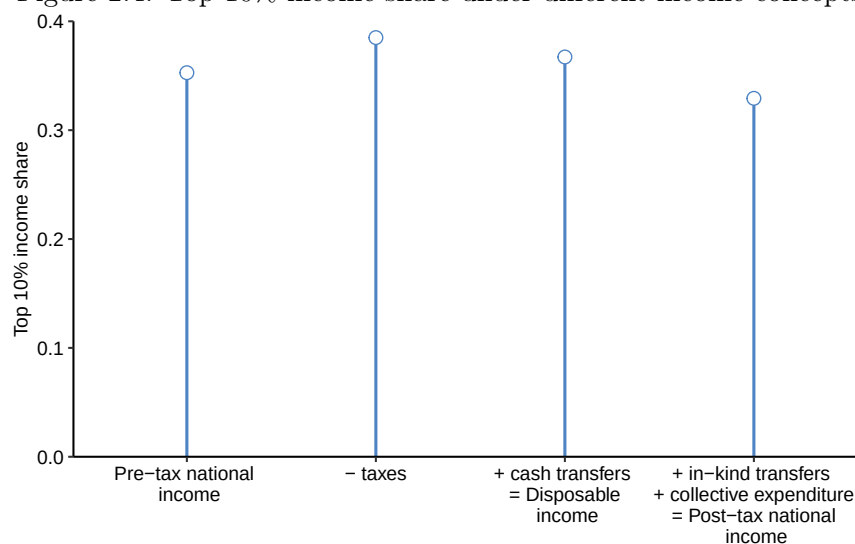
Post-tax national income is obtained by adding all forms of government spending to and subtracting all taxes from pre-tax national income. This is the income that can be used to accumulate wealth or to consume private and public goods and services. We show the transition in the top 10% share of income as we move from pre-tax to post-tax income in Figure 2.4.²¹ From this, we can see that the reduction in inequality in the Netherlands is the result of the progressivity of government spending rather than that of taxation.

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 show 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.

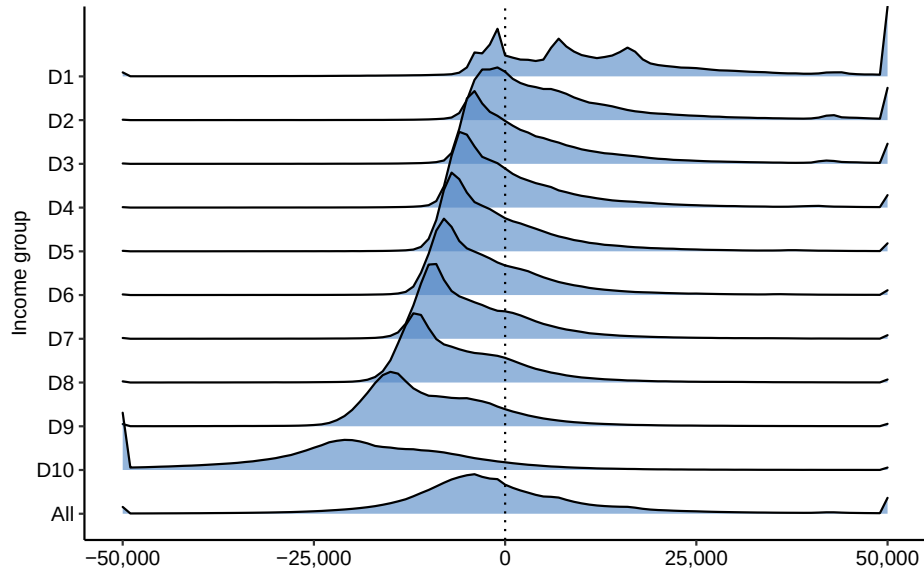
The difference between the distributions of pre-tax and post-tax national income reflects two factors. The first factor is that different income groups receive different amounts of government spending and pay different amounts of taxes. The second factor is that there is substantial variation in taxes paid and transfers received even within income groups, so individuals may move between income groups when going from pre-tax 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 2.5, 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 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 2.4: 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 2.5: 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.

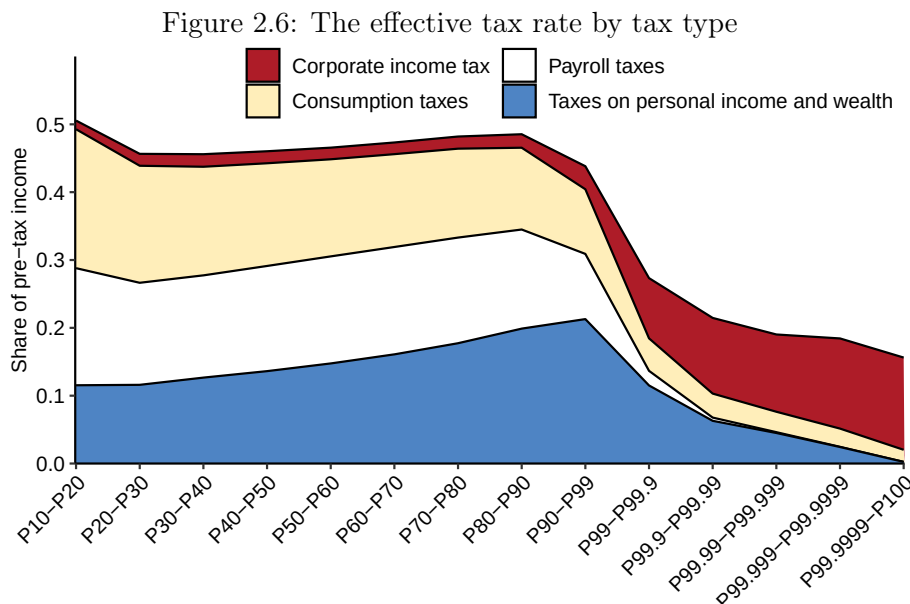
2.5.2 Anatomy of redistribution: taxes

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, an approach termed *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 2.6 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 each income group pays in taxes and social contributions.²² The tax burden is highest for the lowest income groups with a rate close to 50% of pre-tax national

²²In Figure A.16 we exclude payroll taxes.

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 2.4. The top 10% income share increases from 35.3% for pre-tax national income to 38.5% when taxes are deducted.



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 results 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

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).

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.

above that of the US at a level similar to that of France, but Figure 2.7 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 2.8: 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 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

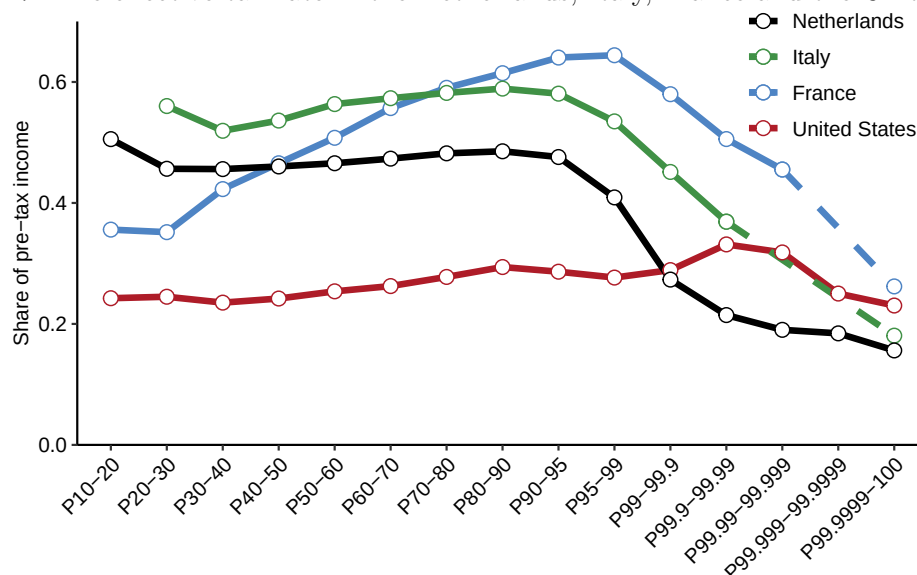
²⁵It is important to note that we only consider taxes in this subsection. In addition to taxes, the receipt of government spending is an important factor determining the ultimate level of post-tax income, especially at the bottom of the income distribution. In Figure A.17 we exclude payroll taxes.

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.

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.

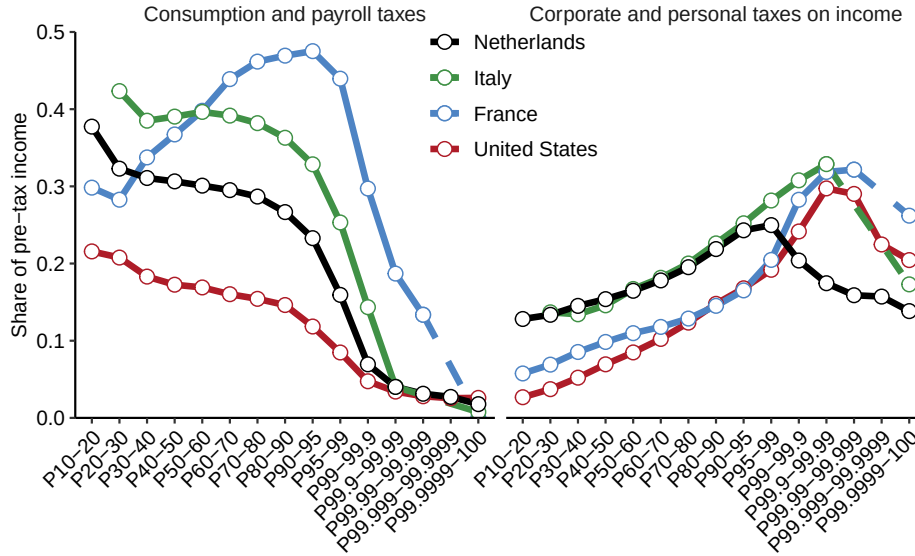
²⁸France is a notable exception in that its payroll taxes are largely progressive. This is the result of a number of reforms during the past 50 years that have been studied by Bozio, Breda and Guillot (2023).

Figure 2.7: 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.

Figure 2.8: 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 mean 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.

2.5.3 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

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.

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) 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

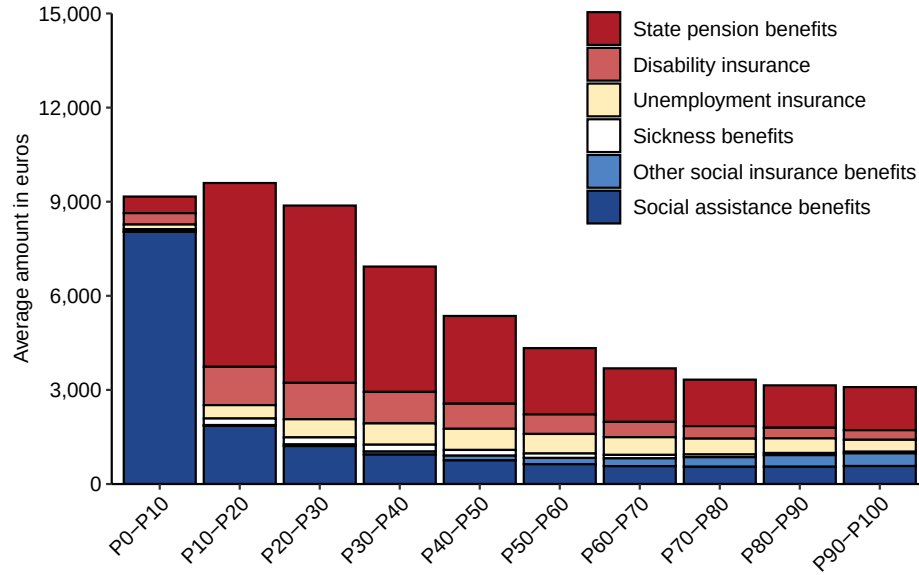
We have access to administrative data covering virtually all cash transfers. Cash transfers can be divided into social security benefits (state pension, disability insurance, unemployment insurance, and sickness benefits), which are part of pre-tax national income, and social assistance benefits, which are not. We show a detailed decomposition of cash transfers in Figure 2.9.³³ 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.

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.

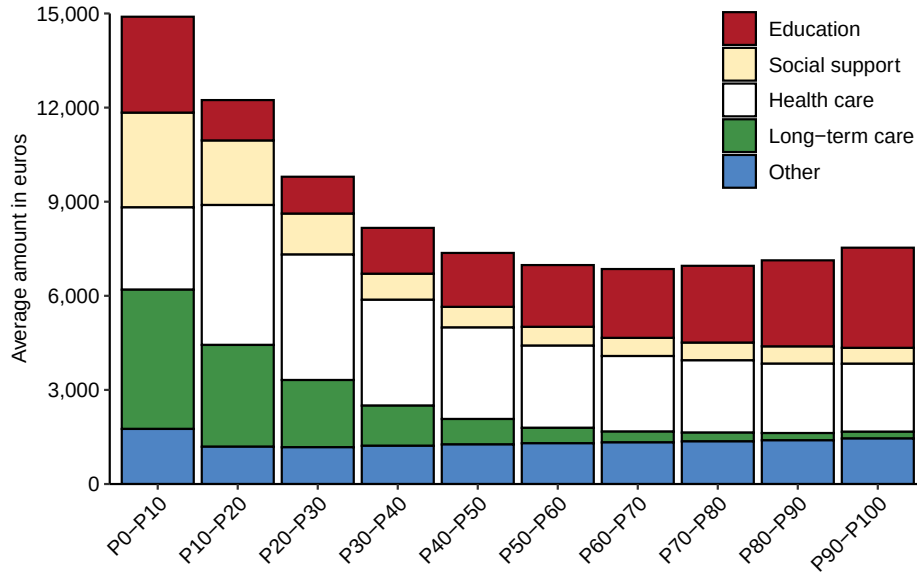
Figure 2.9: The average amount of cash transfers received by each income group



NOTE: This figure shows the amount of cash transfers received by each income group in 2016, with more detailed categories than in Figure 2.11. 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 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 2.10 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 2.10: 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.

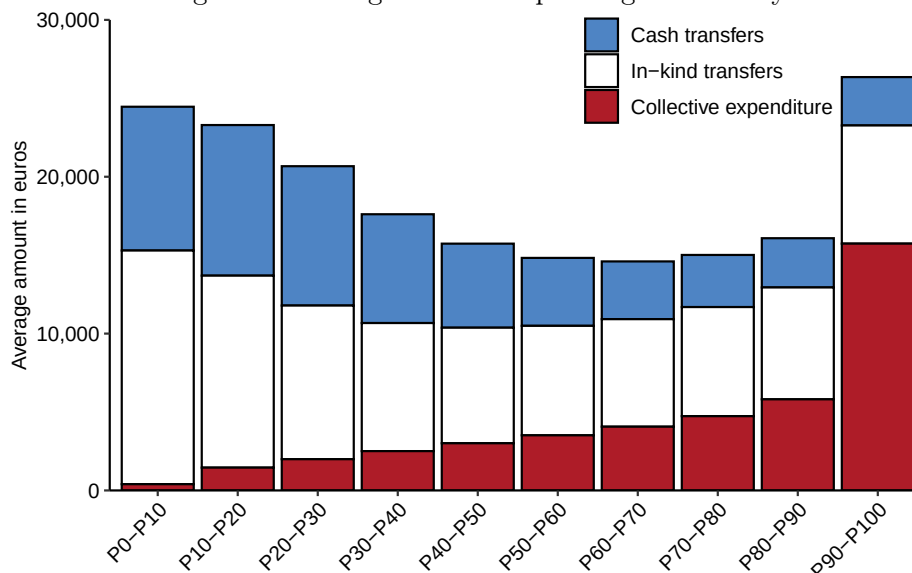
Spending programmes that fall under “social support” such as rental assistance or municipal social support are often explicitly means-tested, making them the most progressive type of government spending. Spending on health care, and long-term care in particular, also falls with income. On the one hand, 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 live in households with children, while more than 50% of those in the top decile do.

When we combine all types of government spending, as we do in Figure 2.11, 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

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 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.

expressed as a share of income as we do in Figure A.25.

Figure 2.11: 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 reduce income inequality, as illustrated in Figure 2.4 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 methodological choices.³⁵

The simplest method for assigning in-kind transfers is to assign the same amount to each adult

³⁵An 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.

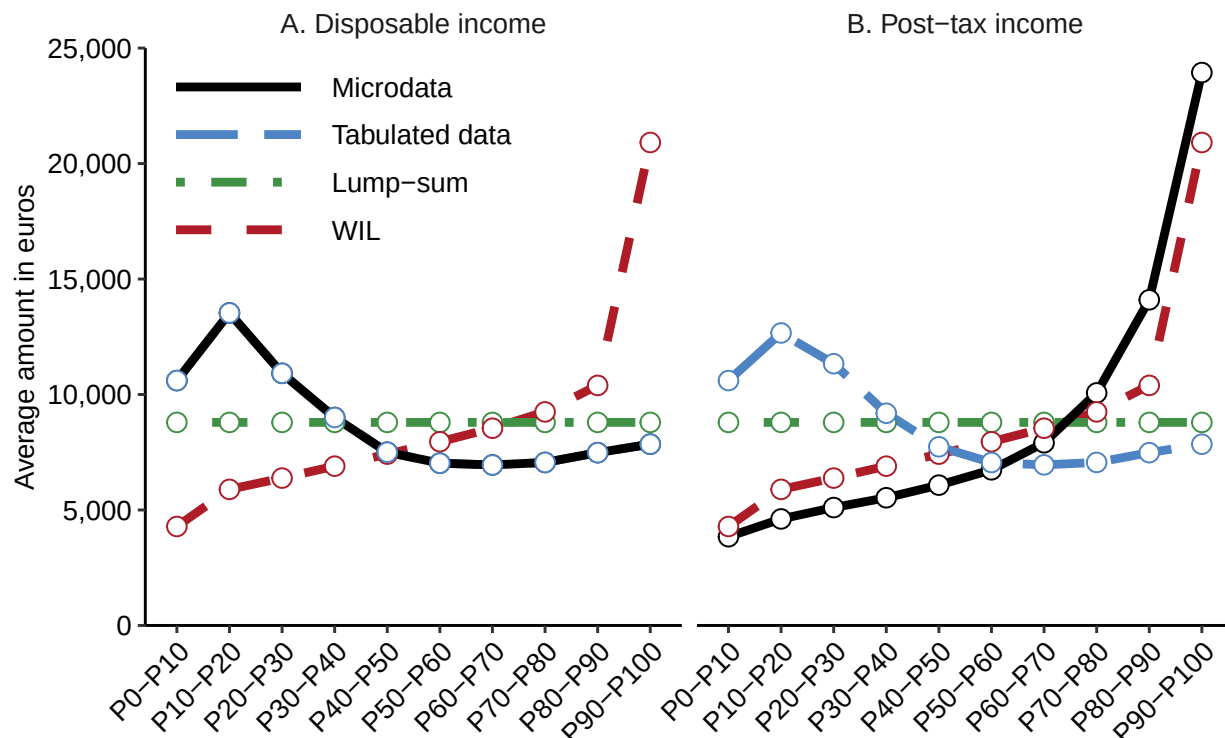
(the *Lump-sum* method).³⁶ A slightly different method is the one recommended by the World Inequality Lab’s most recent Distributional National Accounts guidelines which assigns in-kind transfers related to health care in a lump sum manner, while assigning all other in-kind transfers proportionally to 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, 2023*b*) (the *Tabulated data* method).

We show in Figure 2.12 how these different methods compare to assigning in-kind transfers based on 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 2.10, 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 2.12. 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.

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

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

Figure 2.12: 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.

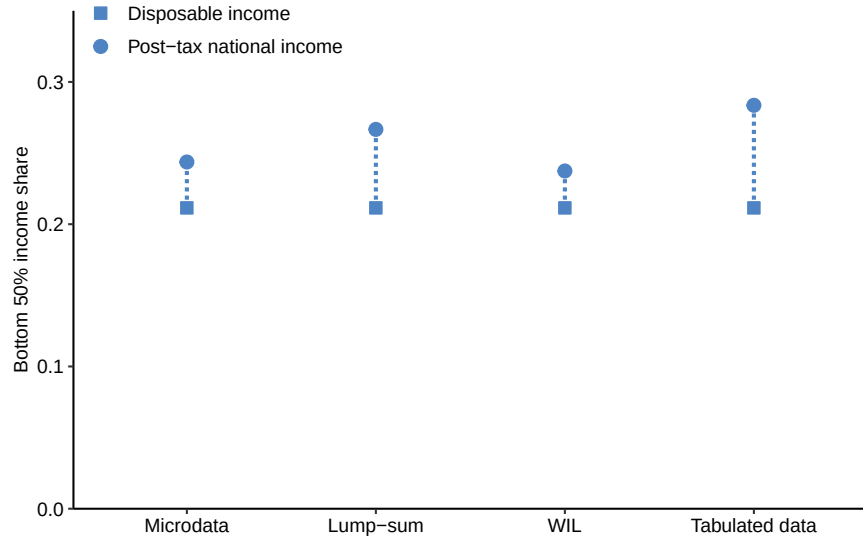
All these methods suffer from a second type of bias. They assign the same amount of in-kind transfers to individuals with the same level of income and therefore ignore inequality in the receipt of in-kind transfers conditional on income.³⁸ This inequality can be considerable, as we show in Figure A.32: 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 2.12. 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

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

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 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 allow, 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 2.13 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 a 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 2.13: 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.

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

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 based on 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 and 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 typically 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 based on 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 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 programmes 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 programmes 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.

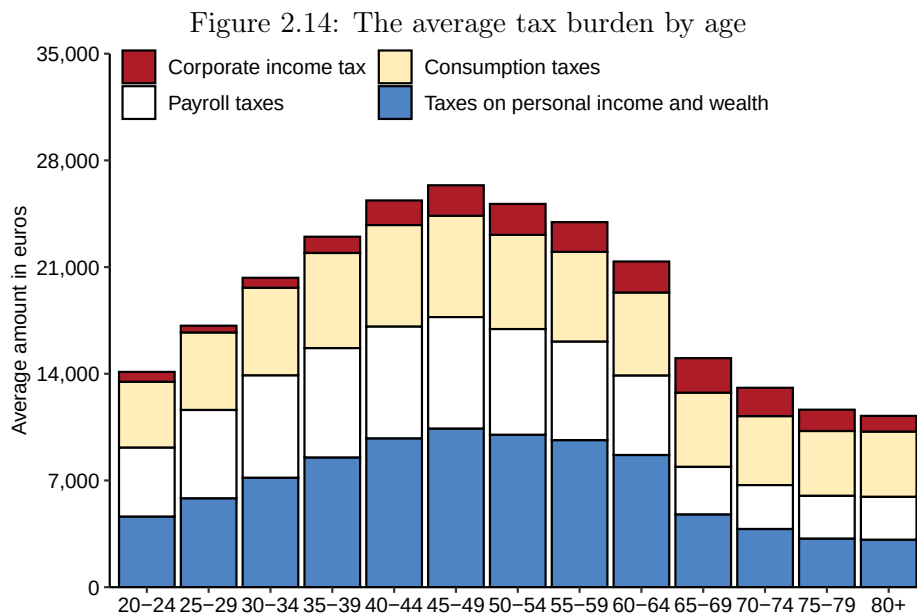
2.5.4 Redistribution across social groups

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

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

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 2.14.⁴² 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 higher age groups is the corporate income tax, reflecting the higher concentration of equity ownership, both directly and indirectly through pension funds, among the old.



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.

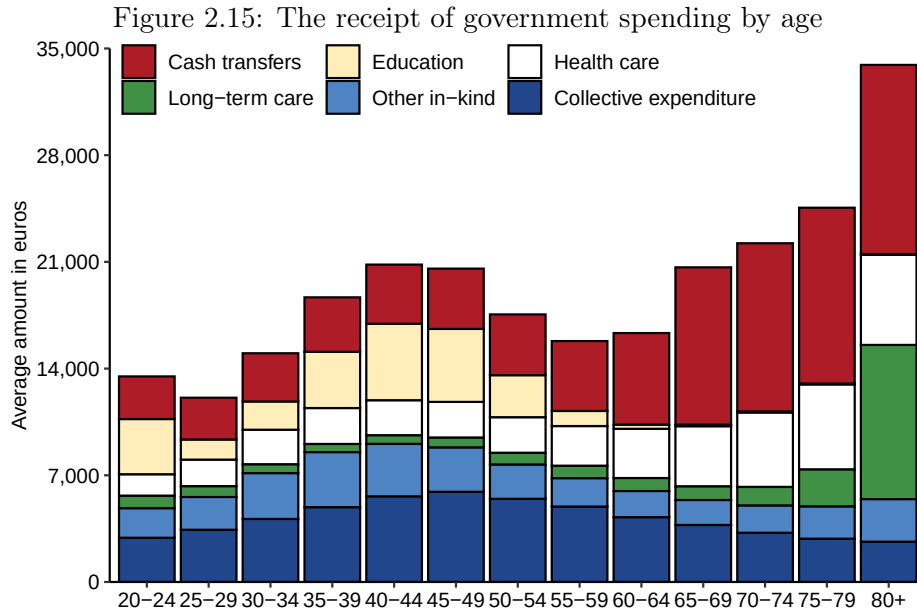
The age distribution of government spending shown in Figure 2.15, on the other hand, is not primarily determined by the income-age profile. Education spending is concentrated among the age groups between 35 and 49, which contain a high share of parents with school-going children, as well as among students 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

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

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

⁴³ We 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.

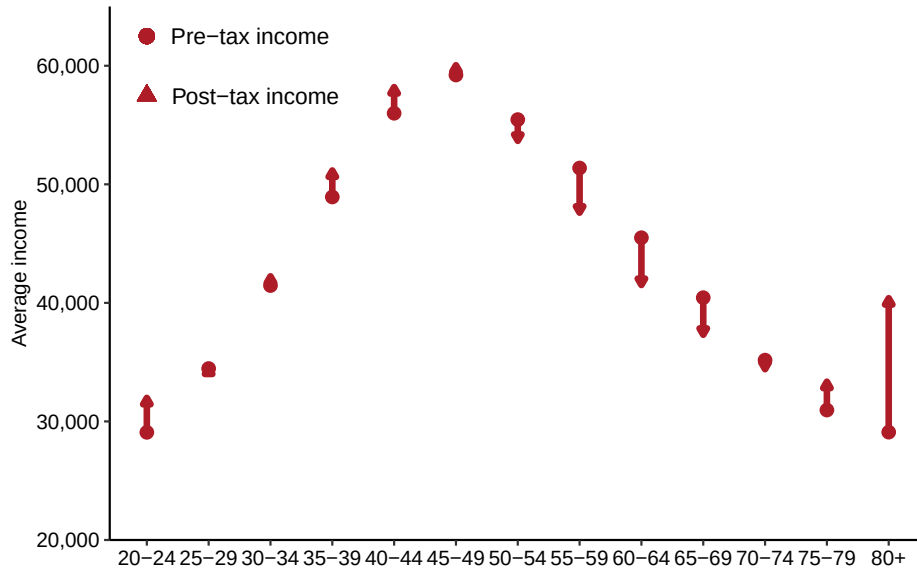
⁴⁴ See Bakx, Van Doorslaer and Wouterse (2023) for more details on the system of long-term care in the Netherlands.



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 2.16. Interestingly, most redistribution takes place between the age groups over 50, while those between the ages of 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.

Figure 2.16: 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.

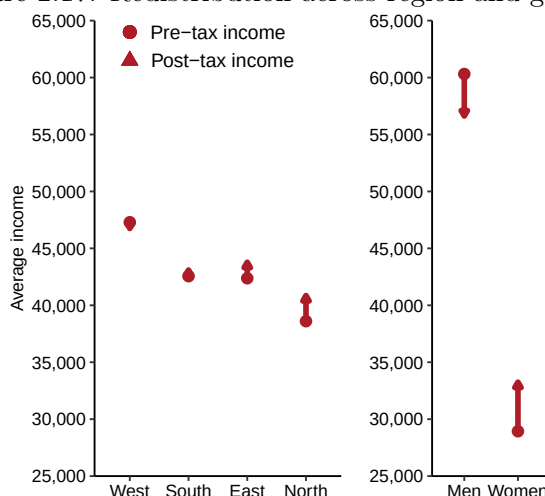
We also show this for other dimensions such as region and gender in Figure 2.17. There is a growing interest in spatial inequality, as evidenced by the construction of regional statistics by the OECD (2022) and the multi-country *Linking National and Regional Inequality* project (Bauluz et al., 2023). With individual-level data on residency, it is 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 recent years, a lot

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

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 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 who 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 2.17: Redistribution across region and gender



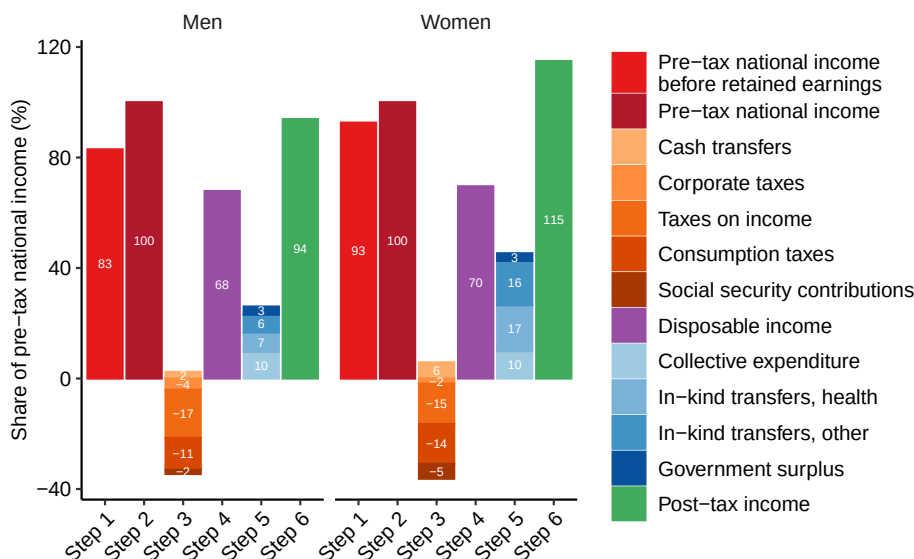
NOTE: The left panel of this figure shows the share of pre-tax national income and post-tax national income accruing to different regions in 2016. The unit of analysis is the individual adult and income is split equally among all adult members of a household. The right panel shows the share of pre-tax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

In Figure 2.18, 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 results 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

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

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 spending conditional on income.

Figure 2.18: Transition from pre-tax 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.

2.6 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 (Hoyne, 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 through taxation. This insight warrants more empirical as well as conceptual research into the precise distributive impact of different spending programmes.

Chapter 3

Taxing High Wages: Evidence from the Netherlands

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Abstract. We study the effects of a temporary tax on high wages levied on employers in the Netherlands. The tax imposed a 16 per cent surcharge on the portion of wages above €150,000 in 2012–2013. Using linked employer–employee data and income tax returns, and combining bunching, difference-in-differences and triple-differences designs, we find no effect on employees’ wages, implying that employers bore the full burden of the tax. In contrast, owner-managers reduced their own pay to offset the surtax. The response to the tax persists for many years after its repeal and is particularly strong among owner-managers in accounting and tax consultancy. To prevent income relabelling, anti-avoidance rules set a minimum level of compensation for owner-managers. We find no response among those for whom these rules bind, suggesting that they can effectively limit tax avoidance. Our results show that the capital-labour income split in private businesses is highly sensitive to tax laws, that temporary taxes can have long-lasting effects, and that elasticities are shaped by policy design.

3.1 Introduction

With income inequality rising in many countries, there is renewed interest in policies to reduce it. In the United States, politicians from both major parties have proposed extending the Social Security payroll tax—which is shared between employers and employees—to high-wage earners.¹ In Europe, several countries have gone one step further and actually introduced payroll taxes targeted

¹In the United States, earnings above a cap – \$176,100 in 2025 – are not subject to the Social Security payroll tax. Senator Lindsey Graham (R-SC) in 2005 suggested lifting the cap to roughly \$200,000 (Furman and Greenstein, 2005); during the 2008 presidential campaign Barack Obama proposed imposing the tax on earnings above \$250,000 (Burman, 2008), and similar plans have been proposed since then by Democratic presidential nominee Joe Biden in 2020 and Senator Ruben Gallego (D-AZ) and Representative Angie Craig (D-MN) in 2025 (Biden for President Campaign, 2019; Smith, Johnson and Favreault, 2020; U.S. Congress, 2025*a,b*).

at the top of the wage distribution.² According to the canonical model of tax incidence, economic incidence is independent of statutory incidence.³ The economic incidence of taxes on labour earnings should depend on the relative elasticities of labour supply and demand rather than on whether they are formally levied on employers or employees. Because estimates of the labour-supply elasticity—at least for prime-age men—are substantially smaller than estimates of the labour-demand elasticity, the conventional view among economists is that employer-side taxes are largely shifted onto employees.⁴ Recent studies, however, have cast doubt on this long-held belief by documenting cases of incomplete—or even zero—pass-through of employer-side payroll taxes onto employees (e.g., Saez, Matsaganis and Tsakloglou, 2012; Bozio et al., 2025). While many policy proposals focus on taxing top earners, evidence on the effects of such policies remains scant. Most payroll taxes are capped, leaving top earners unaffected at the margin and therefore often excluded from empirical analyses.⁵ Moreover, top earners differ from other taxpayers in the composition of their income, in the labour-market frictions they face, and in their ability to shift income across time and tax bases, all of which may mean that the elasticity of their earnings with respect to taxes differs from that of earners lower in the wage distribution. Who bears the burden of employer-side taxes targeting top earners is therefore still an open question.

This paper addresses this question by studying a temporary employer-side payroll tax introduced in the Netherlands in 2012. The tax imposed a 16 per cent levy on the portion of each employee’s wage above €150,000 and lasted for two years (2012–2013). To analyse its effects, we use linked employer–employee data and personal income tax returns. Our data cover the universe of workers, who were subject to the surtax, as well as the self-employed, retirees and employees of foreign employers, who were not. Crucially, the data identify owner-managers—an uncommon feature in most administrative tax data—allowing a comparison of their responses with those of regular employees. The data are available without top-coding and cover all forms of income, whether paid in cash or in kind, making them well suited to studying behaviour at the top of the wage distribution.

The design of the surtax lets us combine multiple strategies to credibly estimate its effect on wages and labour costs. The surtax threshold at €150,000 creates a sharp kink in marginal tax rates. If there is any pass-through of the tax onto employees, it should induce bunching at the kink point. Beyond this local response, the exclusion of certain groups from the tax—most notably the self-employed—allows us to estimate pass-through using a difference-in-differences design. Finally, by comparing workers just below and above the threshold, we implement a triple-differences design

²In addition to the Dutch tax studied in this paper, examples include the famous French levy on employers with employees earning over €1 million in 2013–2014, and the 5 per cent surtax in Norway on earnings over NOK 750,000 in 2023–2024.

³See chapter IX in Marshall (1920), chapter 19 in Samuelson (1948), and chapter 19 in Gruber (2011) for textbook treatments of the irrelevance of statutory incidence, and Benzarti (2025) for a critical review.

⁴In one survey, economists estimate that only a fifth of the burden of payroll taxes is borne by employers (Fuchs, Krueger and Poterba, 1998).

⁵An important exception is Guillot (2021) who studies the French levy on employers with employees earning over €1 million.

that isolates behavioural responses to the tax from other contemporaneous changes that differentially affect workers and the self-employed. Together, these complementary approaches provide a comprehensive assessment of behavioural responses to the tax.

Our empirical analysis yields three main results. First, contrary to the classical model of tax incidence, employees' wages remain entirely unaffected by the surtax. Employers do not shift the tax onto employees, implying that the resulting increase in labour costs is fully borne by employers.

Second, the wages of owner-managers decline sharply in response to the tax. Unlike regular employees, this type of worker has considerable discretion over how and when to draw income. The response to the introduction of the tax is immediate, and it does not revert following its repeal. Instead, it persists for many years. Again, this contradicts the standard model, which predicts symmetry between tax increases and decreases. This persistence is consistent with owner-managers' incentives to minimise reported labour income. The response is visible across all industries but is particularly pronounced among accountants and tax consultants—professions likely to be most familiar with the tax rules.

Third, rules that regulate owner-managers' compensation significantly limit the pass-through of employer-side taxes. These rules require owner-managers to pay themselves a "reasonable" salary to prevent the reclassification of labour income as capital income. We find that wages for owner-managers who are constrained by such rules remain stable and closely mirror those of regular employees. This result is among the first to document the effectiveness of policies that limit income shifting and shows that behavioural elasticities are not immutable parameters, but are shaped by policy design (Slemrod and Kopczuk, 2002).

This paper contributes to several strands of literature. First, it adds to the large body of work on payroll tax incidence, a question that has preoccupied economists since the advent of social insurance. Early empirical studies lacked compelling methods, often relying on cross-country comparisons or time-series evidence, and yielded widely varying estimates—from full shifting of employer contributions onto workers to none at all (Hamermesh, 1993). Later studies improved on both data and identification, using microdata and quasi-experimental variation, yet still failed to reach a consensus on the extent to which payroll taxes are shifted to wages. A few studies find near or full pass-through of payroll taxes onto wages (Gruber, 1997; Anderson and Meyer, 1997, 2000; Baicker and Chandra, 2006; Kim, Kim and Koh, 2022), but most find incomplete or negligible shifting (Komamura and Yamada, 2004; Murphy, 2007; Bennismarker, Mellander and Öckert, 2009; Korkeamäki and Uusitalo, 2009; Kugler and Kugler, 2009; Cruces, Galiani and Kidyba, 2010; Saez, Matsaganis and Tsakloglou, 2012; Lehmann, Marical and Rioux, 2013; Huttunen, Pirttilä and Uusitalo, 2013; Adam, Roantree and Phillips, 2017; Alvaredo et al., 2017; Bosch and Micevska-Scharf, 2017; Bozio, Breda and Grenet, 2017; Müller and Neumann, 2017; Neumann, 2017; Egebark and Kaunitz, 2018; Adam, Phillips and Roantree, 2019; Saez, Schoefer and Seim, 2019; Guillot, 2021;

Benzarti and Harju, 2021; Guo, 2024; Bozio et al., 2025).⁶ Because payroll taxes are typically phased out at high earnings levels, there is limited evidence on their incidence among top earners. An important exception is Guillot (2021), who finds that the burden of the French employer levy on employees earning over €1 million was split almost evenly between firms and workers. However, the threshold is so high that it applied to only about 1,000 taxpayers per year, compared with about 40,000 in the Dutch case. Yet top earners are the main target of prominent payroll tax reform proposals in countries such as the United States and the Netherlands, where policymakers have proposed raising or eliminating the cap on earnings subject to payroll taxes.⁷ The distributional and efficiency consequences of such reforms hinge on whether the burden of higher employer payroll taxes is borne by firms, by high-wage employees, or shared between them. There are several explanations for the incomplete pass-through of payroll taxes onto workers. At the bottom of the wage distribution, statutory minimum wages prevent employers from reducing pay, and collectively bargained wage scales can work similarly further up the distribution. In addition, fairness norms may limit within-firm wage differentials when otherwise identical workers face different tax treatment. We find that even among top earners such frictions are sufficiently large to prevent any pass-through of the surtax onto employees. In contrast, the discretion that owner-managers have in setting their own compensation means that many of them are able to overcome these frictions and reduce their wages. Our analysis highlights another mechanism relevant for top earners: their compensation may be constrained by tax rules requiring a minimum or “reasonable” level of pay, as for S-corporation owners in the US, effectively tying gross wages to legal definitions of adequate remuneration. By reducing the elasticity of earnings with respect to taxes, rules like this can lower the efficiency cost of taxes on top earners.

Second, this paper contributes to the literature on the taxation of top earners. Rising inequality has increased the fiscal importance of the rich, but their taxation comes with distinctive challenges (Güçeri and Slemrod, 2023). The composition of top incomes differs markedly from that of other taxpayers: while labour earnings dominate the incomes of the bottom 90 per cent, the income of the rich often takes the form of dividends, capital gains or retained earnings. Business ownership is prevalent among top earners, giving them considerable control over both the timing and the form of their income (Smith et al., 2019; Kopczuk and Zwick, 2020). The retention of income within the firm allows owner-managers to avoid the progressive rates of the personal income tax (Alstadsæter, Kopczuk and Telle, 2014; Miller, Pope and Smith, 2024; Bruil et al., 2025). Additionally, some personal consumption may be disguised as business expenses, thereby escaping corporate, personal,

⁶It is important to note that, according to Edwards and Cox Edwards (2000), Gruber (1997)’s estimate of full pass-through in Chile is largely mechanical, stemming from the legal requirement under Decree Law 3501 that employers raise gross wages to maintain workers’ net pay after the shift to employee-financed pension contributions.

⁷For the United States, Democratic presidential nominee Joseph R. Biden proposed in 2020 to subject earnings above \$400,000 to Social Security payroll taxes (Biden for President Campaign, 2019; Smith, Johnson and Favreault, 2020). In the Netherlands, several major parties support raising or abolishing the cap on earnings subject to payroll taxes; in addition, the left-wing alliance GroenLinks–PvdA has proposed introducing a new 15 per cent payroll tax on “high wages” (Centraal Planbureau, 2025).

and consumption taxes (Leite, 2024). At the top, the boundary between capital and labour income is often blurred, limiting the extent to which these forms of income can be taxed differently without inducing relabelling responses (Gordon and Slemrod, 2000; Pirttilä and Selin, 2011; Alstadsæter and Jacob, 2016). Our analysis documents a sharp contrast in behavioural responses between regular employees and owner-managers. Whereas the surtax on high wages is not passed through to employees, owner-managers are able to reduce their own wages to offset the tax-induced increase in labour costs. This asymmetry underscores that effective taxation at the top requires attention to income-shifting opportunities between corporate, capital, and labour tax bases when designing tax rates and rules.

Finally, our paper relates to an emerging literature on temporary taxation and tax holidays. Some policies are explicitly announced as temporary; others become temporary in practice when changes in government, in macroeconomic conditions, or other factors, lead to reversals.⁸ This raises well-known credibility concerns about whether “temporary” taxes are perceived as such. Tortarolo, Cruces and Castillo (2020), Martínez, Saez and Siegenthaler (2021), Sigurdsson (2024) and Sigurdsson (2025*a*) study income tax holidays in Argentina, Switzerland, Norway and Iceland to estimate intertemporal labour-supply responses. Across settings, elasticities are quantitatively modest on average, but larger for more flexible groups (e.g., first-time workers, job switchers and those near retirement) and when the tax holiday is salient. Sigurdsson (2025*b*) shows that the increase in labour supply can come at the expense of human capital accumulation, ultimately lowering lifetime earnings. In our setting, we document a pronounced asymmetry between the introduction and repeal of the surtax: wages, at least for owner-managers, fall immediately upon introduction and remain depressed for many years after the repeal of the tax.⁹ This finding highlights that long-run revenue effects can differ considerably from short-run effects when behavioural responses are persistent.

The rest of this paper proceeds as follows. Section 3.2 describes the institutional context and data. Section 3.3 presents the results for regular employees and Section 3.4 for owner-managers. Section 3.5 investigates how wage-setting rules for owner-managers affect the pass-through of employer-side taxes. Section 3.6 concludes.

⁸Conversely, some policies are announced as temporary but become effectively permanent. As Milton and Rose Friedman famously remarked, “nothing is so permanent as a temporary government program” (Friedman and Friedman, 1984).

⁹Related asymmetries in tax incidence have been documented for value-added taxes by Benzarti et al. (2020); Benzarti, Garriga and Tortarolo (2024).

Table 3.1: Schedule of the withholding tax on wages and the income tax, 2013

Annual wage (€)	Marginal tax rate (%)
0 – 19,645	37
19,646 – 55,991	42
55,992 and above	52

Note: Thresholds and rates are taken from the tax authority’s annual wage tax manual, *Handboek Loonheffingen 2013* (Belastingdienst, 2013). Schedules for other years are reported in Tables A.1 and A.2.

3.2 Institutional setting, data and conceptual framework

3.2.1 The withholding tax on wages and the income tax

A system of wage withholding has been in place in the Netherlands since 1941.¹⁰ Since then, employers have been required to remit taxes on behalf of their employees. The schedule of the withholding tax on wages, shown in Table 3.1 for 2013, is identical to that of the income tax, and the withholding tax serves as a prepayment of the income tax. The withholding tax covers all forms of remuneration from employment, whether in cash or in kind. In addition to regular salaries, it applies to performance-related pay, overtime, stock options, and benefits in kind such as the private use of a company car. It does not apply to income from self-employment or to wages paid by foreign employers without a Dutch payroll presence.

The personal income tax is levied on wage income as well as on other types of income, most importantly income from self-employment. It allows for a number of deductions, such as mortgage interest and certain medical expenses. Whereas the wage tax is withheld by employers in (usually monthly) instalments during the year, the income tax is a single annual assessment. When the income tax return is filed, the wage tax withheld is credited against the final income tax liability. In principle, the brackets of the withholding tax and the income tax are indexed annually to projected inflation, but the government can deviate from this rule.

3.2.2 Surtax on high wages

The surtax on high wages was first announced in April 2012 as part of a broader agreement on tax increases and spending cuts reached by coalition and opposition parties in order to comply with European budget rules. The details were specified in a letter to parliament from the Minister of Finance on 25 May: employers were required to pay an additional 16 per cent tax on the portion of an employee’s 2012 wage exceeding €150,000.¹¹ The law went into force on 1 January, 2013, and its

¹⁰In 1939, the Dutch government proposed a comprehensive tax reform that included withholding at source, but the bill was withdrawn later that year for lack of political support. Shortly following the German occupation of the Netherlands, a withholding tax on wages modelled on the German *Lohnsteuer* was introduced by decree and took effect in 1941 (Essers, 2012). Today’s withholding tax on wages is based on the Wage Tax Act 1964 (Staatsblad, 1964).

¹¹Tweede Kamer der Staten-Generaal (2012b).

tax base was identical to that of the wage withholding tax.¹² The tax was applied retroactively to all wages paid in 2012, including those from before the announcement. Like the wage withholding tax, the self-employed were excluded from the tax, as were employees of foreign employers without a Dutch payroll presence, and employees whose income was spread across multiple employers such that no single employer paid more than €150,000. By contrast, the surtax could not be credited against employees' income tax liabilities and was charged exclusively to employers, ensuring that the legal burden fell entirely on the employer rather than the employee.

Although the law included a sunset clause providing for automatic expiration on 1 January 2014, the government announced in March 2013 that the tax would be extended by one year in response to deteriorating macroeconomic forecasts.¹³ After repeated assurances from government officials that the levy would not be extended a second time, it expired on 1 January 2015.¹⁴

A natural alternative to an employer levy would have been the introduction of an additional bracket in the income tax. This would have placed the legal burden of the tax on individuals rather than firms, and subjected self-employed workers to the tax on the same basis as employees. Curiously, the government justified its choice of an employer levy on the grounds that international comparisons of countries' attractiveness as business locations typically use the top marginal income tax rate as a key indicator. By opting for a levy on employers, these comparisons remained unaffected (Tweede Kamer der Staten-Generaal, 2012*a*; Eerste Kamer der Staten-Generaal, 2012).

Anti-avoidance provisions. The Dutch law contained several anti-avoidance provisions. First, wage income was aggregated at the employer–employee level, meaning that splitting a contract into multiple smaller contracts would not affect the employer's tax liability. Similarly, wages paid by “associated corporations”, defined as those in which the employer had at least one-third of the shares, were also included in the tax base.¹⁵ Second, if an employee converted their employment into a self-employment contract with the same employer, the resulting income was deemed wage income for the purposes of the surtax, thereby neutralising this avoidance channel.¹⁶

Legal challenges. Thousands of taxpayers filed formal objections against their surtax assessments.¹⁷ Several of these objections culminated in court cases that centred on the protection of property and the prohibition of discrimination.¹⁸ Two of these cases reached the Dutch Supreme Court, which upheld lower courts' judgments and ruled that concerns over the retroactive nature

¹²The surtax was enacted through article 32bd of the Wage Tax Act 1964 (Staatsblad, 1964, 2012*b*).

¹³Tweede Kamer der Staten-Generaal (2013*b*).

¹⁴Tweede Kamer der Staten-Generaal (2013*a*).

¹⁵As specified in article 32bd, paragraph 2 of the Wage Tax Act 1964 (Staatsblad, 1964).

¹⁶As specified in article 10f of the Wage Tax Implementation Decree 1965 (Staatsblad, 1965, 2012*a*).

¹⁷According to the Court of Audit, the tax authority had received almost 10,000 objections as of January 2014 (Tweede Kamer der Staten-Generaal, 2015).

¹⁸Article 1 of the First Protocol of the European Convention on Human Rights (ECHR), and Article 14 of the ECHR and Article 26 of the International Covenant on Civil and Political Rights, respectively.

of the tax and the differential treatment of different types of taxpayers were outweighed by the severity of the government’s budgetary needs and the broad discretion afforded to the legislator in matters of taxation.¹⁹ This judgment was later upheld by the European Court of Human Rights in a case brought by three parties including Feyenoord Rotterdam N.V., the Netherlands’ second-most-successful professional football club.²⁰

3.2.3 Owner-managers and reasonable compensation

Owner-managers make up an important group among top earners.²¹ Since owner-managers are both employees and shareholders, they enjoy considerable discretion in how to structure their income. Wage income is subject to the progressive schedule in Table 3.1, with a top marginal tax rate of 52 per cent. In contrast, income distributed as dividends faces a combined corporate and personal marginal tax rate roughly ten percentage points lower.²² Income can also be retained within the company, which allows shareholders to accumulate wealth while deferring personal income taxes until retained earnings are eventually distributed as dividends or realised as capital gains.

The differences in marginal rates on different types of income create strong incentives for owner-managers to minimise wage income.²³ To limit such income shifting, Dutch law requires owner-managers to pay themselves a minimum level of compensation.²⁴ Comparable rules exist in many countries where tax rates on capital and labour income differ. In the United States, shareholder-employees of S-corporations are required to pay themselves “reasonable compensation”, while owner-managers of closely held corporations in Germany (“*GmbHs*”) must receive “arm’s-length” remuneration. Norway and Sweden address the issue by allowing for a “normal return” on capital to be taxed at the flat capital income rate, while all “excess” profits are taxed as labour income under a progressive schedule. In the Netherlands, the minimum level of compensation is defined as the maximum of i) €42,000, ii) the wage for comparable jobs, and iii) the highest salary paid within the firm.²⁵ While the first and last amounts can be established objectively, the second involves a considerable degree of judgement and can lead to conflicts between the taxpayer and the tax authority. As shown in Figure A.1, the number of court cases concerning the minimum level of compensation

¹⁹ECLI:NL:HR:2016:121; ECLI:NL:HR:2016:124.

²⁰European Court of Human Rights, *P. Plaisier B.V. and others v. the Netherlands*, Decision of 14 November 2017, Application no. 46184/16.

²¹In the Dutch tax code, owner-managers (“*directeur-groootaandeelhouders*” in Dutch) are defined as employees with a “substantial shareholding” in the company they work for. The concept of “substantial shareholding” is defined in Article 4.6 of the Income Tax Act 2001 as holding at least 5 per cent of the shares in a company (Staatsblad, 2000).

²²Tables A.3 and A.4 report the corporate and dividend tax schedules. Over 2006–2019, the implied combined marginal tax rate on distributed profits ranged between 37.6 and 47.2 per cent.

²³There are non-tax reasons to pay out income in the form of wages. For example, banks and mortgage lenders may not treat dividends as equivalent to salary income when assessing an applicant’s creditworthiness. Additionally, salary payments can be targeted to a specific individual, whereas dividends must generally be distributed in proportion to shareholders’ shareholdings.

²⁴This minimum level (“*gebruikelijk loon*”) is codified in Article 12a of the Wage Tax Act 1964 (Staatsblad, 1964).

²⁵The amount for 2012 is €42,000. The amount was gradually increased from €39,000 in 2006 to €45,000 in 2019.

Table 3.2: Number of jobs above and below €150,000 in 2012

	Above €150,000		Below €150,000		Total	
	Number	Share (%)	Number	Share (%)	Number	Share (%)
A. Treated						
Employee	34,175	58	6,610,503	75	6,644,678	75
Owner-manager	5,696	10	223,629	3	229,325	3
B. Control						
Self-employed	15,487	26	617,212	7	632,699	7
Retired	2,586	4	1,383,356	16	1,385,942	16
Foreign employer	719	1	24,006	0	24,725	0
Total	58,663	100	8,858,706	100	8,917,369	100

Note: This table presents the aggregate number of jobs in 2012 for different groups, separately for those earning above and below €150,000. For employees and owner-managers, a job is defined as a unique employer–employee combination. For the self-employed and workers with foreign employers, we do not have information about contractors or employers, so that strictly speaking, these numbers represent the number of individuals rather than jobs. Retirees are similarly defined at the individual level.

of owner-managers has more than tripled since 2008, suggesting either stricter enforcement by the tax authority or increasing assertiveness among owner-managers and their tax advisors.

3.2.4 Data

All data are accessed through a secure connection to Statistics Netherlands’ microdata environment. The various datasets maintained by Statistics Netherlands can be linked through anonymised, unique identifiers for individuals and firms.

Linked employer–employee data. Data on employers and employees stem from the monthly reporting of wages to the tax authority for the purposes of wage withholding and is available for the years 2006–2024. In addition to various wage components, the dataset contains information on the contract type, employment duration, hours worked, and the employer’s sector classification. Monetary variables are available in full without top-coding. Employees may hold multiple employment relationships with the same employer. For the purposes of the surtax on high wages and of our analysis, such cases are aggregated into a single observation for each employer–employee pair. The data do not cover the self-employed or workers with foreign employers without a Dutch payroll presence. For these groups, we use individual-level data from income tax returns.

In 2012, there were 7,531,427 jobs in total; nearly 56,000 of these (0.7 per cent) paid a wage above the surtax threshold of €150,000 (Table 3.2). Owner-managers are overrepresented at the top of the wage distribution, accounting for 10 per cent of jobs paying above €150,000 compared with less than 3 per cent of jobs below that amount.

Table 3.3 reports the industry mix of employees below and above the €150,000 threshold.²⁶ High-earning employees are concentrated in a small set of industries such as professional, scientific and technical activities; financial and insurance activities; and information and communication. By contrast, they are scarce in education and in public administration and defence, both of which are subject to a public sector salary cap. Table 3.4 shows that owner-managers are predominantly employed in professional, scientific and technical activities, with an additional over-representation in human health.²⁷ Within the former, management consultancy, law, accounting and tax consultancy account for most of the employment; within the latter, non-hospital medical and dental practices dominate.

Table 3.3: Sectoral composition of employees in 2012 (ISIC, 1-digit level)

Industry, ISIC 1 (%)	Above €150,000	Below €150,000
Professional, scientific and technical activities	19	6
Financial and insurance activities	18	4
Wholesale and retail trade; repair of motor vehicles and motorcycles	16	14
Manufacturing	14	12
Human health and social work activities	8	18
Information and communication	8	3
Transportation and storage	6	5
Administrative and support service activities	2	9
Construction	2	5
Education	0	7
Public administration and defence; compulsory social security	0	7
Real estate activities	0	1

Note: This table shows the distribution of employees across industries in 2012, separately for those paid above and below €150,000. Employees are grouped into industries based on their employer's 1-digit International Standard Industrial Classification (ISIC).

Individual-level data For the self-employed, retirees, and employees of foreign employers without a Dutch payroll presence, we use individual-level data that are available on an annual basis for the years 2006–2023. This dataset covers the entire Dutch population as registered in the population registry on January 1 each year and draws primarily on income tax returns for information on income. The information on income is reported in full without top-coding. Among the 632,699 self-employed individuals, 15,487 (2.4 per cent) have incomes above €150,000. The corresponding numbers of retirees and employees of foreign employers with incomes above this threshold are 2,586 (0.2%) and 719 (2.9%), respectively.

²⁶See Tables A.5 and A.6 for the industry mix at the 2- and 3-digit level.

²⁷See Tables A.7 and A.8 for the industry mix at the 2- and 3-digit level.

Table 3.4: Sectoral composition of owner-managers in 2012 (ISIC, 1-digit level)

Industry, ISIC 1 (%)	Above €150,000	Below €150,000
Professional, scientific and technical activities	34	26
Wholesale and retail trade; repair of motor vehicles and motorcycles	13	19
Human health and social work activities	9	4
Financial and insurance activities	5	12
Manufacturing	5	9
Construction	2	9
Information and communication	1	5
Administrative and support service activities	1	4
Real estate activities	1	3
Transportation and storage	0	3

Note: This table shows the distribution of owner-managers across industries in 2012, separately for those paid above and below €150,000. Owner-managers are grouped into industries based on their employer's 1-digit International Standard Industrial Classification (ISIC).

3.2.5 Conceptual framework

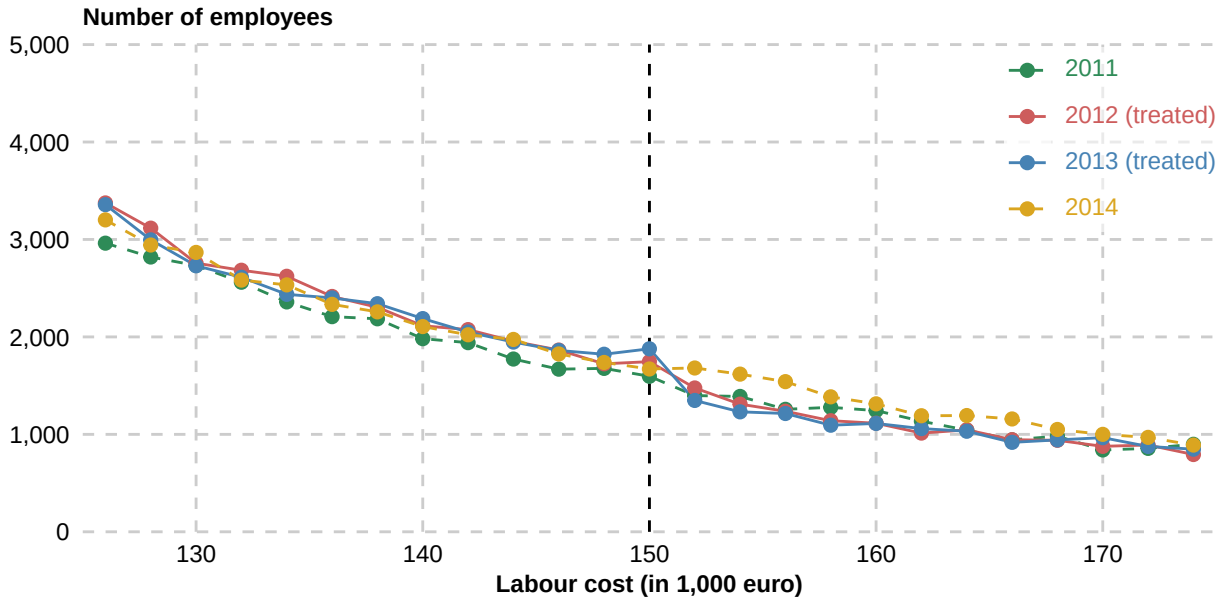
In the canonical model of tax incidence, workers' choices are based on the disposable wage, w_d , while employers care about labour costs, w_{lc} . The wedge between them is created by the payroll tax, τ_p , and the income tax, τ_i : $w_d = (1 - \tau_i) \frac{w_{lc}}{1 + \tau_p}$. This implies a marginal tax rate with respect to labour costs equal to: $\frac{\tau_i + \tau_p}{1 + \tau_p} = \frac{0.16 + 0.52}{1.16} = 0.59$. In a frictionless framework, the legal incidence is irrelevant for economic incidence. When either the payroll or income tax rate is increased, a worker should reduce their labour supply if the substitution effect exceeds the income effect. In practice, however, contracts, collective bargaining agreements, and other frictions make wages sticky. As a result, labour supply can respond differently to changes in income and payroll taxes (Lehmann, Marical and Rioux, 2013).

3.3 Evidence for employees

3.3.1 Bunching evidence: Employees

The surtax applied to the portion of wages above €150,000 at a rate of 16 per cent. This threshold introduced a sharp discontinuity in marginal tax rates, creating a strong incentive for employers to reduce the wages of their highest-paid employees. If employers were successful in doing so, we would expect to observe bunching at the kink point in the wage distribution where tax incentives change discontinuously (Saez, 1999, 2010; Kleven, 2016). To test this empirically, we group all employees into €2,000 bins and plot their frequencies in Figure 3.1. In 2011, one year before the surtax was introduced, there is little evidence of bunching at the kink point, with fewer than 2,000 employees earning exactly €150,000. When the surtax takes effect in 2012, the distribution of employees

Figure 3.1: The number of employees across the labour cost distribution



Note: This figure groups employees into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

remains largely smooth, with a minimal amount of apparent bunching that slightly increases in 2013 and disappears in 2014.

3.3.2 Bunching by industry: Employees

To further investigate the bunching patterns, we group employees by their employer's industry (ISIC, 1-digit). As Table 3.3 shows, high-earning employees are concentrated in six sectors: professional, scientific and technical activities; financial and insurance activities; wholesale and retail trade; manufacturing; human health and social work activities; and information and communication. Figure 3.2 confirms that there is no meaningful bunching among employees in any industry. The apparent exception is human health and social work activities. However, the bunching there predates the surtax and, as Figure A.19 shows, is driven by the hospital sector. This pattern is explained by the hospital sector's collective bargaining agreement, which sets full-time salaries for medical specialists around €150,000 (Nederlandse Vereniging van Ziekenhuizen, 2011). To prevent this from affecting our results, we exclude the hospital sector from subsequent analyses.

3.3.3 Difference-in-differences and triple-differences: Comparing employees to the self-employed

Bunching identifies behavioural responses among taxpayers near the kink. Our analysis finds no response for employees, implying that, locally around the kink, employers bore the full burden of

the tax. To assess whether this holds more broadly, we exploit the fact that some groups, notably the self-employed, were not subject to the surtax.

Estimating behavioural responses at the top of the distribution poses distinct challenges. First, labour income at the top often takes multiple forms (e.g., bonuses and in-kind payments). Because all labour income is taxable in the Netherlands, regardless of the precise form, our administrative data provide a comprehensive picture of the labour income of top earners. Second, some individuals reach the top due to large positive transitory incomes. Mean reversion implies that their incomes are likely to fall even absent a tax change, mechanically inducing a negative correlation between changes in income and tax cuts at the top (Saez, Slemrod and Giertz, 2012). We address this issue by implementing a difference-in-differences design using repeated cross-sections of the top 0.5 per cent of employees and the top 0.5 per cent of self-employed individuals. We also estimate a triple-differences specification that uses the bottom half of the top 1 per cent as an additional control group. This specification nets out shocks that are specific to either employees or the self-employed, but common across the top and bottom halves of their top 1 per cent. We choose the 0.5 per cent cut-off so that the group still includes the €150,000 threshold in 2019, the final year of our analysis. Consequently, in 2012–2013 a small share of employees in this group have incomes just below €150,000, which dilutes treatment and may bias our estimate slightly toward zero. This design relies on parallel trends: absent the surtax, wages and labour costs for employees and the self-employed would have evolved similarly. Figure 3.3 provides visual support: it plots the unadjusted averages of gross wages and labour costs for both groups from 2006 to 2019, with visibly parallel trends prior to the tax. When the tax is in place, gross wages continue to evolve similarly, so that labour costs rose by approximately the full amount of the tax.

Concretely, to estimate the effect of the surtax on employees’ gross wages and labour costs, we implement an event-study difference-in-differences on repeated cross-sections of the top 0.5 per cent of employees and top 0.5 per cent of self-employed individuals:

$$w_{igt} = \alpha_t + \lambda_g + \sum_{k \in \{2006, \dots, 2019\} \setminus \{2011\}} \beta_k \mathbf{1}\{t = k\} \times \mathbf{1}\{g = \text{employee}\} + X_{it}\gamma + \varepsilon_{it}, \quad (3.1)$$

where w_{igt} denotes gross wage or labour cost of individual i of group $g \in \{\text{employee, self-employed}\}$ in year t ; α_t are year fixed effects; λ_g are group fixed effects; and X_{it} are industry controls (ISIC, 3-digit level). By construction, labour costs and gross wages are identical in all years except when the surtax applies in 2012 and 2013. We also estimate a triple-differences specification that uses the bottom half of the top 1 per cent as an additional control. Figure 3.4 plots the coefficients. Before the tax, the coefficients are all close to zero and mostly statistically insignificant. When the surtax is in place, the effect on gross wages remains zero, while the effect on labour costs jumps, returning to zero in 2014, after the tax has been repealed. The effect goes up to slightly above zero in subsequent years, indicating a divergence between employees’ wages and the incomes of the

self-employed from 2015 onwards, but there is no clear link to the surtax. The bottom panel shows the triple-differences estimates, which are virtually identical to the difference-in-differences results.

The near absence of a behavioural response among employees points to the importance of labour-market frictions that prevent employers from passing the surtax on to employees. Employment contracts and collective bargaining agreements limit the extent to which employers and employees can adjust wages or hours. Although top earners are typically less bound by such institutional features and receive a larger share of their income in more flexible forms such as performance pay, we nevertheless find no effect on their gross wages. Our estimates also rule out sizeable avoidance responses through employer–employee collusion of the type documented by Feinmann, Rocha and Lauletta (2024) in Brazil. Finally, while some frictions exist independently of policy, the surtax intentionally introduced new ones through anti-avoidance provisions that prohibited employees from working as self-employed contractors to the same employers.²⁸

3.4 Evidence for owner-managers

3.4.1 Bunching evidence: Owner-managers

We now turn to the effect of the surtax on owner-managers. As Table 3.2 shows, this group is overrepresented among top earners. Unlike regular employees, their (partial) ownership stake gives them greater control over the form (wages vs. dividends) and timing of income, as well as over actual labour supply. As before, we first examine whether the surtax induced bunching at the threshold of €150,000. Figure 3.5 plots the number of owner-managers across the labour cost distribution for 2011–2014. Already in 2011, one year before the surtax, this number is somewhat elevated around €150,000, with around 400 owner-managers earning exactly €150,000. When the tax is introduced in 2012, this number more than doubles to roughly 900, and rises further in 2013. After repeal in 2014, there is still a substantial amount of bunching. Figure A.2 shows that bunching persists for many years and is still visible in 2018, showing that temporary taxes can have long-lasting effects. This persistence can be explained by owner-managers’ tax incentives to minimise labour income.

3.4.2 Bunching by industry: Owner-managers

As shown in Table 3.4, more than a third of owner-managers are employed in professional, scientific and technical activities. At the three-digit level (Table A.8), these are concentrated in management and consultancy, legal services, accounting, bookkeeping, auditing, and tax consultancy. Another important sector—human health and social work activities—consists largely of medical and dental practices. As with employees, very few top-earning owner-managers work in the public sector. Despite substantial cross-industry differences, Figure 3.6 shows clear bunching in every industry.

²⁸Article 10f of the Wage Tax Implementation Decree 1965 (Staatsblad, 1965, 2012*a*).

Consistent with the aggregate pattern, there is no bunching in 2011 (the pre-tax year), and the bunching persists after the tax was repealed.

Which industry bunches most? To gauge relative bunching, Figure 3.7 plots, for each industry, the number of owner-managers at €150,000 in 2013 divided by the corresponding 2011 count. If the number of owner-managers in 2013 is equal to that in 2011, this ratio is equal to 1. Bunching is visible across industries, but it is most pronounced in accounting, bookkeeping and auditing, and tax consultancy: in this industry, nearly four times as many owner-managers cluster at €150,000 in 2013 as in 2011, compared with roughly 2.5 times in “management consultancy activities.” This pattern suggests that those most familiar with the tax rules responded most strongly.

3.4.3 Where do bunchers come from?

Theory predicts that a kink in the tax schedule induces taxpayers with earnings just above the threshold to relocate to the kink. The panel structure of our data allows us to track where owner-managers who earn €150,000 in year t come from. Figure 3.8 plots their locations in the prior-year labour cost distribution. In 2011 (green), most bunchers had wage income below €150,000 in 2010; just over 750 were already at the kink in 2010.²⁹ Because there was no surtax in 2011, we treat the 2011 “origin curve” as the no-tax counterfactual. The origin of 2012 bunchers (in red) differs markedly from the 2011 bunchers. Relative to 2011, many more previously had wage income above €150,000, consistent with a downward adjustment toward the kink. To verify that this shift is driven by the surtax, Figures A.30 and A.31 plot origin curves for owner-managers earning €100,000 and €130,000 in year t , and who were thus not subject to the surtax. These curves are essentially unchanged between 2011 and 2012.

3.4.4 Difference-in-differences and triple-differences: Comparing owner-managers to the self-employed

The bunching analysis shows that owner-managers—unlike employees—adjust their behaviour in response to the surtax. Do these responses extend to taxpayers further away from the kink? To answer this question, we apply the same difference-in-differences design as in Section 3.3.3, comparing the top 0.5 per cent of owner-managers with the top 0.5 per cent of self-employed individuals, and the same triple-differences design that uses the bottom half of each group’s top 1 per cent as an additional control group. Figure 3.9 plots average gross wages and labour costs for owner-managers and the self-employed. Before the surtax, both series grow at roughly the same pace for the two groups. When the tax is introduced, growth in owner-managers’ gross wages immediately slows down relative to that of the self-employed, by an amount that approximately offsets the tax-induced rise in labour costs in 2012–2013. After repeal, gross wages and labour costs do not return

²⁹This number is not directly comparable with the number of bunchers in earlier figures. For reasons of statistical disclosure, these figures use €10,000 rather than €2,000 bins.

to their prior path until 2018, indicating a persistent effect well beyond the tax period.

Figure 3.10 plots the coefficients for the effect of the surtax on wages and labour costs using the difference-in-differences and triple-differences designs. As for employees, the coefficients before the tax are close to zero and insignificant. Upon introduction of the tax, gross wages fall immediately by around €3,000 on average. This is exactly enough to offset the tax-induced rise in labour costs, so that the estimated effect on labour costs remains flat until 2013. Labour costs fall sharply when the tax is repealed and both labour costs and gross wages remain depressed for many years after the repeal and only return to their pre-tax trend in 2018.

In the case of regular employees, employers bore the burden of the tax because labour-market frictions prevented them from adjusting wages downward. Since owner-managers are both employer and employee, such frictions do not protect them from the surtax. The only way to avoid the tax is to lower their own gross wage, and that is what we observe. Owner-managers still have reasons to pay themselves labour income, for example because too low a wage can trigger a tax audit, but the surtax reduced the relative attractiveness of earning labour income compared to retaining profits in the firm or paying dividends.

3.5 Reasonable compensation

Rules on “reasonable compensation” constrain how owner-managers set their pay. In countries where capital and labour income face different tax rates, such rules limit the relabelling of labour income as capital income. As explained in Section 3.2.3, Dutch owner-managers must pay themselves at least the highest of: (i) €42,000; (ii) the wage common for comparable jobs at other firms; (iii) the highest wage paid within their own firm. Can these rules explain why owner-managers do not cut wages more than they do? To answer this, we identify a group of owner-managers who are actually bound by the rules. The first criterion is too low to matter for those subject to the surtax, and the second relies on a subjective external comparison. The third criterion, however, is objectively verifiable: when a firm employs other highly paid workers, an owner-manager cannot reduce his or her (but usually his) own wage as much as in firms without such employees.

We therefore define a “constrained owner-manager” as an owner-manager in a firm with at least one other worker in the top 1 per cent of earners.³⁰ Figure 3.11 plots triple-differences estimates for this group. In stark contrast to the results for all owner-managers, constrained owner-managers show no fall in gross wages, so that labour costs rise by approximately the full size of the surtax. These findings suggest that anti-avoidance rules regulating owner-manager pay can effectively limit behavioural responses to taxation. They also confirm that the capital-labour split in private businesses, where there is often considerable overlap between owners and highly-paid employees, is highly sensitive to tax rates and rules.

³⁰Note that this identifies one group for whom the rules bind; the rules may bind in other cases as well, and the tax authority sometimes invokes the first (subjective) criterion to challenge reported salaries.

3.6 Conclusion

Rising wage inequality has spurred policymakers to think about policies to address it. One such policy is an employer-side payroll tax targeted at high-wage earners. Standard theory predicts that such taxes should be passed on to employees. This paper studies a temporary employer-side payroll tax on top earners in the Netherlands and finds that there is, in fact, zero pass-through for regular employees. Employment contracts, collective bargaining agreements and other frictions prevent adjustments to employees' wages, so the full burden of the tax is borne by employers. In sharp contrast, labour market frictions do not protect owner-managers from the surtax as they are both employee and employer. They can only reduce their tax liability by lowering their gross wage, which is what they do. The fall in wages is immediate and persists for many years after the repeal of the tax. However, owner-managers cannot adjust their wages freely. They are subject to rules that limit income shifting by requiring a minimum level of compensation. We identify a group of owner-managers bound by these rules and find that they are effective: this group does not lower their wages in response to the surtax. These results show that tax laws play a crucial role in determining whether income is paid out as dividends or as wages in privately held businesses. This also means that elasticities of taxable income are highly dependent on tax and non-tax policies (Slemrod and Kopczuk, 2002).

Our results have important implications for policy design. Employer-side payroll taxes that target high-wage earners are motivated by concerns over rising inequality. The absence of shifting onto regular employees implies that they largely fail to compress the wage distribution. Instead, the surtax reduces the profits of employers whose production relies on high-wage labour inputs, while leaving more capital-intensive employers relatively untouched. Despite this, the surtax is still likely to reduce income inequality because it lowers profits, which are concentrated at the top of the income distribution.

Another implication concerns revenue projections. Because regular employees, the largest group of affected taxpayers, do not adjust their wages, the static revenue effect of the surtax is close to the mechanical effect. However, the persistent behavioural response among owner-managers means static scoring overstates long-run revenue. Accounting for these dynamics is essential when evaluating temporary taxes whose effects can outlast the policy window.

Finally, our results indicate that anti-avoidance rules regulating the pay of owner-managers can effectively limit tax-base shifting. Rules addressing this issue typically rely on legally ambiguous concepts such as "reasonableness" or "appropriateness", which makes enforcement costly and vulnerable to legal challenge. A strength of the Dutch rules is their reliance, at least in part, on an objective criterion - the highest wage paid in a company - that is less amenable to manipulation.

This paper fits in a large body of empirical research documenting incomplete pass-through of employer-side payroll taxes onto workers, challenging the canonical model of tax incidence (Benzarti, 2025). If employers bear a meaningful share of these taxes, future research should examine how

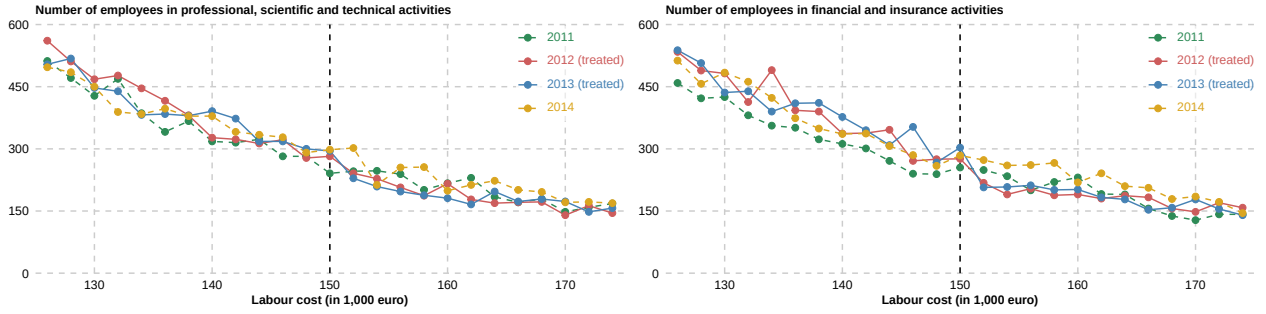
they affect decisions at the firm-level. This would allow for a more comprehensive analysis of tax incidence, considering the effects on employees, employers as well as consumers, both in the short and the long run.

Our results also underscore the importance of studying owner-managers separately, as the ways in which they can respond to tax changes differ sharply from those of regular employees. Recent research examines tax avoidance via consumption through the firm (Leite, 2024) and intertemporal income shifting (Miller, Pope and Smith, 2024), yet there remains little evidence on how these policies differ across countries and on how effective they are at restraining such behaviour.

Figure 3.2: Number of employees in different industries

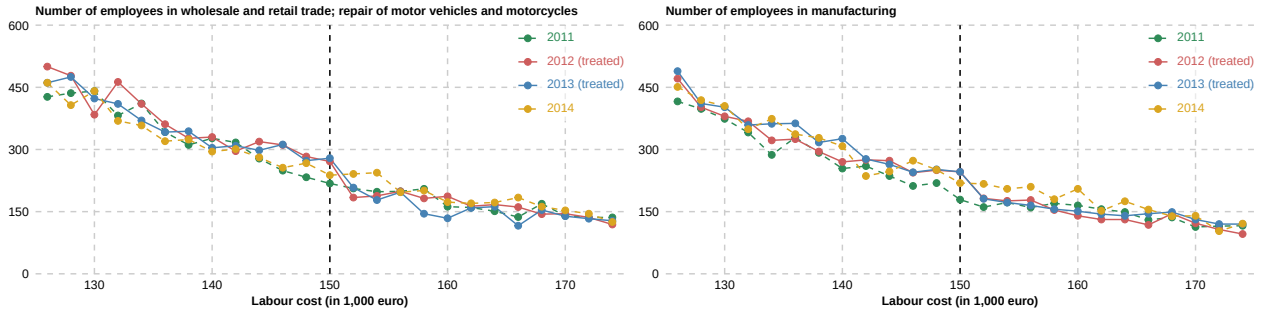
(a) Professional, scientific and technical activities

(b) Financial and insurance activities



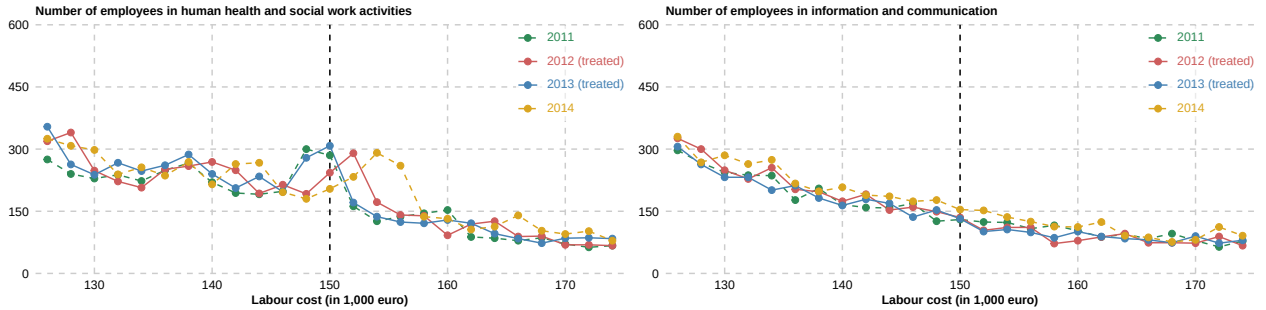
(c) Wholesale and retail trade

(d) Manufacturing



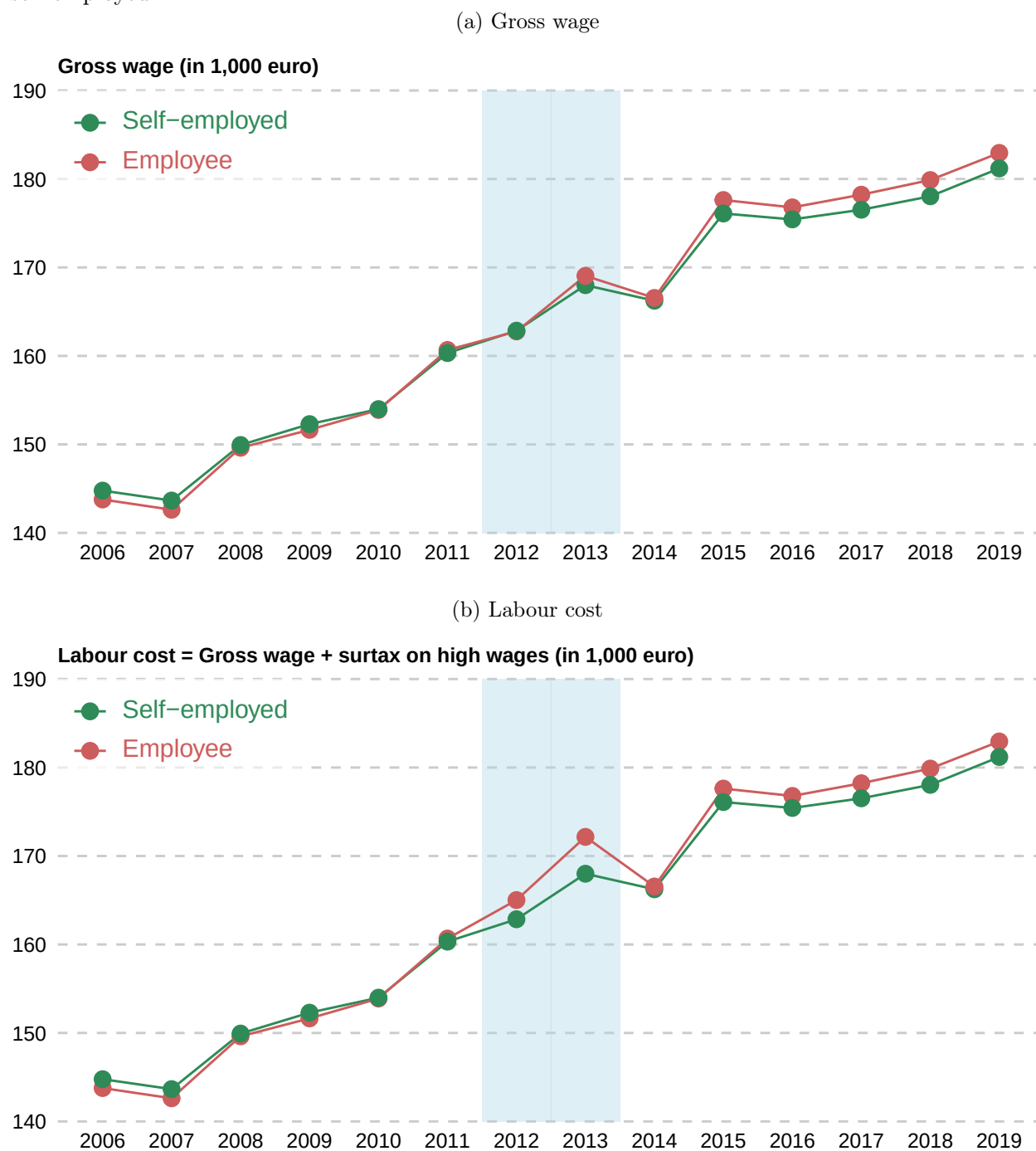
(e) Human health and social work activities

(f) Information and communication



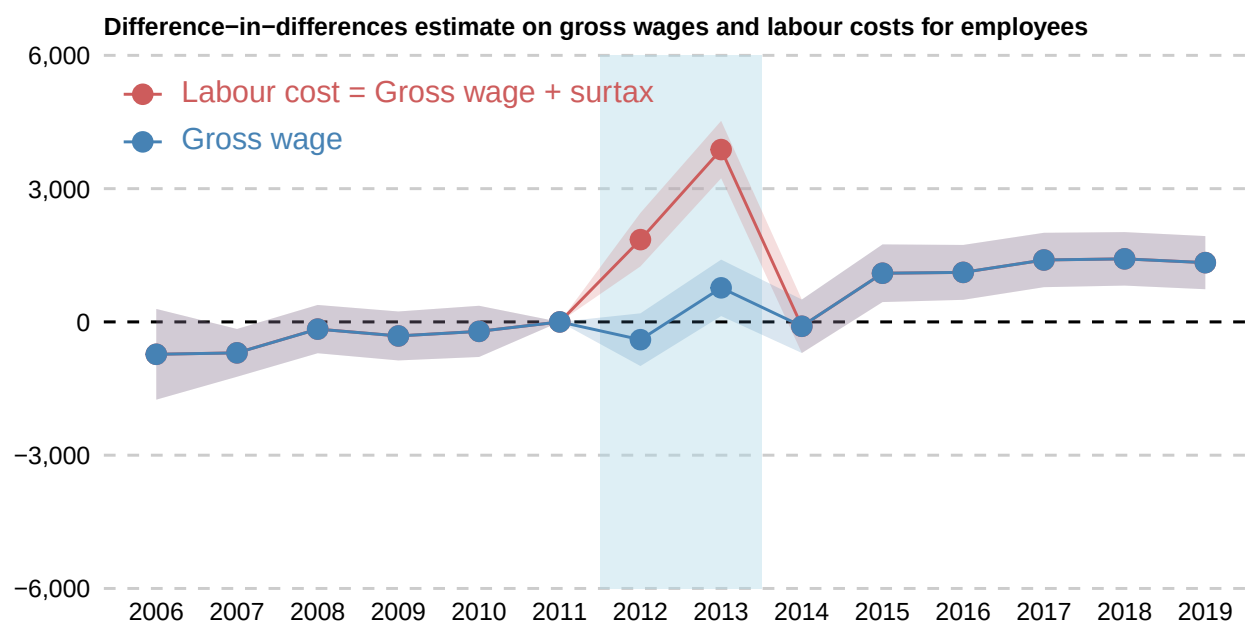
Note: This figure groups employees into €2,000 bins of labour costs and plots the bin counts for each year for different industries defined at the ISIC 1-digit level in 2011–2014.

Figure 3.3: Average gross wage and labour costs for the top 0.5 per cent of employees and of the self-employed

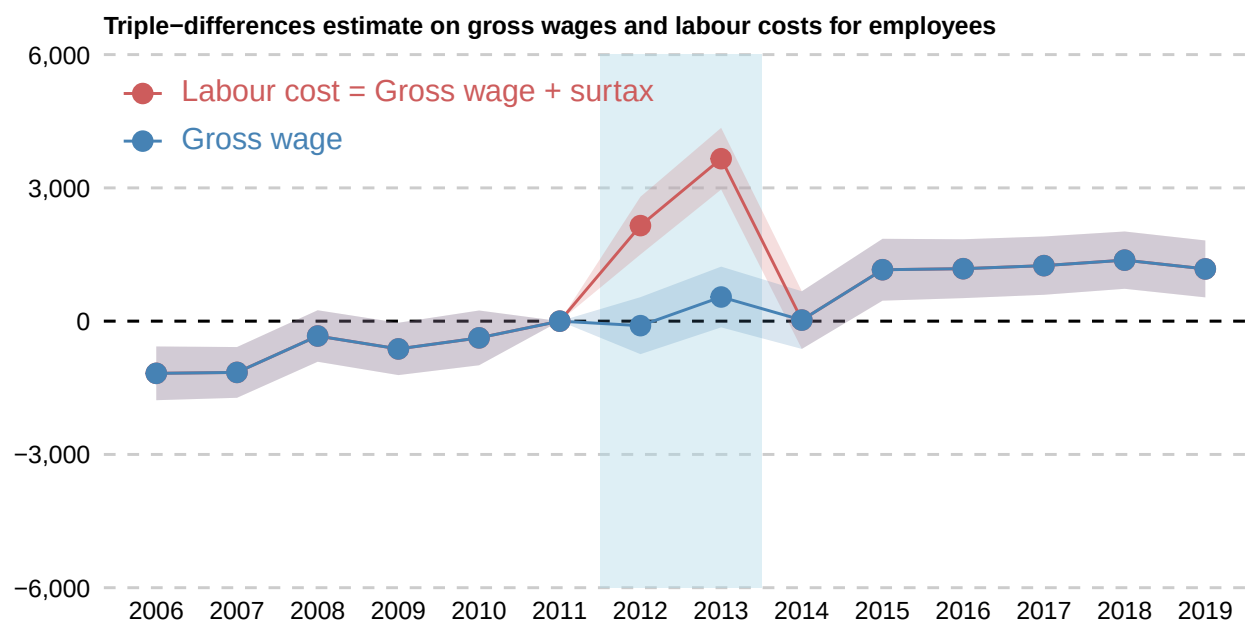


Note: This figure separately ranks employees and self-employed individuals by labour costs and computes average wages and labour costs for the top 0.5 per cent of each group. Labour costs are defined as the sum of gross wages and the surtax on high wages.

Figure 3.4: The estimated effect of the surtax on gross wages and labour costs of employees
(a) Difference-in-differences

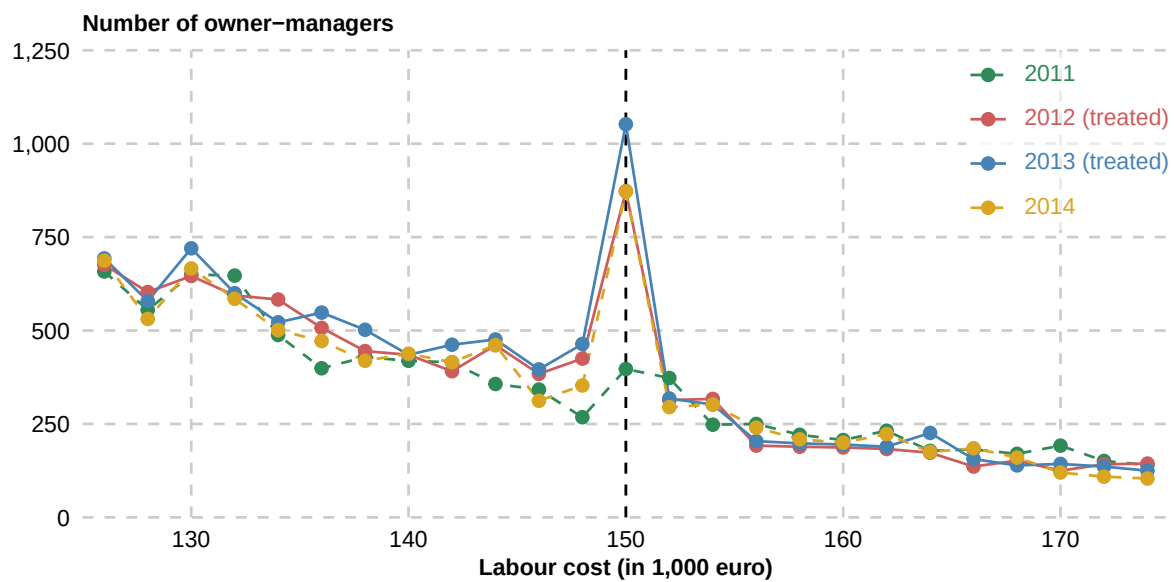


(b) Triple-differences



Note: This figure plots event-study coefficients from Equation 3.1 comparing employees to the self-employed, each defined within their top 0.5 per cent. Coefficients are normalised to zero in 2011; shaded ribbons denote 95 per cent confidence intervals. The bottom panel adds a third difference by using the bottom half of the top 1 per cent within each group as an additional control.

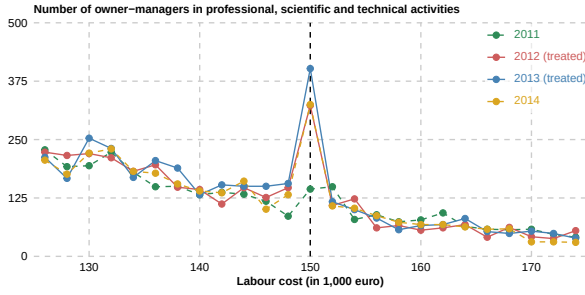
Figure 3.5: Number of owner-managers across the labour cost distribution



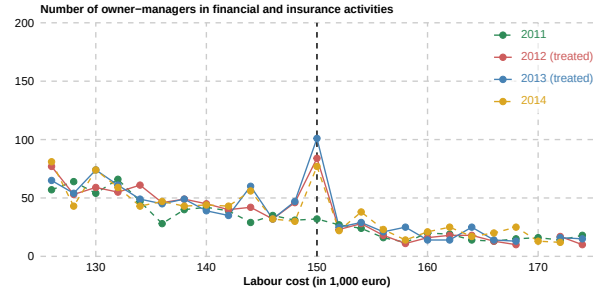
Note: This figure groups owner-managers into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure 3.6: Number of owner-managers in different industries

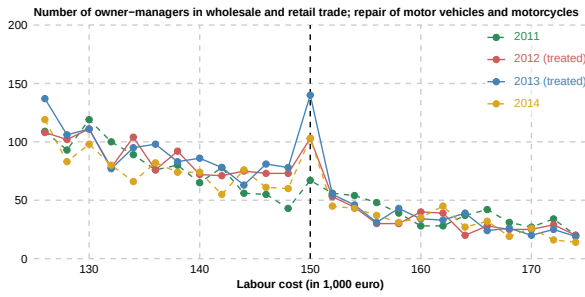
(a) Professional, scientific and technical activities



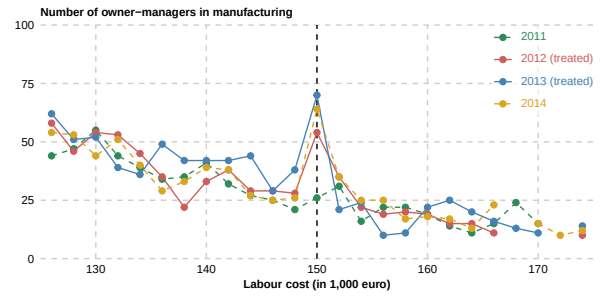
(b) Financial and insurance activities



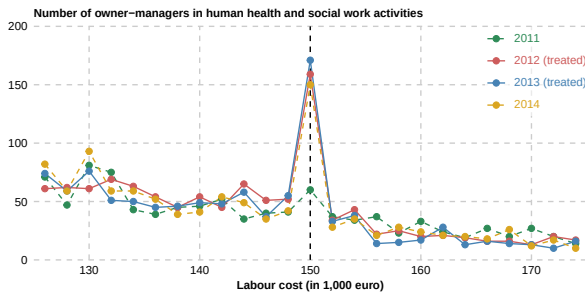
(c) Wholesale and retail trade



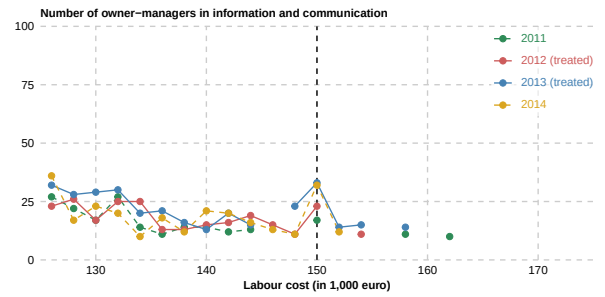
(d) Manufacturing



(e) Human health and social work activities

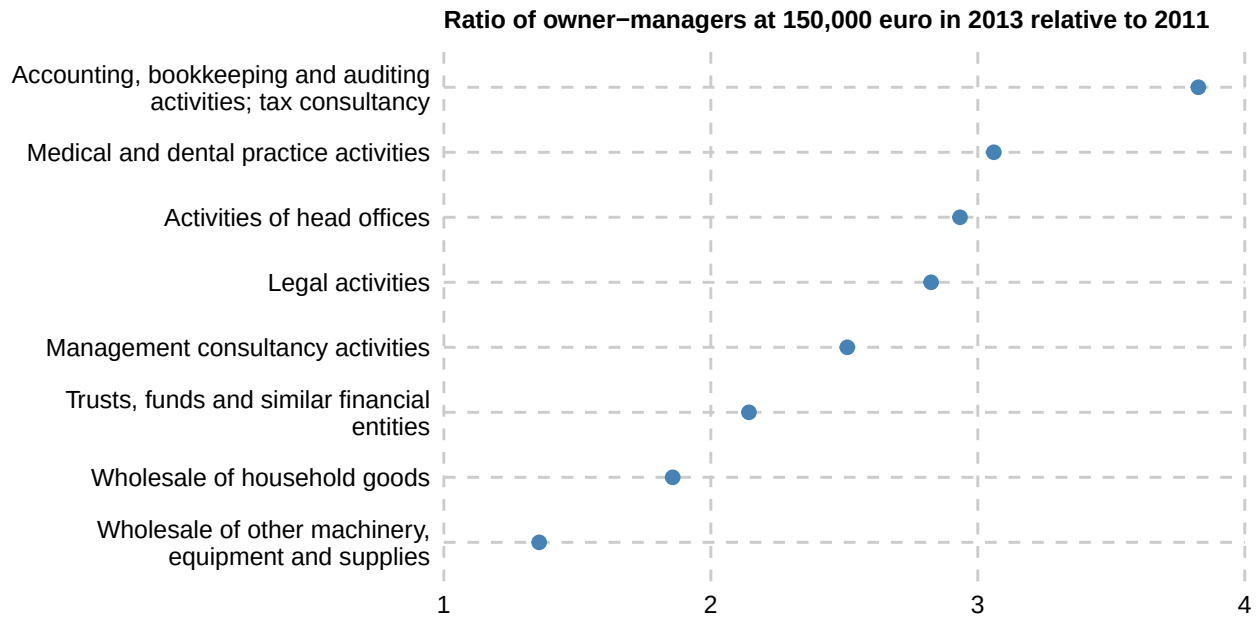


(f) Information and communication



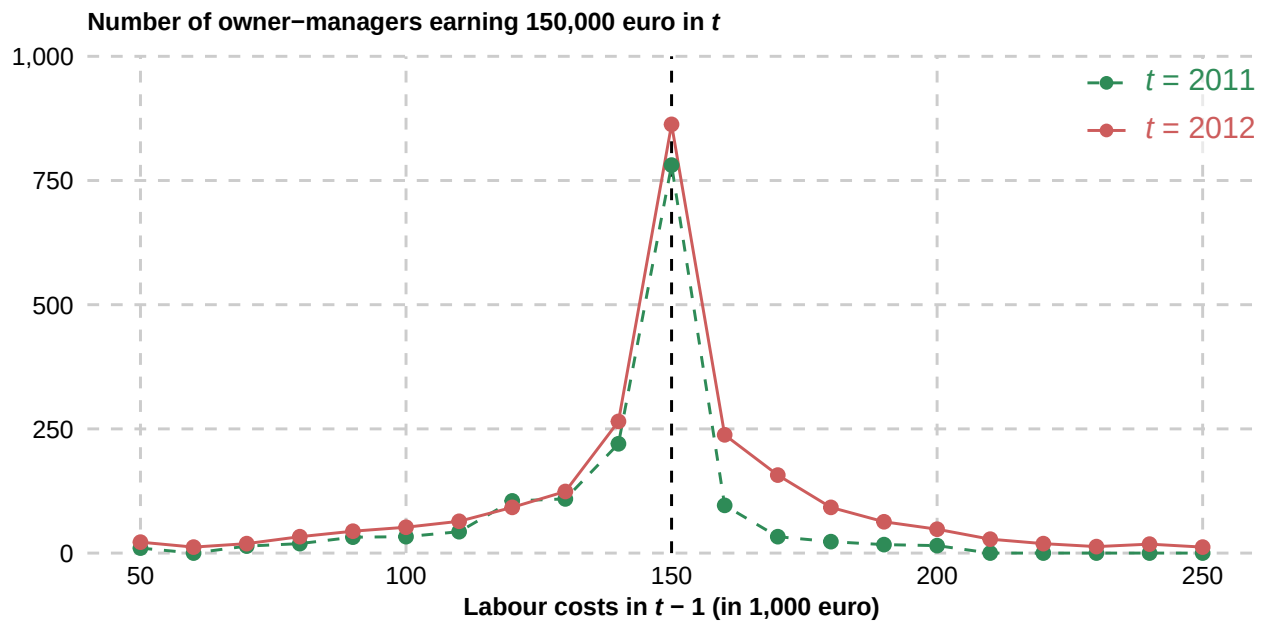
Note: This figure groups owner-managers into €2,000 bins of labour costs and plots the bin counts for each year for different industries defined at the ISIC 1-digit level in 2011–2014. For reasons of statistical disclosure, bin counts below 10 are omitted from these figures.

Figure 3.7: Ratio of the number of owner-managers in 2013 relative to 2011



Note: For each three-digit industry, the figure plots the number of owner-managers at €150,000 in 2013 divided by the corresponding 2011 count. A value of 1 indicates no change.

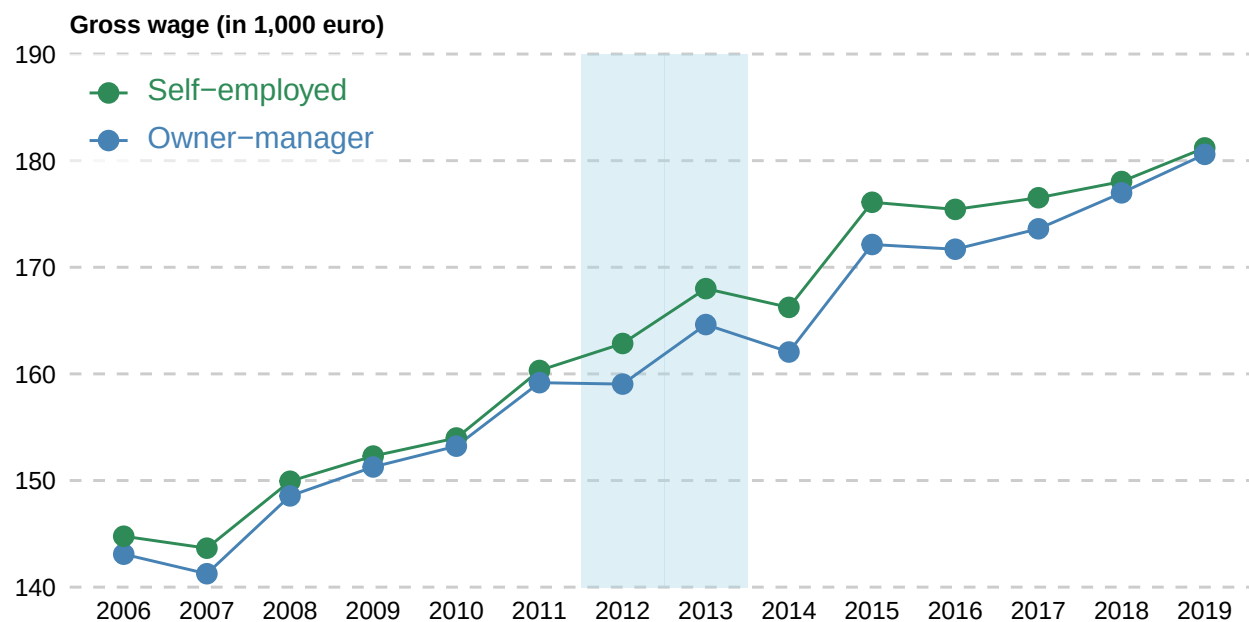
Figure 3.8: Number of owner-managers earning €150,000 in t across the $t-1$ labour cost distribution



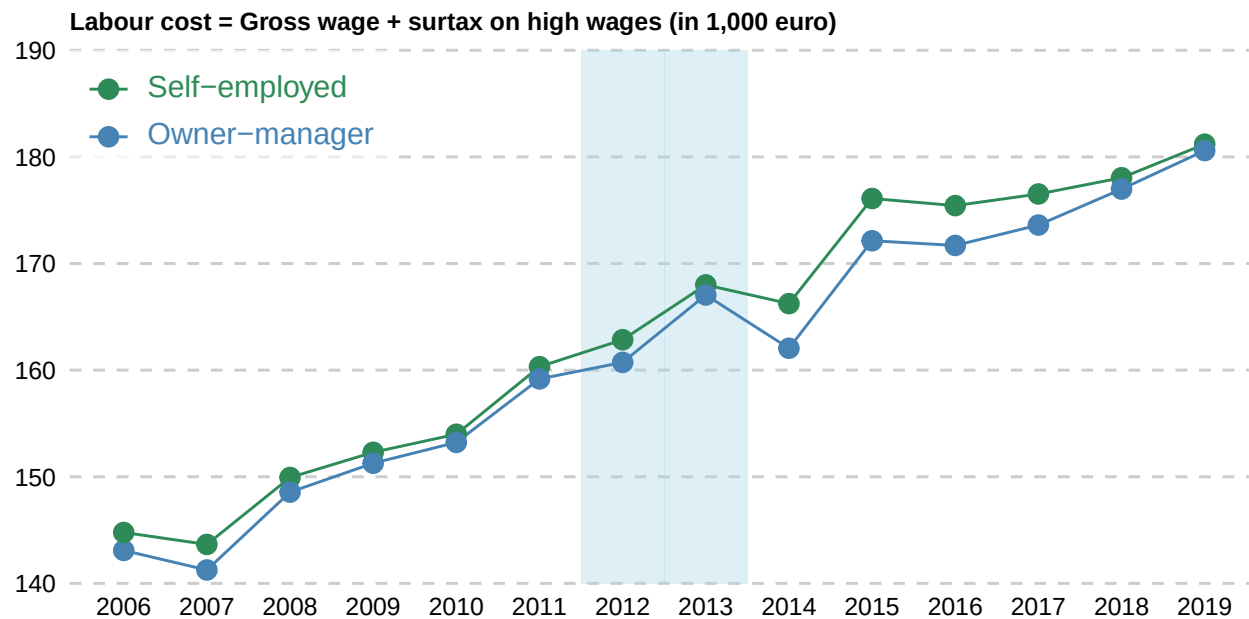
Note: For all owner-managers at €150,000 in year t , the figure shows their position in the prior-year ($t-1$) labour cost distribution. Bins are €10,000.

Figure 3.9: Average gross wage and labour costs for the top 0.5 per cent of owner-managers and of the self-employed

(a) Gross wage

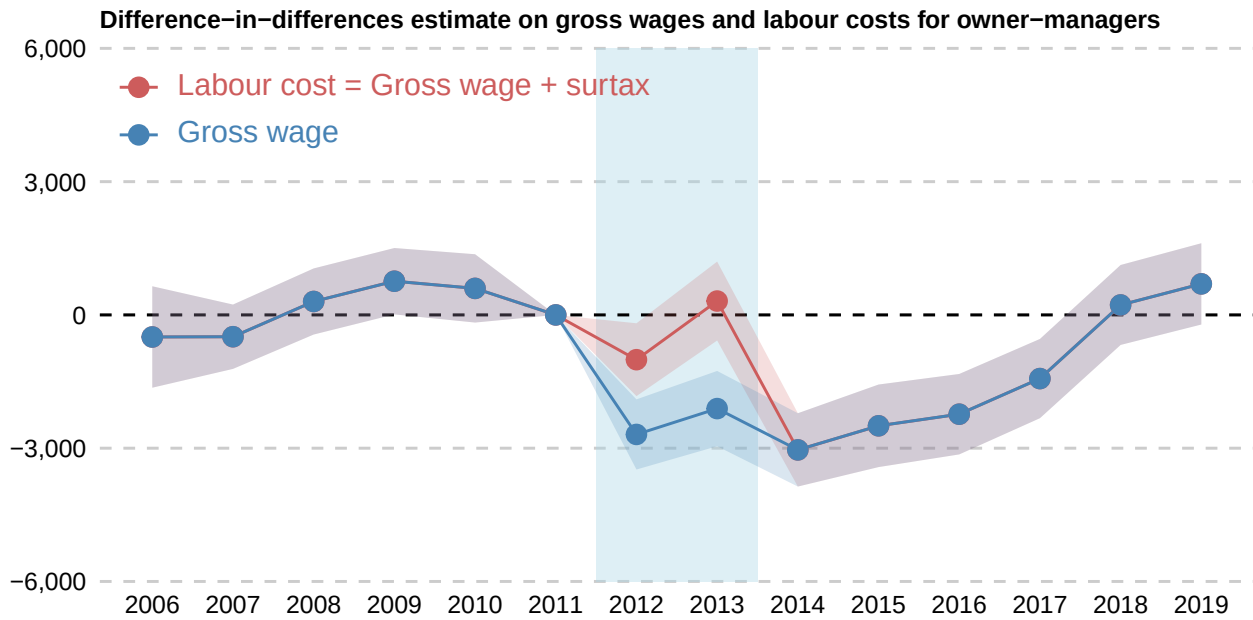


(b) Labour cost

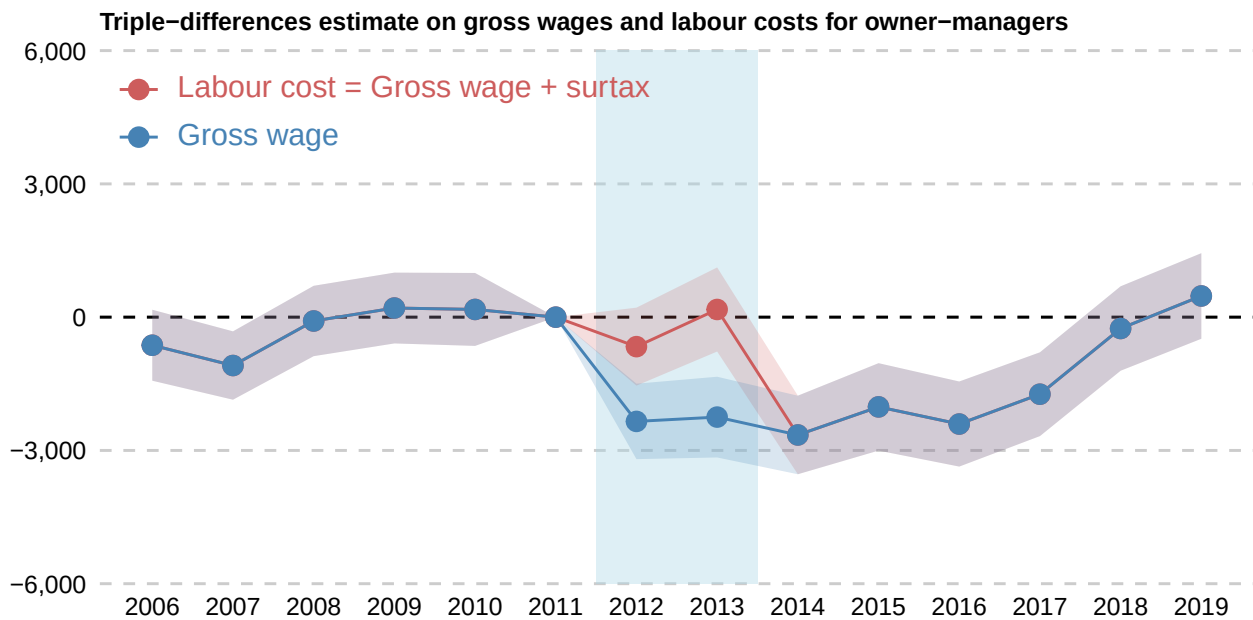


Note: This figure separately ranks owner-managers and self-employed individuals by labour costs and computes average wages and labour costs for the top 0.5 per cent of each group. Labour costs are defined as the sum of gross wages and the surtax on high wages.

Figure 3.10: Estimates on gross wages and labour costs of owner-managers
(a) Difference-in-differences

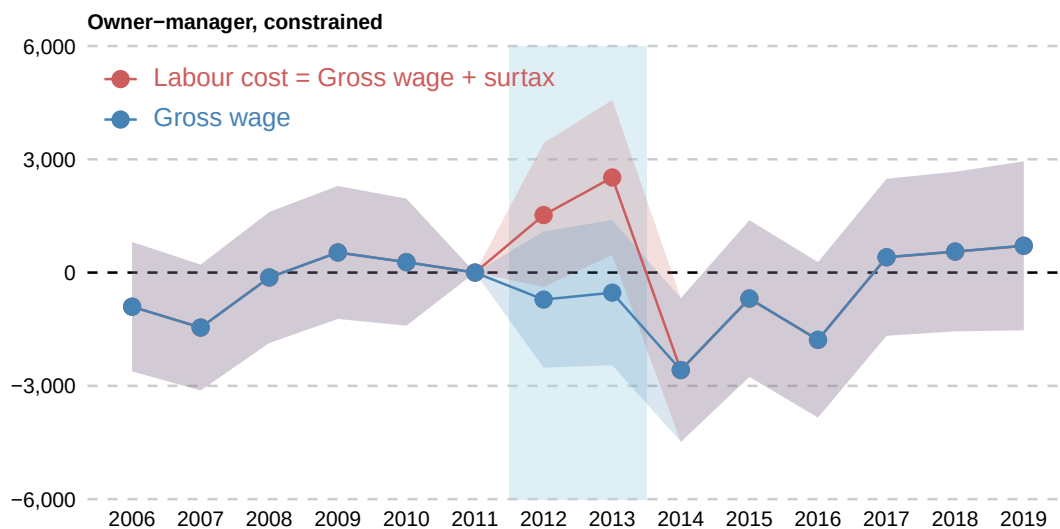


(b) Triple-differences



Note: These panels plot event-study coefficients for owner-managers relative to a comparison group using difference-in-differences (top) and triple-differences (bottom). Coefficients are normalised to zero in 2011. Shaded ribbons denote 95 per cent confidence intervals. The specifications include industry controls; labour cost is defined as gross wage plus the surtax.

Figure 3.11: Triple-differences estimates on gross wages and labour costs of constrained owner-managers



Note: This figure plots event-study coefficients for constrained owner-managers relative to a comparison group using triple-differences. Coefficients are normalised to zero in 2011. Shaded ribbons denote 95 per cent confidence intervals. The specifications include industry controls; labour cost is defined as gross wage plus the surtax.

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Appendix A

Appendix to Chapter 1

A Construction of the hidden wealth variable

This appendix describes the construction of the hidden wealth variable in the amnesty data presented in section 1.3. The dataset contains information on tax evaders who voluntarily entered the program. They would then declare the wealth they had hidden from the tax administration, and pay taxes plus an additional penalty. The penalty rate is applied to the amount of taxes evaded and depends on the date of participation to the program (the schedule is presented in Table 1.2).

We have the following information regarding wealth hidden abroad. First, we have the amount of hidden wealth that is reported by the amnesty participant when they first register for the amnesty program. Second, we have the different components of the amount that is ultimately claimed by the tax administration, i.e. taxes, interest on those taxes, and a penalty. We can use the tax code to approximate the amount of hidden wealth using the tax component.

The first measure may not be entirely accurate as it is self-reported and there is no explicit verification of this amount. Instead, the tax authority requests extensive documentation from the amnesty participant, which is used to establish their tax liability. We observe a large number of missing or unrealistically low amounts, suggesting that participants may not report their hidden wealth accurately - possibly because they may not know the exact amount when they first enter the amnesty. The second measure is based on the amount of evaded taxes ultimately established by the tax administration. To convert this amount into the stock of hidden wealth, we need to make assumptions on the number of years covered by the taxes. In most cases, taxes can be recovered up to 12 years before the participation to the amnesty. Households can legally amend their tax returns up to two years after filing, which means that taxes would cover at most 10 years.¹ We then impute hidden wealth by dividing the amount of taxes recovered by 10 and then by 1.2%, the tax rate relevant for most cases of hidden wealth. In a small number of cases, people enter the amnesty

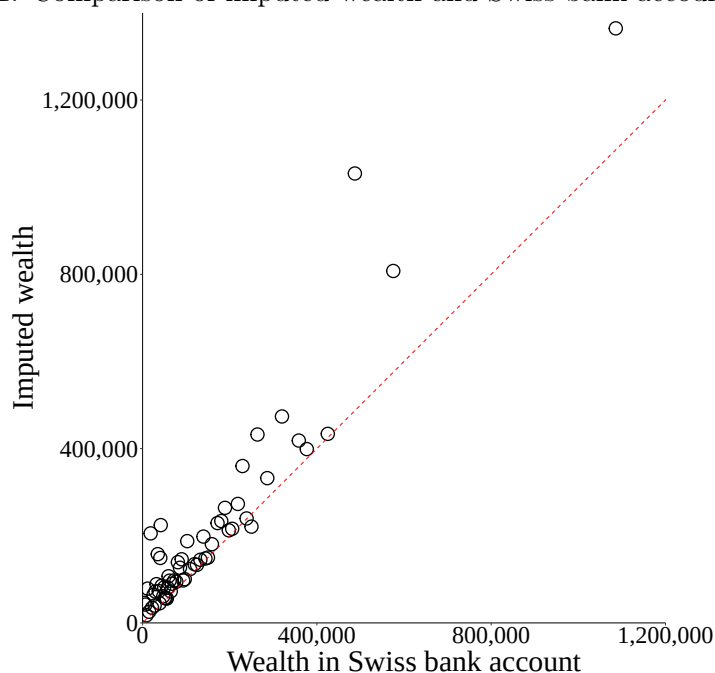
¹Based on discussions with the tax administration, the actual average number of years lies slightly, but not much below 10. For this reason, our imputed value can be interpreted as a lower-bound.

when receiving hidden wealth as part of an inheritance. In those cases, no wealth tax is due, but we can use the inheritance tax to approximate the amount of hidden wealth. The highest tax rate on inheritances received by children is 20% and so we approximate hidden wealth by multiplying inheritance taxes paid by a factor of 5.

All the results of the paper are computed based on this imputed amount of hidden wealth. This choice is driven by two main reasons. First, we consider the imputed amount as more reliable as it is based on taxes actually paid as opposed to a self-reported amount. Second, the declared wealth variable is only available from 2011 onwards, while we can use the imputation method for all years.

We can test our imputation method using our data from the Swiss information request. These data contain both individuals' tax liability, which is the key input for our imputation procedure, as well as their Swiss bank account balances. In Figure A.1 we compare individuals' account balances to imputed values. Due to output restrictions, we are required to average variables across groups of 10 individuals. Overall, our imputed values lie close to the true account balances. If anything, our imputed values are slightly higher than the corresponding account balances. This can be explained by the fact that some individuals may own offshore accounts at banks not covered by the information request or in countries other than Switzerland. In these cases, their offshore wealth is higher than their Swiss bank account balance and we would expect the imputed value to reflect this.

Figure A.1: Comparison of imputed wealth and Swiss bank account balances



Note: This figure compares bank account balances from the Swiss information request with imputed wealth based on taxes paid. The red dotted line denotes the 45 degree line.

As a further robustness test, Figures A.2 and A.3 present sensitivity analyses for the two possible measures of hidden wealth: declared amnesty wealth and amnesty wealth imputed on the basis

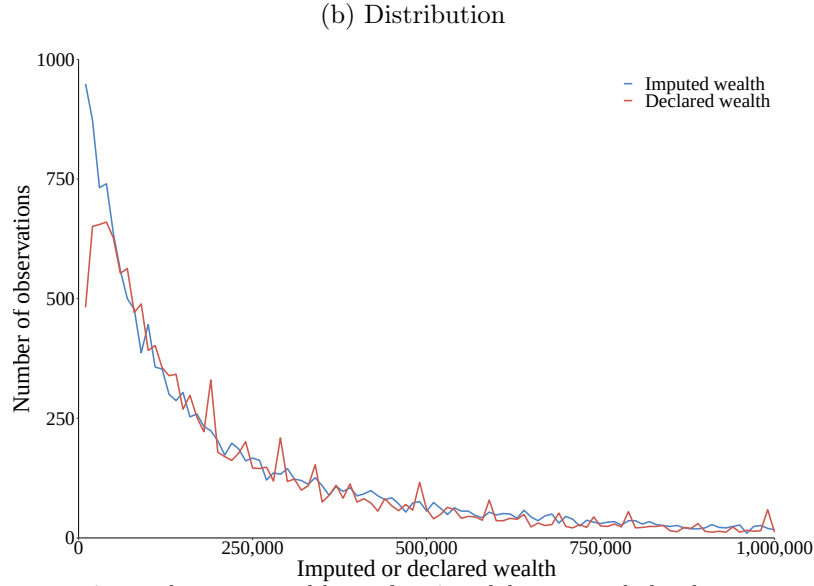
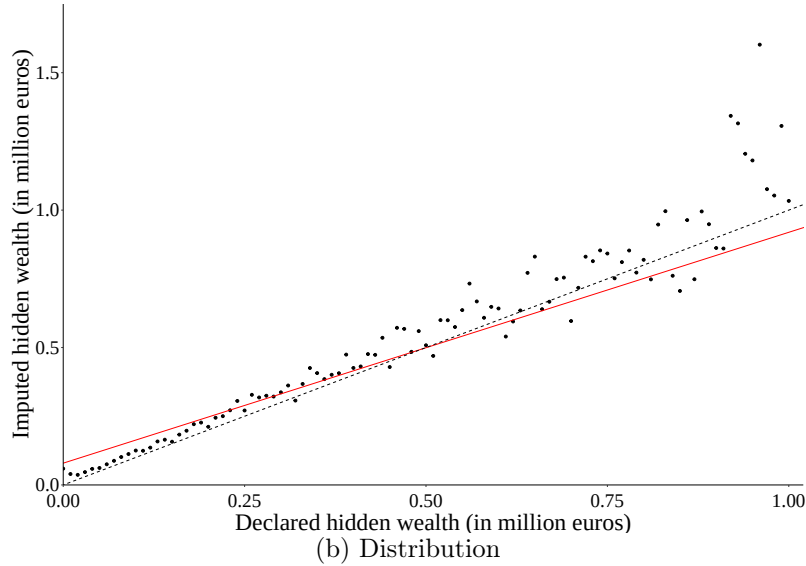
of evaded taxes. As these measures are subject to very different sources of measurement error, consistency between the two variables is somehow reassuring, as it shows that the measurement errors do not induce major systematic biases.

Panel A of Figure A.2 presents the imputed wealth as a function of the declared wealth, averaged across wealth bins, along with the 45 degree line and a simple OLS estimation of imputed wealth over declared wealth. The relationship between the two variables is strong (coefficient of 0.84 for the regression). The imputed value is higher for higher level of declared wealth. This may be due to the fact that large hidden wealth portfolios are typically more complex, which makes it harder to report their value accurately.

Panel B of Figure A.2 presents the distribution of imputed and declared amnesty wealth. Both distributions are very similar, except at the bottom of the distribution where there are more observations for the imputed variable.

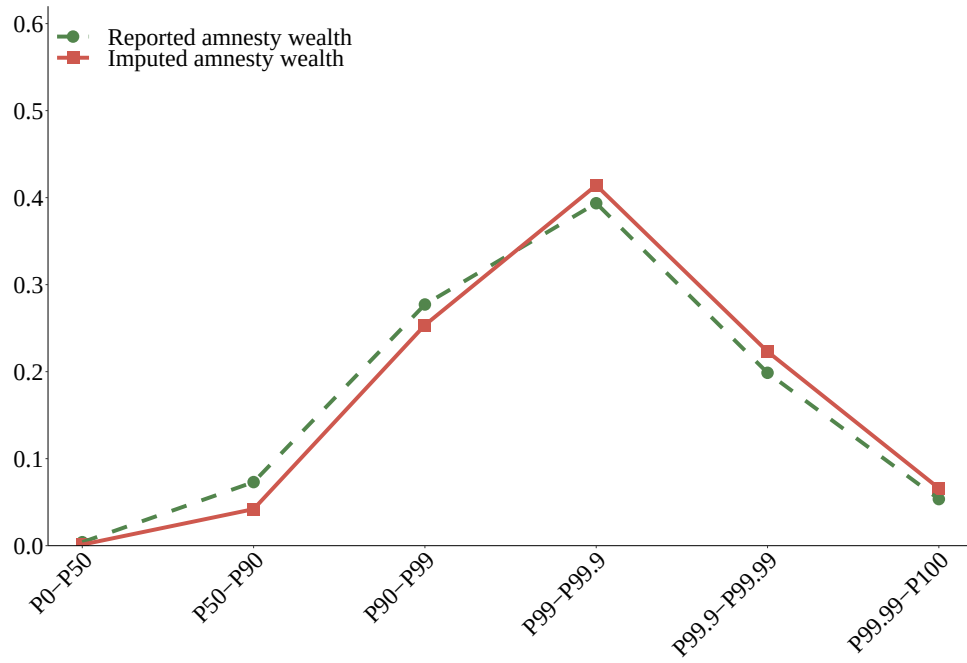
Finally, Figure A.3 presents the distribution of imputed and declared amnesty wealth across wealth groups. Reassuringly, hidden wealth shares are very similar for the two definitions.

Figure A.2: Comparison of declared and imputed amnesty wealth
(a) Average by wealth bins



Note: Panel (a) presents imputed amnesty wealth as a function of the average declared amnesty wealth for different wealth bins. The black dotted line presents the 45 degree line and the red line present the results (constant and slope) of a linear regression of imputed amnesty wealth on declared amnesty wealth. Panel (b) presents the distribution of imputed amnesty wealth and declared amnesty wealth.

Figure A.3: Distribution of self-reported and imputed amnesty wealth

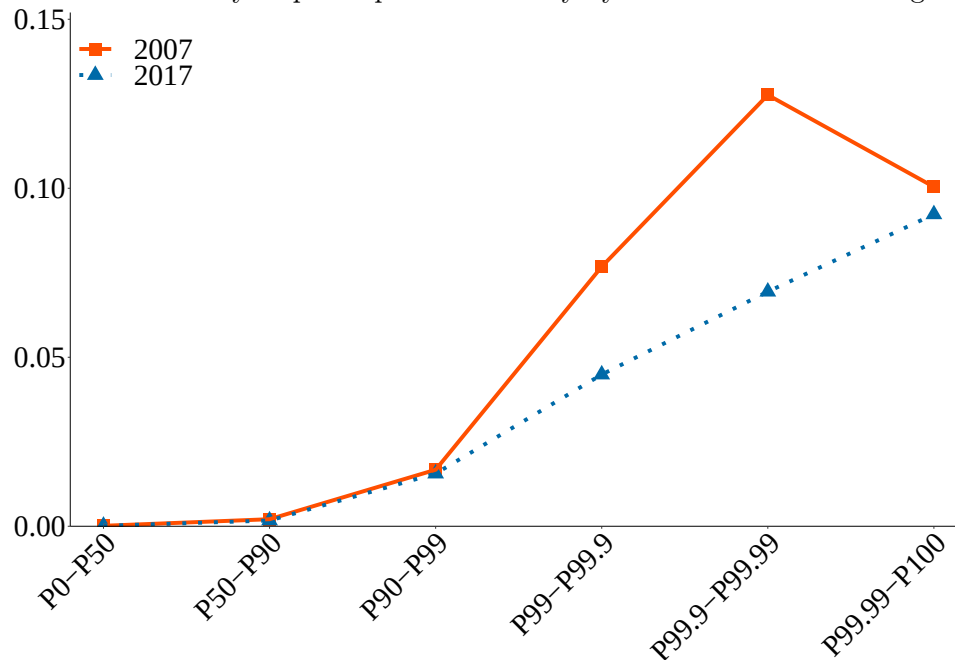


Note: This figure compute the wealth shares of hidden wealth by wealth group (see section 1.4 for details) for the imputed and declared amount of hidden wealth.

B Results for 2007 and 2017

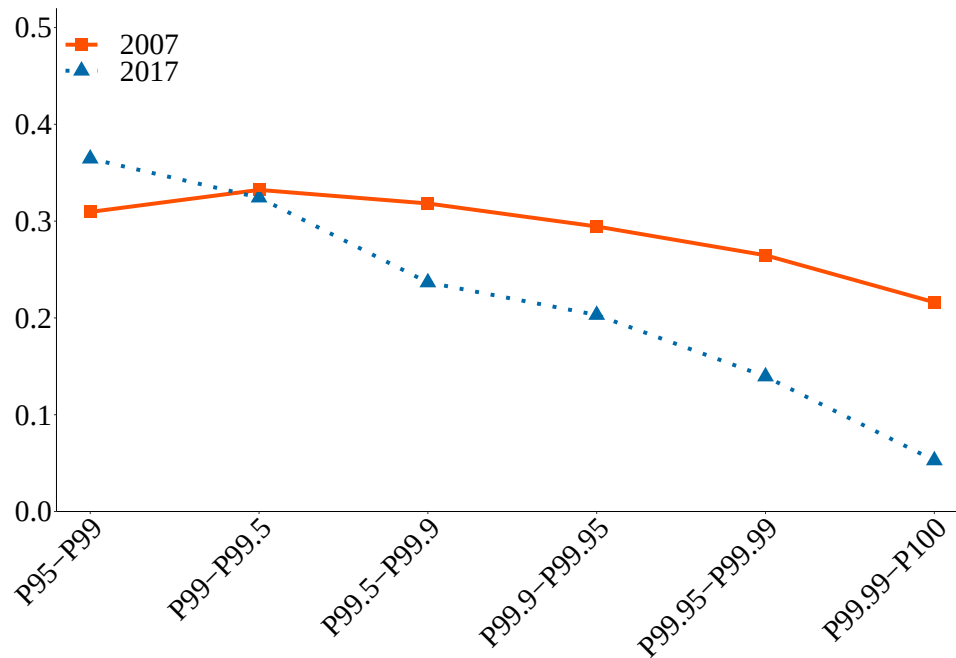
In our baseline analysis, we rank households according to their reported wealth in 2007 to which we add the discounted value of hidden wealth they declare in later years. Here, we show how the basic patterns of evasion change when instead we use households' reported wealth in 2017. Hidden wealth disclosed before 2017 should be part of reported wealth in 2017, though the value may have changed since it was uncovered. Furthermore, previously evading households may have transferred some of their wealth to others like their children. Some of these households may have died or emigrated since disclosing their hidden wealth so that we are not able to link them to data on reported wealth in 2017. All of this may explain why evading households look slightly less wealthy when ranking according to their 2017 wealth compared to the 2007 ranking. In any case, the finding that most evasion is done by the “merely rich” instead of the “super rich” appears robust to changing the base year.

Figure B.1: Probability to participate in amnesty by 2007 and 2017 wealth groups



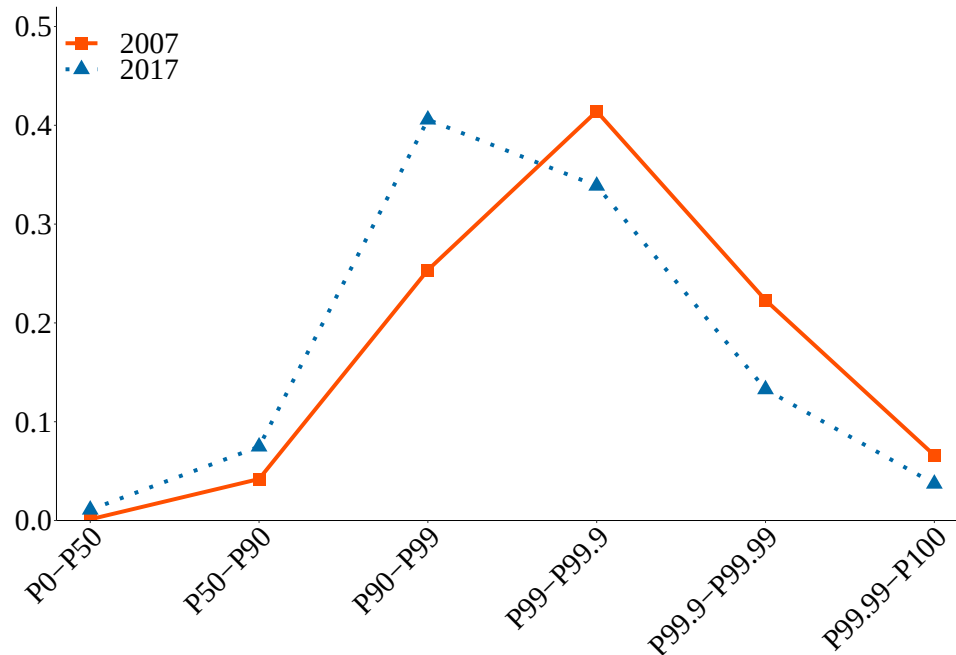
Note: This figure shows the fraction of households in each wealth group who participated in the tax amnesty over the period 2008 to 2018 (extensive margin). Wealth groups are defined in terms of 2007 and 2017 wealth.

Figure B.2: Amnesty wealth as a share of total wealth by 2007 and 2017 wealth groups



Note: This figure shows wealth declared through the amnesty as a share of total wealth, including amnesty wealth, conditional on amnesty participation (intensive margin). Wealth groups are defined in terms of 2007 and 2017 wealth.

Figure B.3: Share of amnesty wealth by 2007 and 2017 wealth groups



Note: This figure shows the share of amnesty wealth held by each of the wealth groups. Wealth groups are defined in terms of 2007 and 2017 wealth.

C Advertisements by foreign banks

In the 1980s and 1990s, it was not uncommon for foreign banks to advertise in Dutch national and regional newspapers.² These advertisements can be found today through the Dutch newspaper archive www.delpher.nl. To take one bank, *Deutsche Bank*, and one regional newspaper, *Limburgsch Dagblad*, as an example: the first advertisement appears on 29 May 1982 and is aimed at cross-border workers. In the subsequent decade, *Deutsche Bank* placed 72 advertisements in this one regional newspaper, emphasising the bank's close proximity to the Netherlands and assuring that their employees speak Dutch. From 1988 onwards, the advertisements explicitly state that investments at the bank are exempt from withholding taxes.

²The idea of including this section was inspired by Ogle (2020).

Figure C.1: A sample of advertisements by Deutsche Bank in the newspaper *Limburgsch Dagblad*

”
Werkt U in Duitsland?
”

**U spaart natuurlijk
vermogenswerkzaam.
Wij betalen
een interessante premie.***

* op dit moment: 5% interest per jaar
* een eenmalige premie van 14% uw spaarbijdrage
aan het eind van de looptijd

Deutsche Bank 

(a) Limburgsch Dagblad, 29 May 1982

Rente voor onze spaarbrieven

6,25% looptijd 4 jaar
netto uitkering

Wij bieden U ook andere attractieve spaarvormen.
Wilt U zich informeren?
Kom dan even langs of vraag inlichtingen via telefoon.
Wij spreken Nederlands, dus er zijn geen taalproblemen.

 **DEUTSCHE BANK**

Aachen, Friedrich-Wilhelm-Platz 15, Tel. 09-49-241/466-1 · Alsdorf, Rathausstr. 4, Tel. 09-49-240/21005 · Eschweiler, Englerthstr. 12, Tel. 09-49-2403/4061-63 · Herzogenrath, Kleikstr. 1, Tel. 09-49-2406/3067 · Hückelhoven, Parkhofstr. 111, Tel. 09-49-2433/4031 · Jülich, Kölnstr. 3, Tel. 09-49-2461/53065 · Merkslein, Kirchrather Str. 150, Tel. 09-49-2406/6091 · Stolberg, Rathausstr. 16a, Tel. 09-49-2402/23091 · Übach-Palenberg, Talstr. 2, Tel. 09-49-2451/4051 · Würselen, Kaiserstr. 97, Tel. 09-49-2405/21058 · Heinsberg, Hochstr. 129, Tel. 09-49-2452/21777

(b) Limburgsch Dagblad, 12 December 1984

**Uw vermogensbelegging kent bij de
Deutsche Bank geen grenzen!**

Bijzonder aantrekkelijke beleggingsmogelijkheden
garanderen U een hoge rente, b.v.:

- Obligaties in DM en andere valuta - nu met een
rente van 6,25 % - 13 % per jaar.

Bronbelastingvrij

Een bezoek aan ons is lonend!
Natuurlijk adviseren wij U graag over andere
kapitaalbeleggingsmogelijkheden.

Vanaf 1.7.1988 hogere rente

Komt U even bij ons langs of belt ons op.
Wij spreken natuurlijk Nederlands.

 **Deutsche Bank**

Met meer dan 1.200 filialen in de Bundesrepubliek.
Bij de grens vindt U ons in de volgende steden:

Filiaal:
Aachen, Friedrich-Wilhelmplatz
(am Eisenbrunnen), Tel. 09-49-241-466-1
Bijkantoor:
Brand, Freunder Landstr. 6, Tel. 09-49-241/522081
Burtscheid, Kapellenstr. 5, Tel. 09-49-241/60954
Oppenhoffallee, Oppenhoffallee 2, Tel. 09-49-241/504041
Schönforst, Triener Str. 323-329, Tel. 09-49-241/520021
Techn. Hochschule, Pontwall 2, Tel. 09-49-241/22736
Alsdorf, Rathausstr. 4, Tel. 09-49-2404/21005
Eschweiler, Englerthstr. 12, Tel. 09-49-2403/4061-63
Hückelhoven, Parkhofstr. 111, Tel. 09-49-2433/4031
Jülich, Kölnstr. 3, Tel. 09-49-2461/53065
Merkslein, Kirchrather Str. 150, Tel. 09-49-2406/6091
Stolberg, Rathausstr. 16a, Tel. 09-49-2402/23091
Übach-Palenberg, Talstr. 2, Tel. 09-49-2451/4051
Würselen, Kaiserstr. 97, Tel. 09-49-2405/21058
Heinsberg, Hochstr. 129, Tel. 09-49-2452/21777

(c) Limburgsch Dagblad, 13 July 1988

**Leg Uzelf bij geldbeleggingen
geen beperkingen op.**

U wilt een groter bedrag voor niet al te lange tijd tegen voordelige
rente beleggen? Maakt dan gebruik van ons aantrekkelijk aanbod
met vaste rente:

- Deutsche Bank-sparen met vaste rente voor 6 tot 36 maanden
(vanaf DM 20.000).
- Deutsche Bank-spaarbrieven met een looptijd van 4 tot 10 jaar
(vanaf DM 10.000).

U kunt ons bezoeken of bellen. Wij adviseren U gaarne.
De weg naar de Deutsche Bank loont de moeite.

Wij zijn heel dichtbij.

**Advies op afspraak ook
buiten openingstijden.**

BRONBELASTINGVRIJ

Bij de grens vindt U ons in de volgende steden:

Aachen, Friedrich-Wilhelmplatz
(am Eisenbrunnen),
Telefoon 09-49-241-466-1

Filiaal:
Herzogenrath, Kleikstrasse 1,
Telefoon 09-49-2406/3067
Hückelhoven, Parkhofstrasse 111,
Telefoon 09-49-2433/4031
Jülich, Kölnstrasse 3,
Telefoon 09-49-2461/53065
Merkslein, Kirchrather Strasse 150,
Telefoon 09-49-2406/6091
Stolberg, Rathausstrasse 16a,
Telefoon 09-49-2402/23091
Übach-Palenberg, Talstrasse 2,
Telefoon 09-49-2451/4051
Würselen, Kaiserstrasse 97,
Telefoon 09-49-2405/21058
Heinsberg, Hochstrasse 129,
Telefoon 09-49-2452/21777

Bijkantoor:
Brand, Freunder Landstrasse 6,
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Burtscheid, Kapellenstrasse 5,
Telefoon 09-49-241/60954
Oppenhoffallee, Oppenhoffallee 2,
Telefoon 09-49-241/504041
Schönforst, Triener Strasse 323-329,
Telefoon 09-49-241/520021
Techn. Hochschule, Pontwall 2,
Telefoon 09-49-241/22736
Alsdorf, Rathausstrasse 4,
Telefoon 09-49-2404/21005
Eschweiler, Englerthstrasse 12,
Telefoon 09-49-2403/4061-63

Deutsche Bank 

(d) Limburgsch Dagblad, 18 April 1992

D Data appendix

The administrative datasets that are used in this paper are maintained by Statistics Netherlands (CBS). Different datasets can be linked through a unique anonymized identifier. Each dataset is accompanied by extensive documentation in Dutch available at <https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/catalogus-microdata>. The key administrative datasets that we rely on are VEHTAB (for wealth), INPATAB (for income), GBAAD-RESOBJECTBUS (for residence), and GBAMIGRATIEBUS (for migration). This appendix provides detailed information on the variables contained in and sources used for these datasets.

VEHTAB This dataset contains information on wealth for all households present in the Netherlands on January 1st of each year. Wealth is observed on January 1st of each year between 2006 and 2020. Wealth consists of financial assets, real estate, business assets, substantial ownerships and other assets minus liabilities. Most data are supplied by the Dutch tax administration. Real estate (including owner-occupied housing) is registered in the national cadaster. Municipalities are tasked with (re-)valuing all real estate annually. These valuations are used for both municipal (property tax) and national taxes (income tax, corporate tax, inheritance tax). Most financial wealth held by households is taxed in Box 3 (see Section 2.1 for a detailed exposition of taxation of income and wealth in the Netherlands). Financial institutions are required to report account balances of bank accounts, equity portfolios, mortgages and other financial instruments to the tax administration. Increasingly, the Dutch tax administration receives information about financial wealth held abroad through the automatic exchange of information. For the self-employed and individuals with substantial ownerships, information on wealth in their businesses is taken from corporate balance sheets constructed for the purposes of the corporate tax (see footnote 13 for an explanation as to why corporate balance sheets are constructed for this purpose). These balance sheets are adjusted by valuing real estate according to the municipal valuation (which is supposed to mirror market prices). Importantly, pension entitlements (funded and unfunded) are not included in this dataset.³

INPATAB This dataset contains information on income, taxes and transfers for all households present in the Netherlands on January 1st of each year. These variables are observed for the years 2011-2020. Most data are supplied by the Dutch tax administration. For this paper, we use the variables taxable income, dividends, imputed rent and mortgage interest to compute each household's tax liability on capital income.⁴

³Further documentation is available in Dutch at <https://www.cbs.nl/-/media/cbs-op-maat/microdatabestanden/documents/2021/51/vehtab.pdf>

⁴Further documentation is available in Dutch at <https://www.cbs.nl/-/media/cbs-op-maat/microdatabestanden/documents/2022/17/inpatab.pdf>

GBAADRESOBJECTBUS This dataset contains the addresses associated with all individuals registered as residents in the Netherlands between 1995 and 2021. The main data sources are the population registry (Basisregistratie Personen) and the address registry (Basisregistraties Adressen en Gebouwen). Each observation corresponds to an individual’s address with start and end date. An individual appears multiple times if they moved within the Netherlands between 1995 and 2021.⁵

GBAMIGRATIEBUS This dataset contains all migratory movements into and out of the Netherlands between 1995 and 2021 as measured by registration in and deregistration from the population register. When immigrating into the Netherlands it is compulsory to register at a municipality and an equivalent deregistration requirement exists in cases of emigration. Each observation corresponds to an individual’s migration spell with start and end date, as well as the country of origin or destination. When a new migratory movement takes place, an end date is added to an observation and a new observation is created.⁶

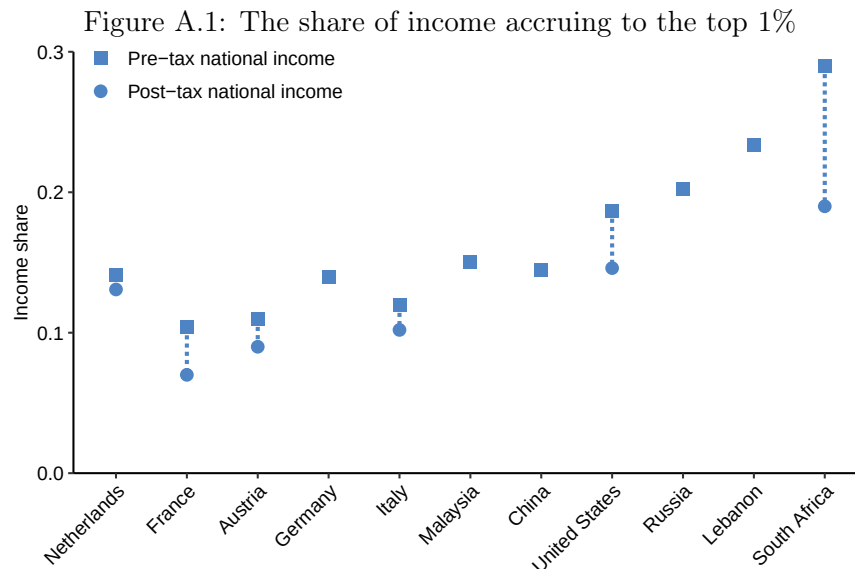
⁵Further documentation is available in Dutch at <https://www.cbs.nl/-/media/cbs-op-maat/microdatabestanden/documents/2022/14/gbaadresobjectbus.pdf>

⁶Further documentation is available in Dutch at <https://www.cbs.nl/-/media/cbs-op-maat/microdatabestanden/documents/2022/14/gbamigratiebus.pdf>

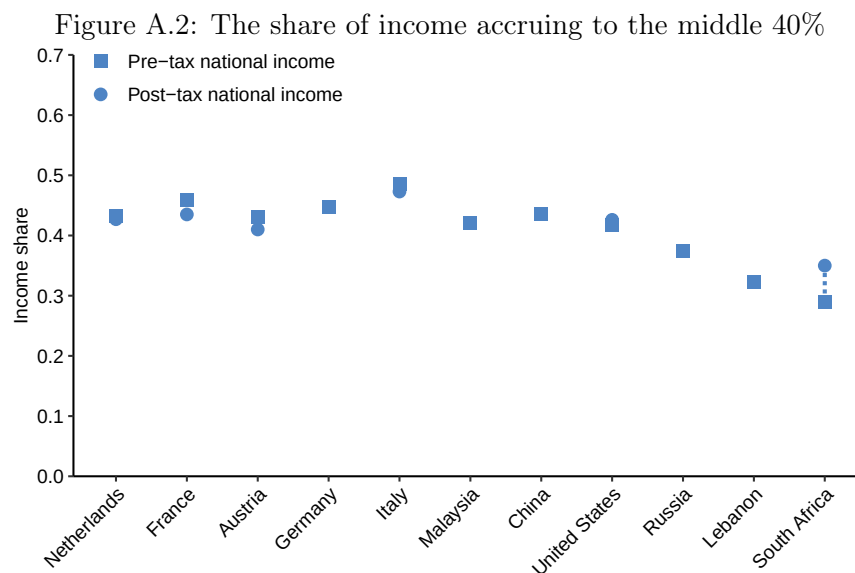
Appendix B

Appendix to Chapter 2

B.1 Appendix Figures and Tables

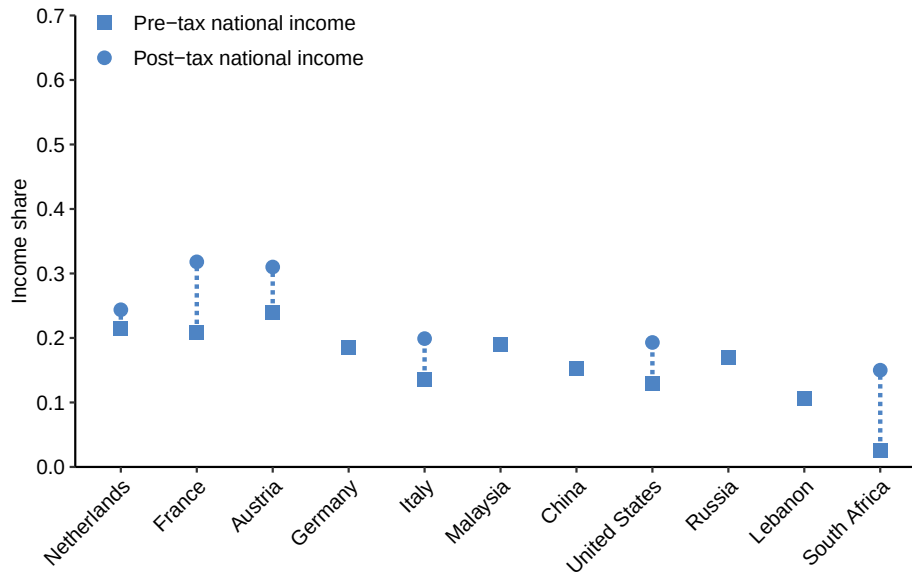


NOTE: This figure shows the share of pre-tax national income and post-tax national income accruing to the 1% income group, for a set of countries for which comparable estimates are available. We use our results for the Netherlands, Bozio et al. (2024) for France, Jestl and List (2022) for Austria, Bach, 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.



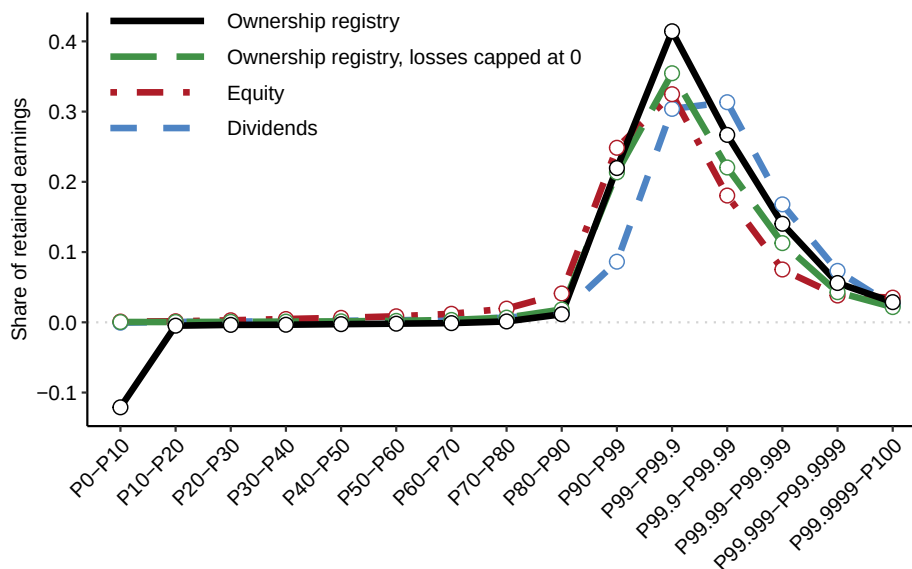
NOTE: This figure shows the share of pre-tax national income and post-tax national income accruing to the P50-P90% income group, for a set of countries for which comparable estimates are available. For the references, see the note to Figure A.1.

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



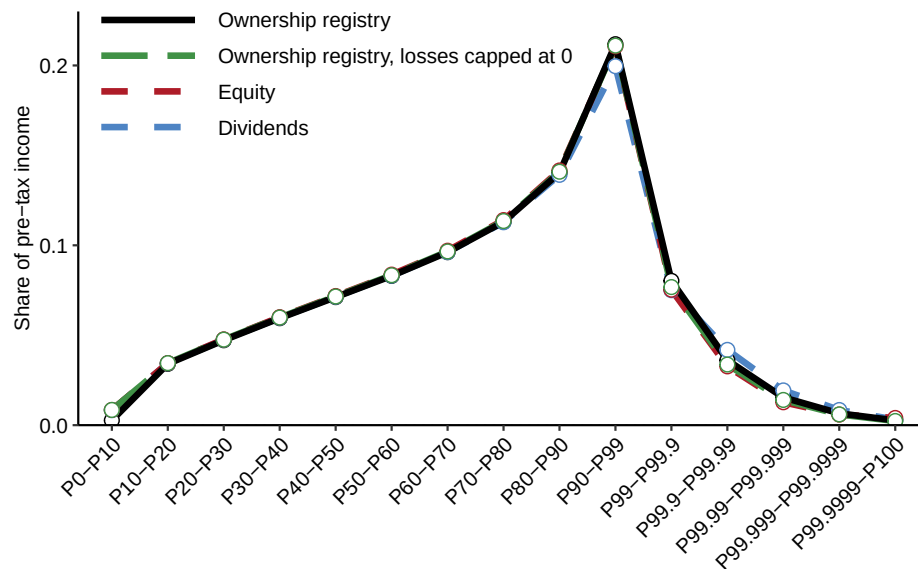
NOTE: This figure shows the share of pre-tax national income and post-tax national income accruing to the bottom 50% income group, for a set of countries for which comparable estimates are available. For the references, see the note to Figure A.1.

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



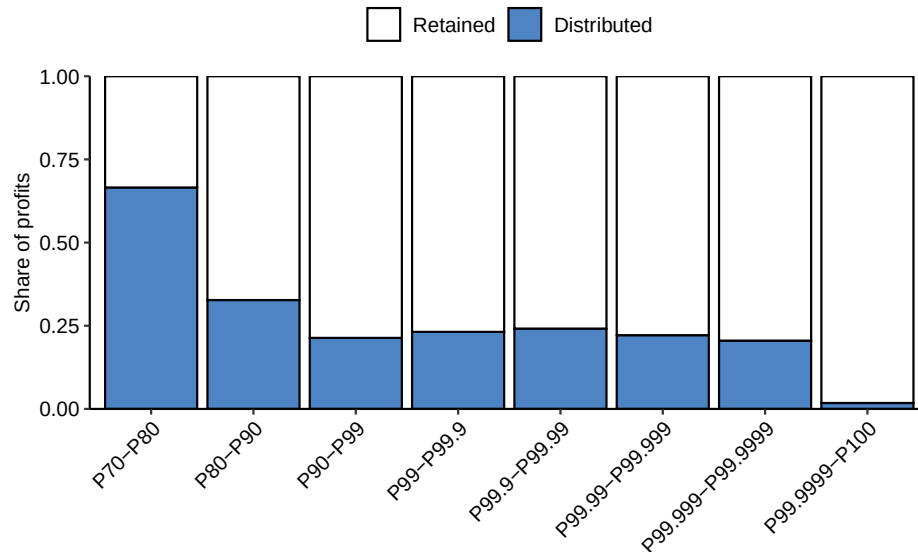
NOTE: This figure presents the distribution of retained earnings. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Specifically, retained earnings are summed by each income group and then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

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

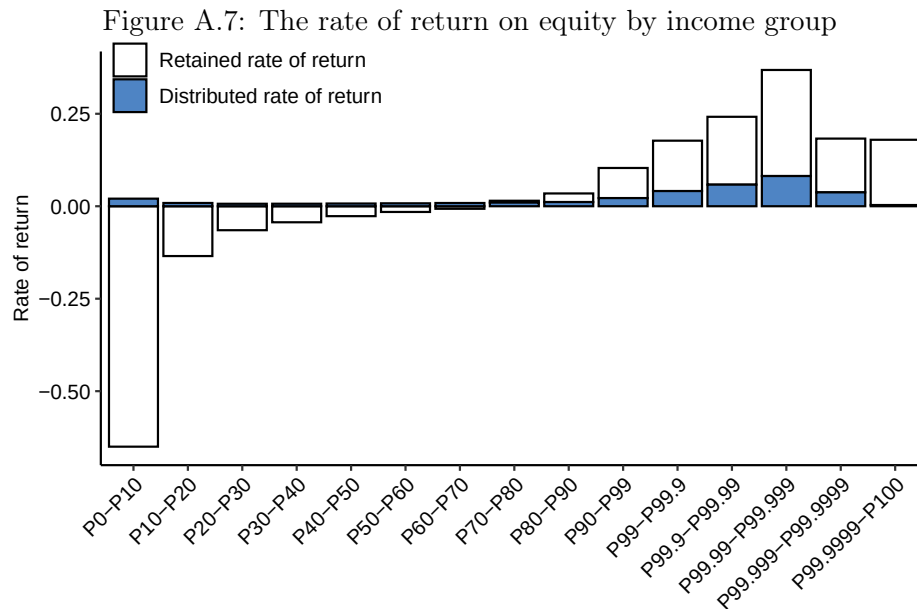


NOTE: This figure shows the share of pre-tax national income accruing to each income group under different assumptions regarding the distribution of retained earnings. The blue line presents our main estimate using ownership registries, and the red and black lines present alternative distribution assumptions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

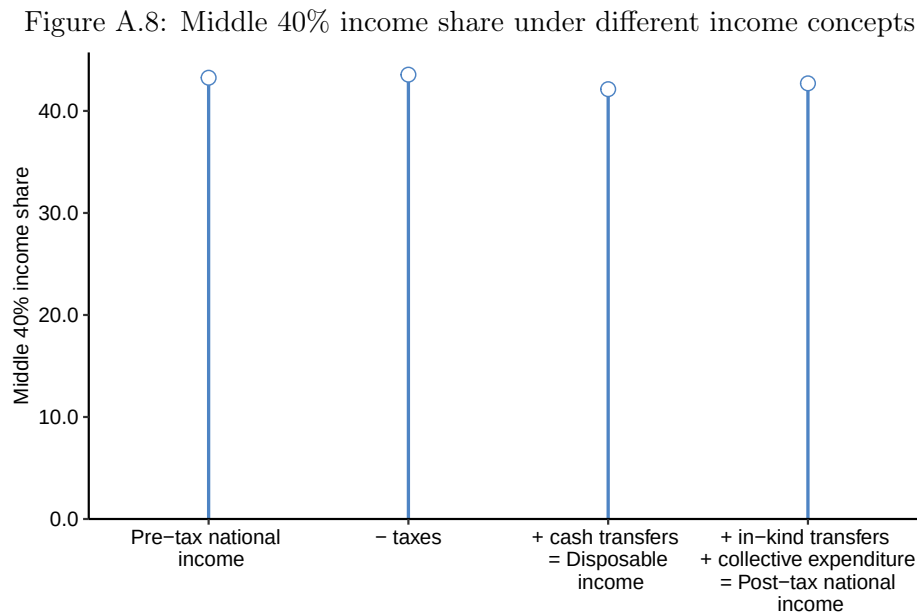
Figure A.6: The share of profits retained and distributed



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.

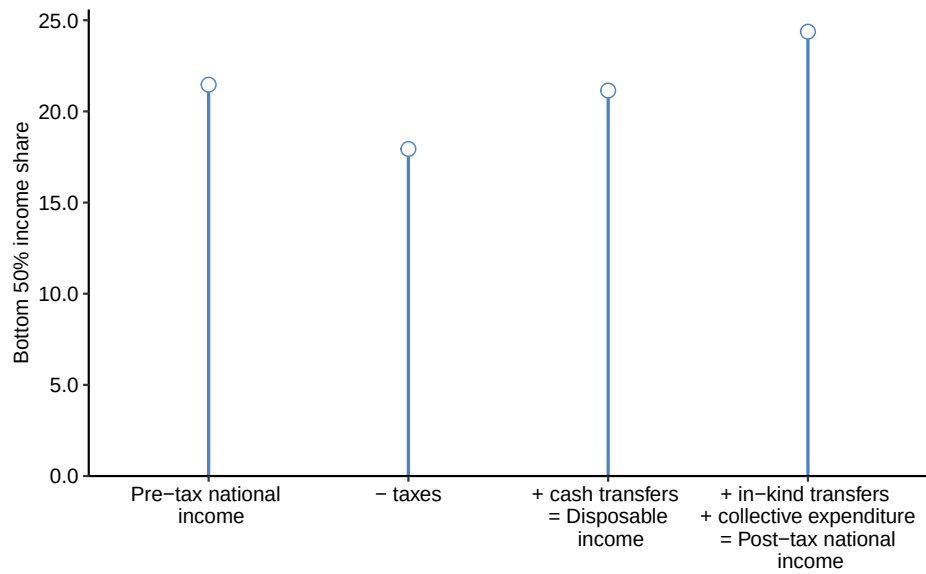


NOTE: This figure shows profits of closely-held corporations expressed as a percentage of corporate equity for different income groups in 2016. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national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



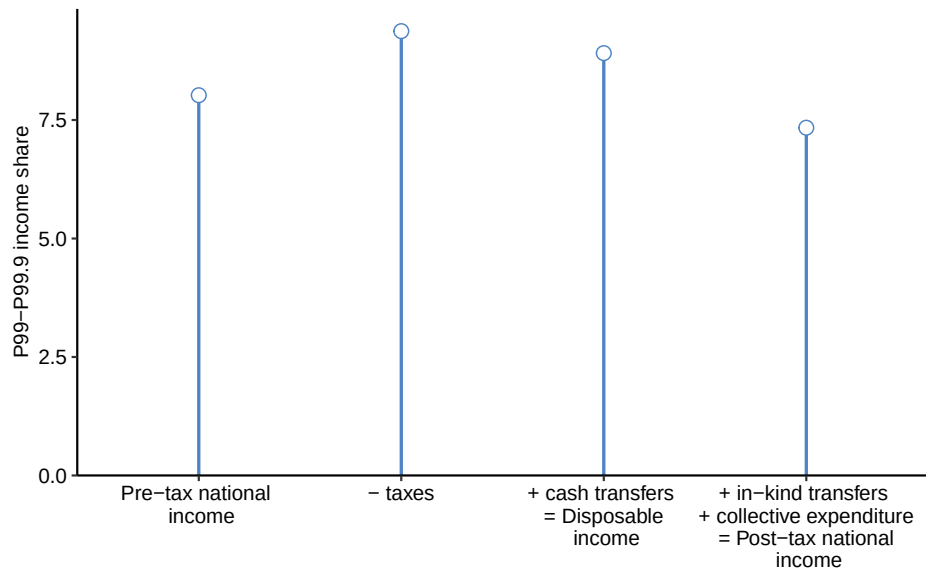
NOTE: This figure presents the middle 40% share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable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

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



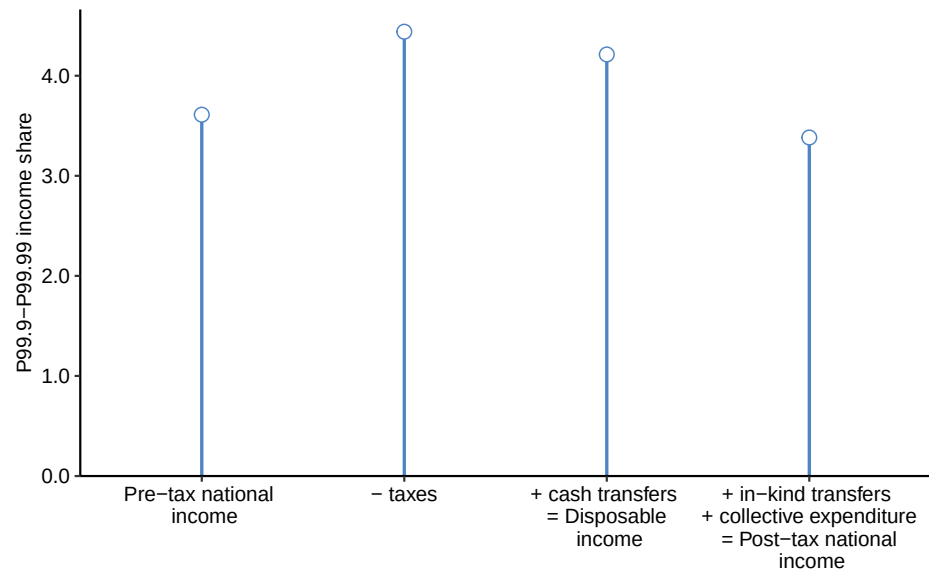
NOTE: This figure presents the bottom 50% share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable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

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



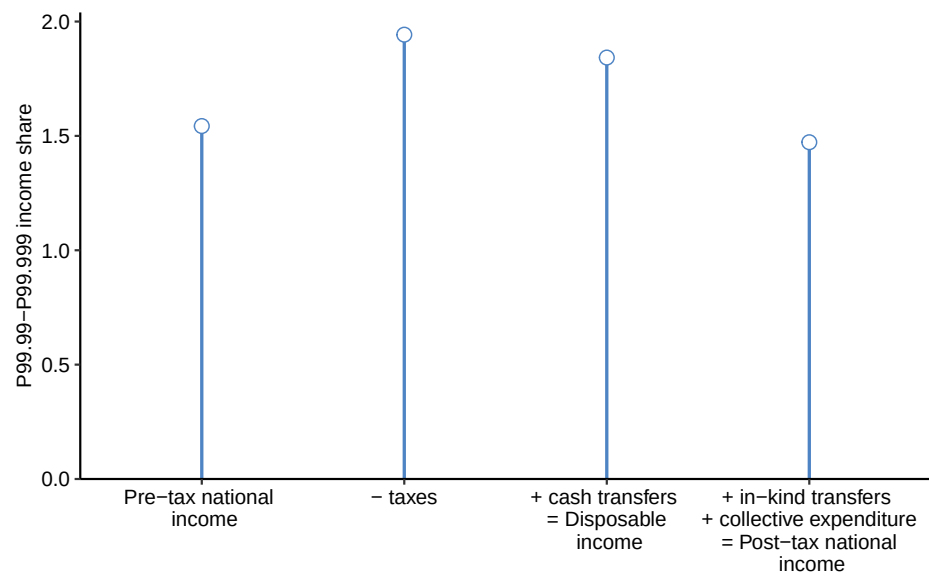
NOTE: This figure presents the P99-P99.9 share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable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

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



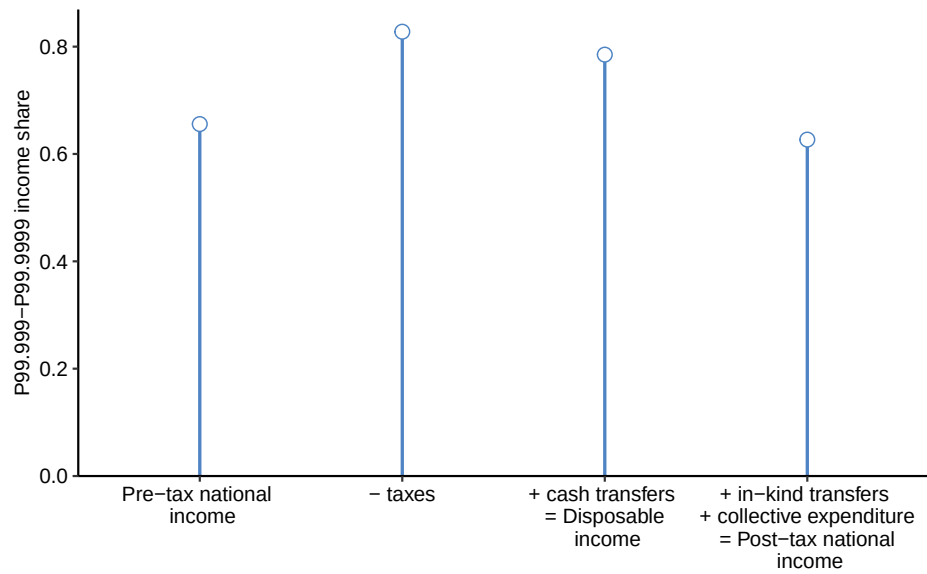
NOTE: This figure presents the P99.9-P99.99 share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable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

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



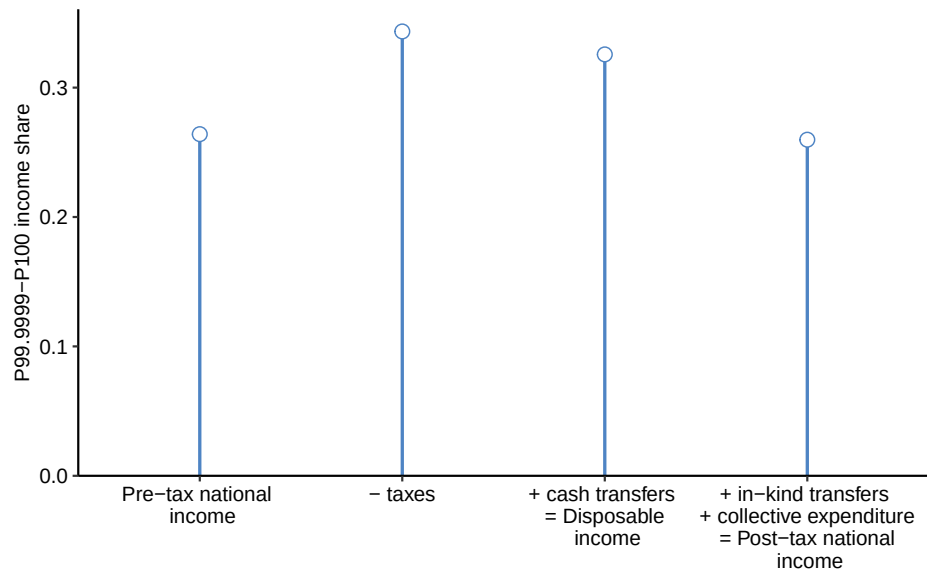
NOTE: This figure presents the P99.99-P99.999 share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable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

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



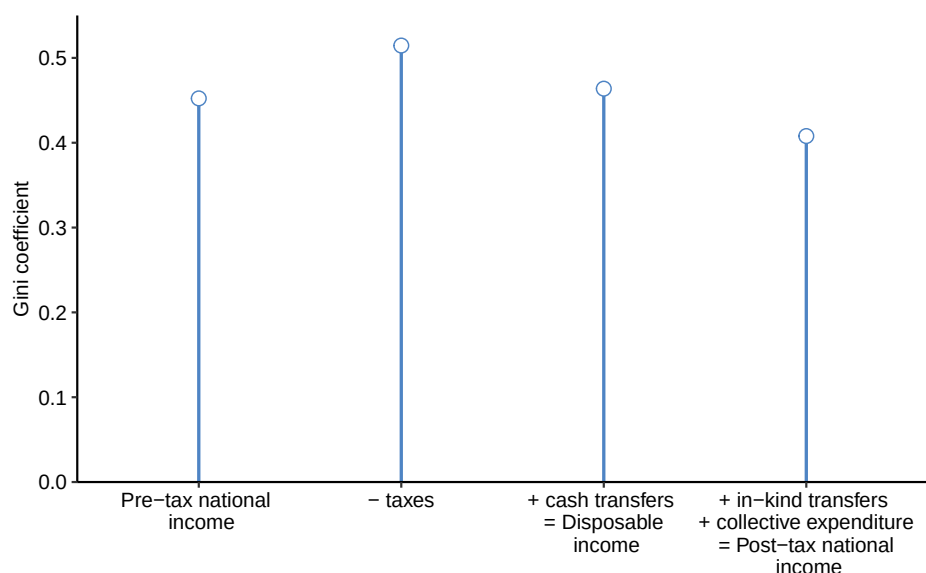
NOTE: This figure presents the P99.999-P99.9999 share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable income, or post-tax national income.

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



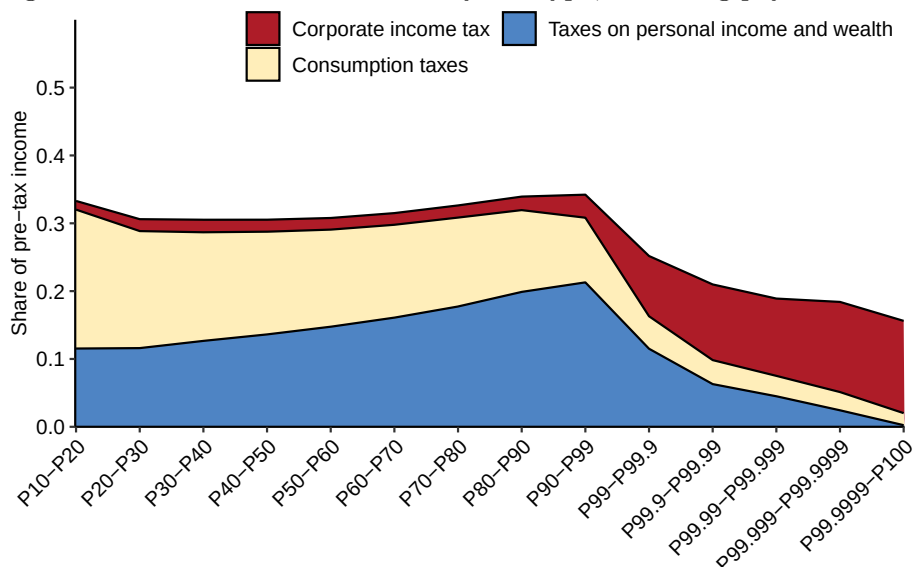
NOTE: This figure presents the P99.9999-P100 share of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable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

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



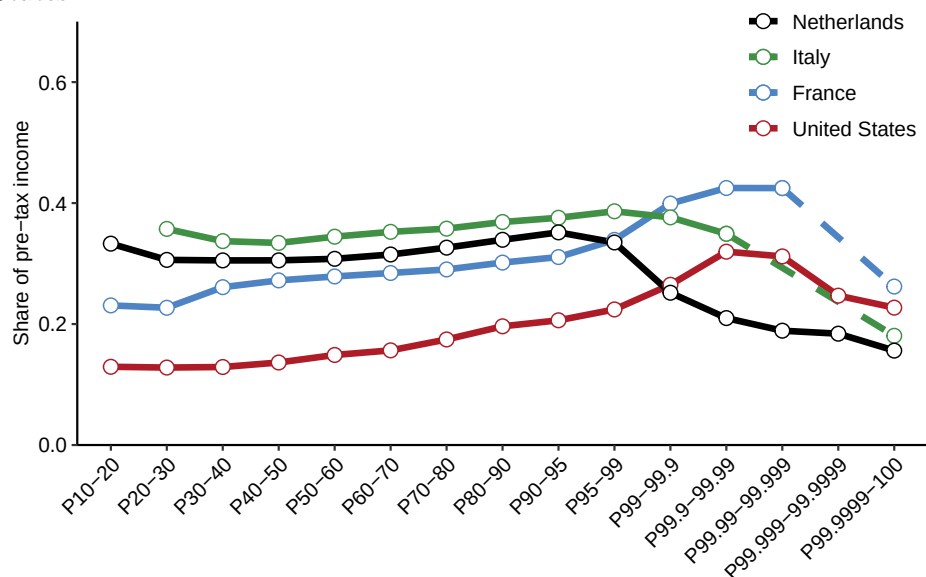
NOTE: This figure presents the Gini coefficient of income under different income concepts. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by either pre-tax national income, pre-tax national income net of taxes, disposable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

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



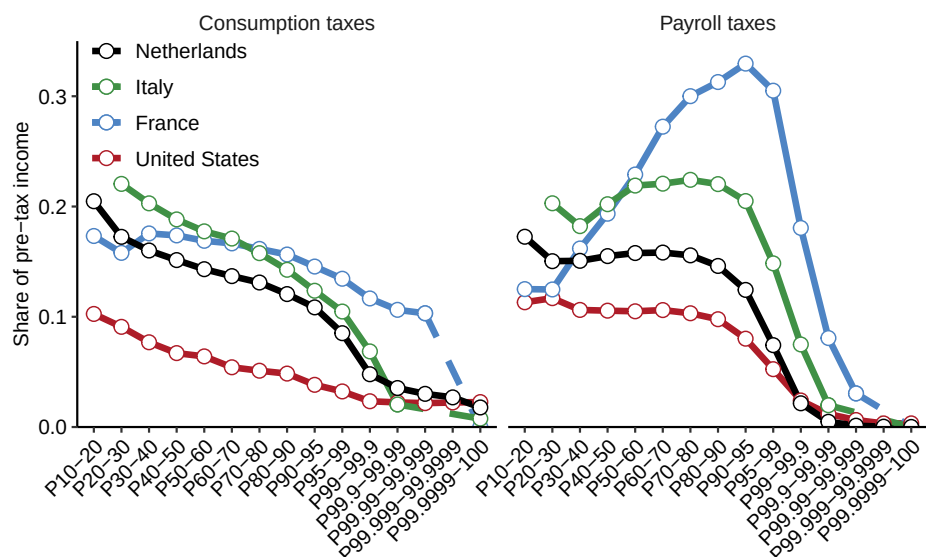
NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands in 2016, decomposed by type of tax, excluding payroll taxes. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax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



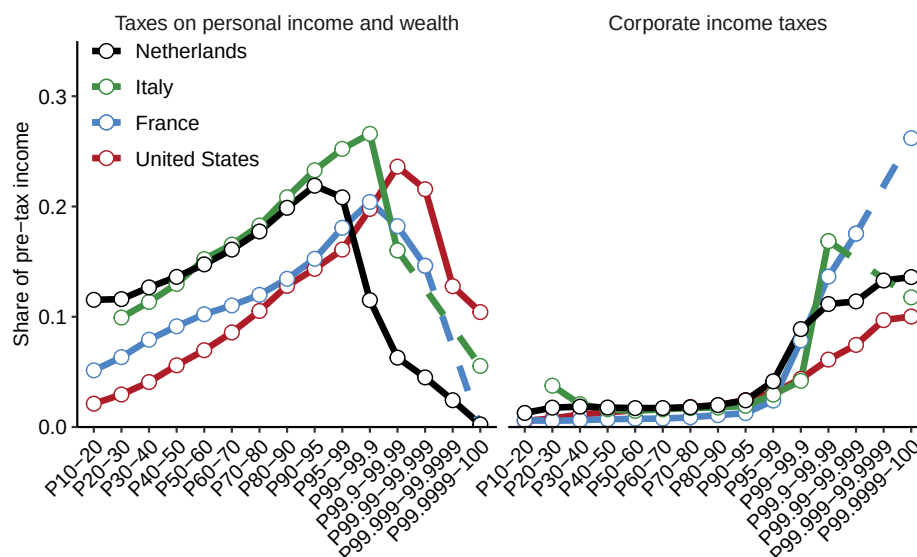
NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands, Italy, France and the United States, excluding payroll taxes. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax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



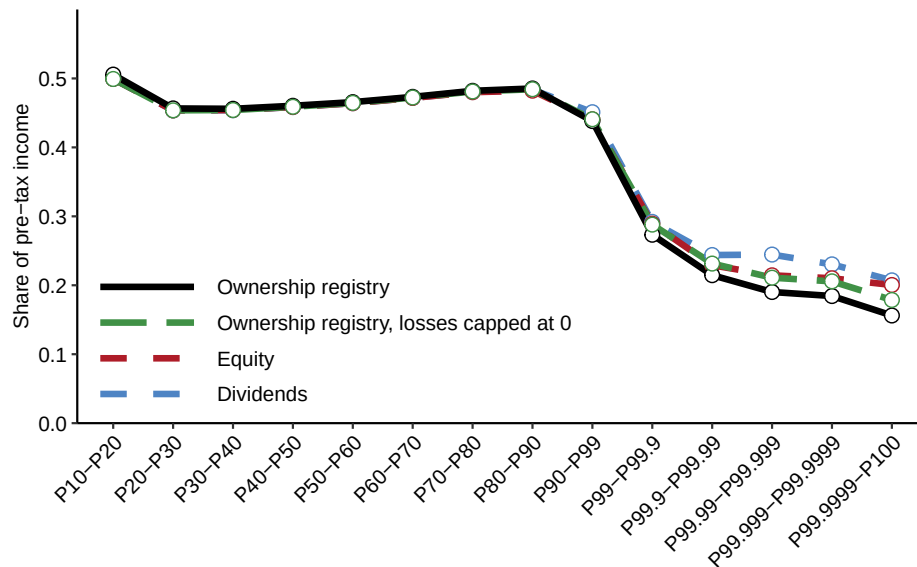
NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands, Italy, France and the United States, for consumption and payroll taxes. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their 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



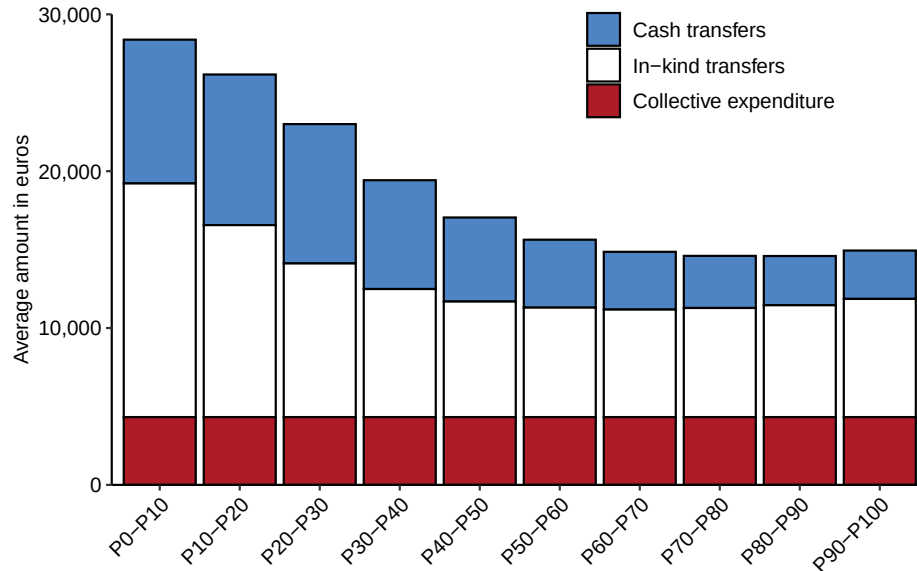
NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands, Italy, France and the United States, for corporate income taxes and taxes on income and wealth. The unit of analysis is the individual adult and income is split equally among the adult members of a household. 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



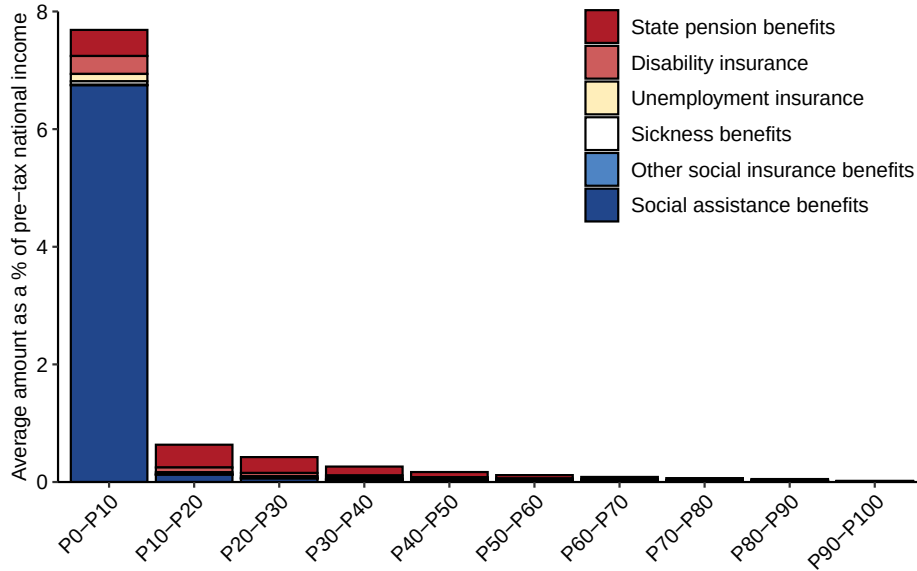
NOTE: This figure shows the effective tax rate faced by each income group in the Netherlands in 2016, under different distributional assumptions regarding retained earnings. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked 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



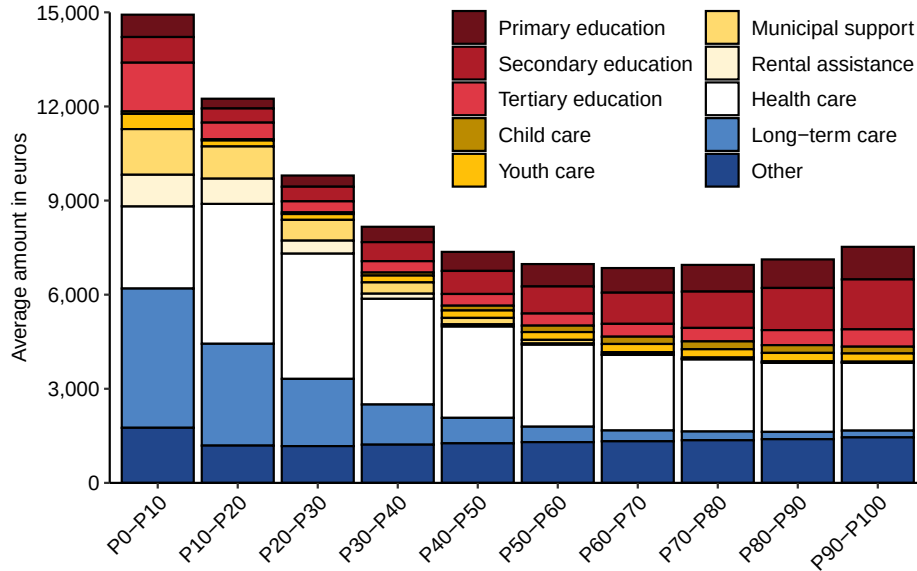
NOTE: This figure shows the amount of government spending received by each income group in 2016. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Cash and in-kind transfers are assigned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



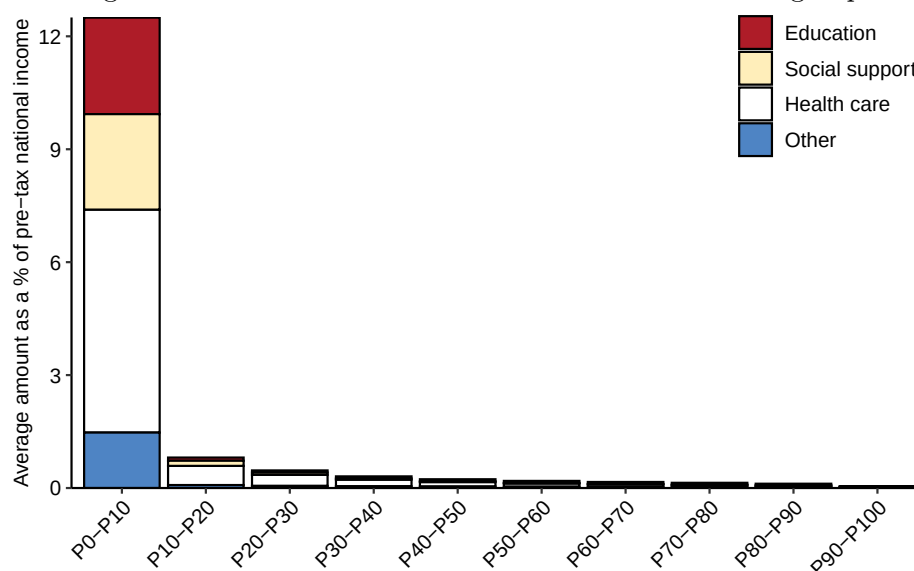
NOTE: This figure shows the amount of cash transfers received by each income group in 2016 divided by pre-tax national income, with more detailed categories than in Figure 2.11. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are 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



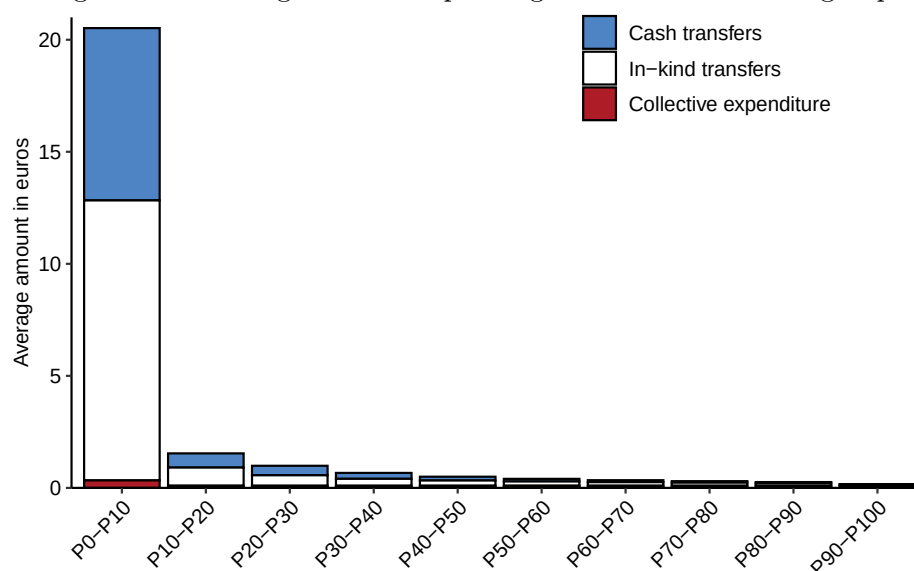
NOTE: This figure shows the amount of in-kind transfers received by each income group in 2016, with more detailed categories than in Figure 2.10. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national 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



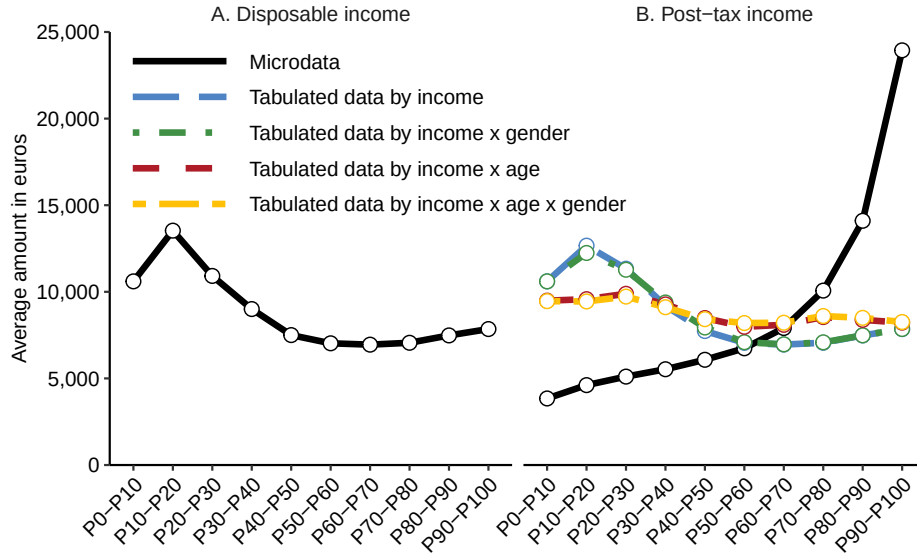
NOTE: This figure shows the amount of in-kind transfers received by each income group in 2016 divided by pre-tax national income, with more detailed categories than in Figure 2.11. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults 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



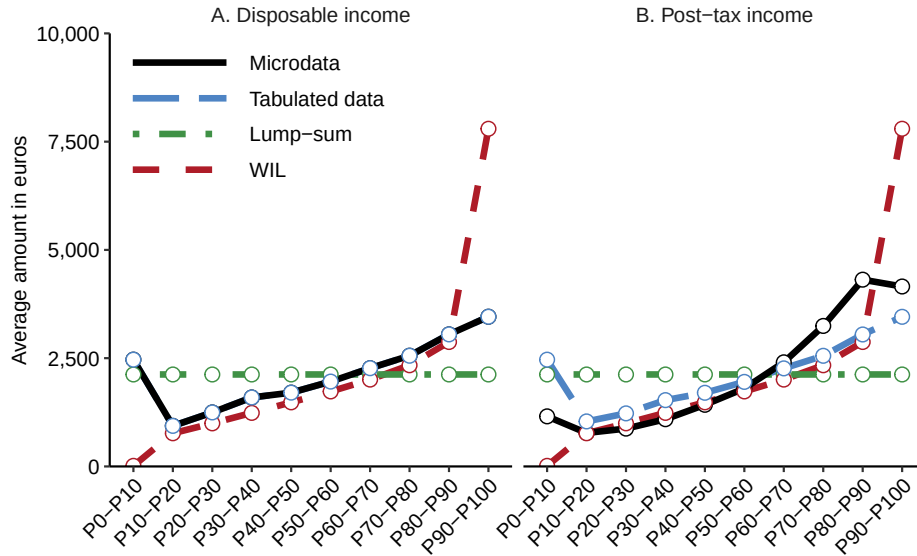
NOTE: This figure shows the amount of government spending received by each income group in 2016 divided by pre-tax national income. The unit of analysis is the individual adult and income is split equally among the adult members of a household. Adults are ranked by their pre-tax national income. Cash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



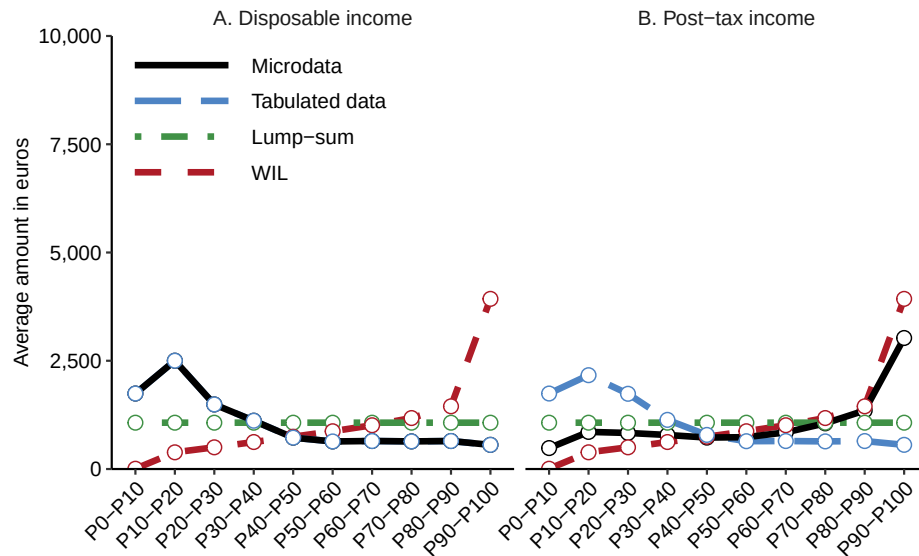
NOTE: This figure shows the average amount of other in-kind transfers received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. 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



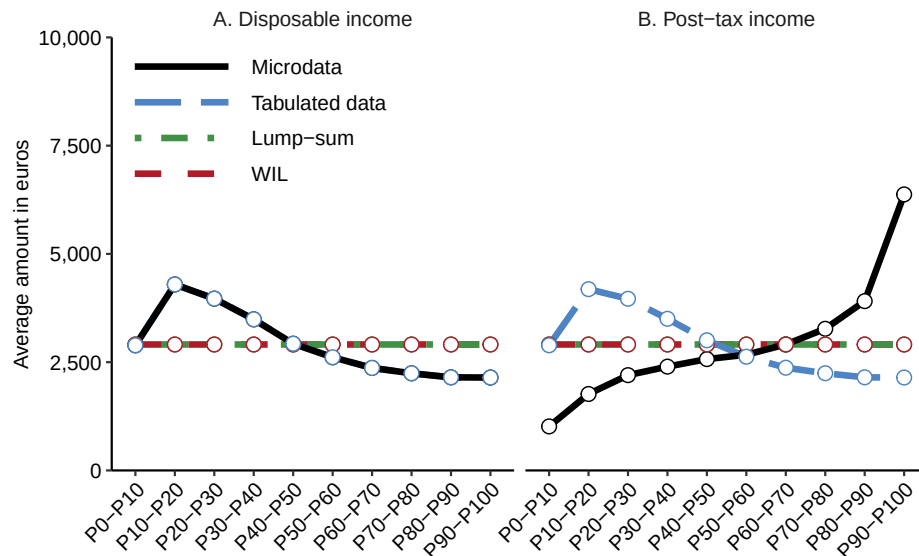
NOTE: This figure shows the average amount of education spending received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. 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



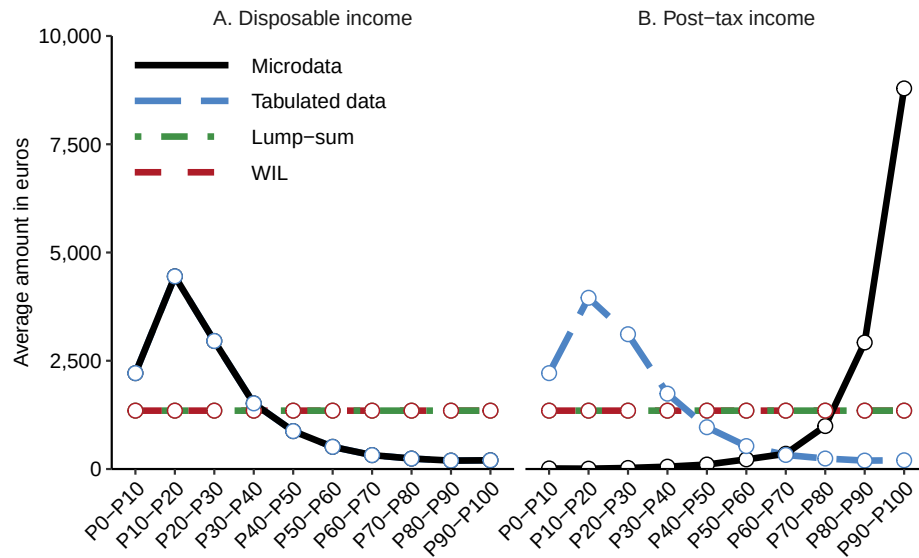
NOTE: This figure shows the average amount of social support received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. Adults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



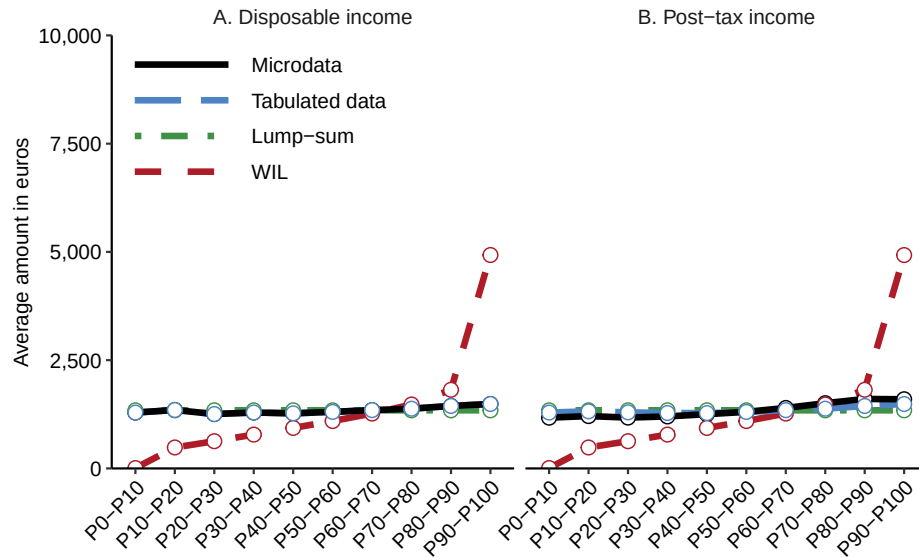
NOTE: This figure shows the average amount of health care spending received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. 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



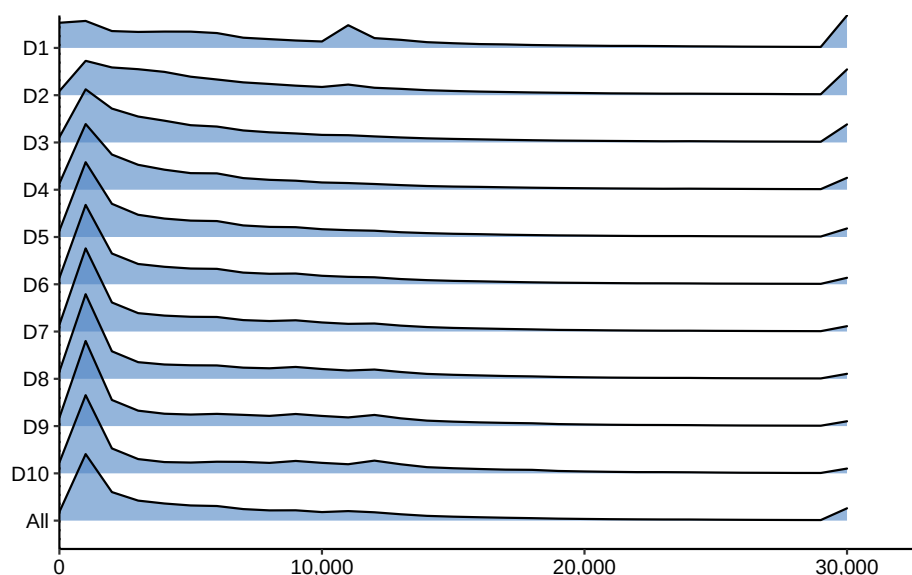
NOTE: This figure shows the average amount of long-term care spending received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household.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



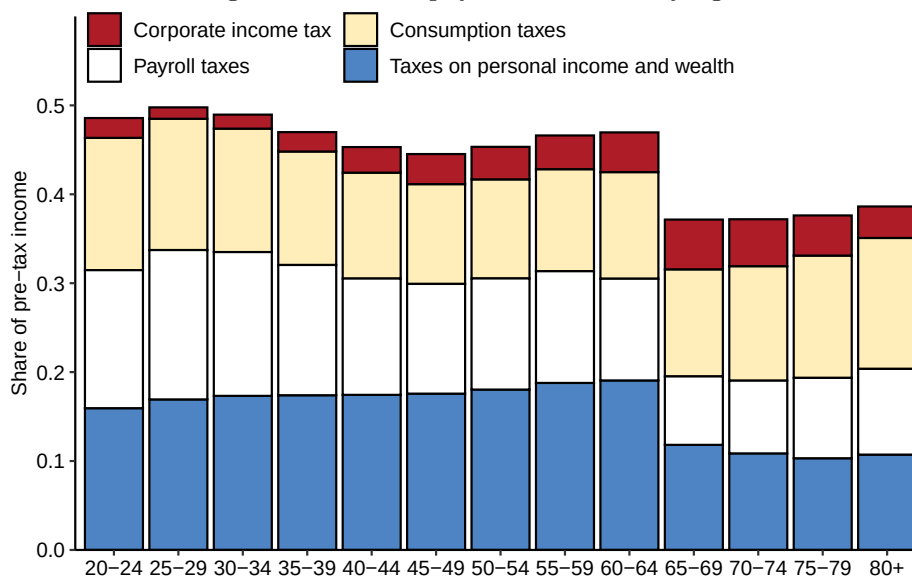
NOTE: This figure shows the average amount of other in-kind transfers received by each income group in 2016 under different distributional assumptions regarding the receipt of in-kind transfers. The unit of analysis is the individual adult and income is split equally among all adult members of a household. 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



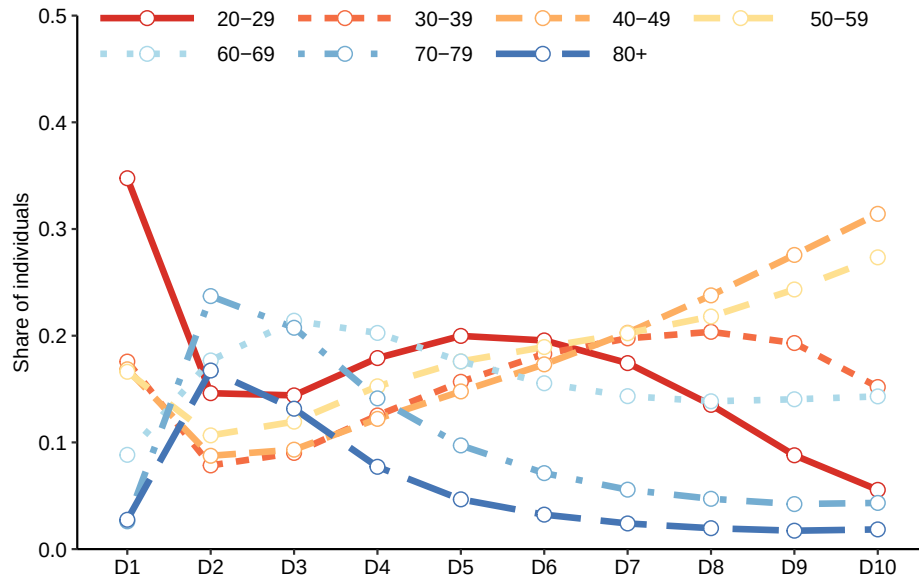
NOTE: This figure shows the amount of taxes paid expressed as a share of pre-tax national income for different age groups in 2016. The unit of analysis is the individual adult. Taxes on labour are assigned to workers. Taxes on capital are assigned to the owners of capital. Consumption taxes are assigned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

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



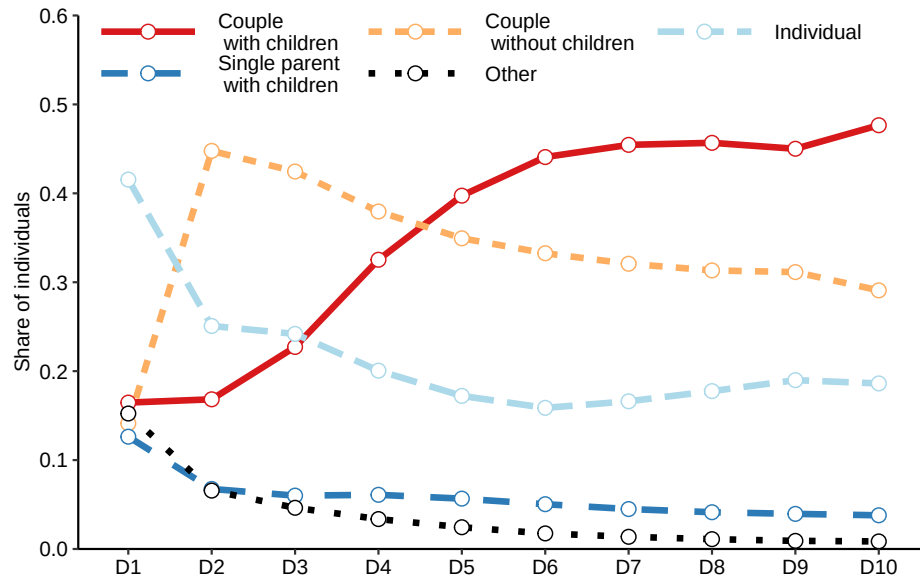
NOTE: This figure shows the average level of pre-tax national income for different age groups in 2016. The unit of analysis is the individual adult and income is split equally among the adult members of a household.

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



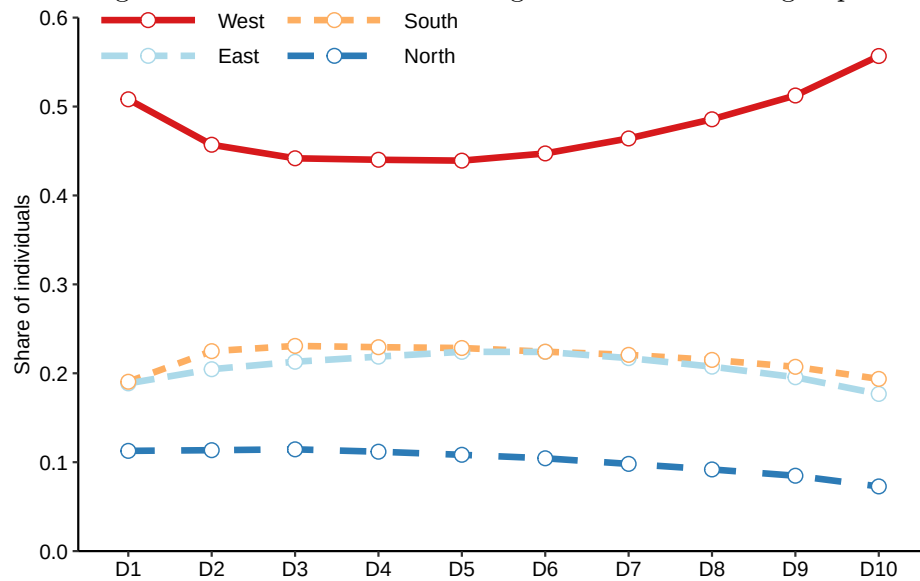
NOTE: This figure shows the share of different age groups in each income decile. The unit of analysis is the individual adult and income is split equally among the adult members of a household.

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

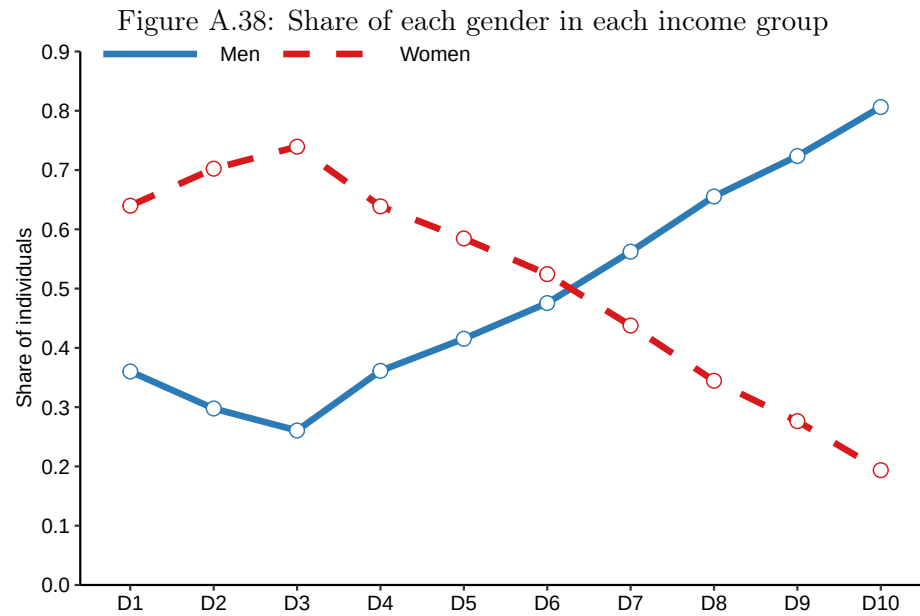


NOTE: This figure shows the share of different household types in each income decile. The unit of analysis is the individual adult and income is split equally among the adult members of a household.

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

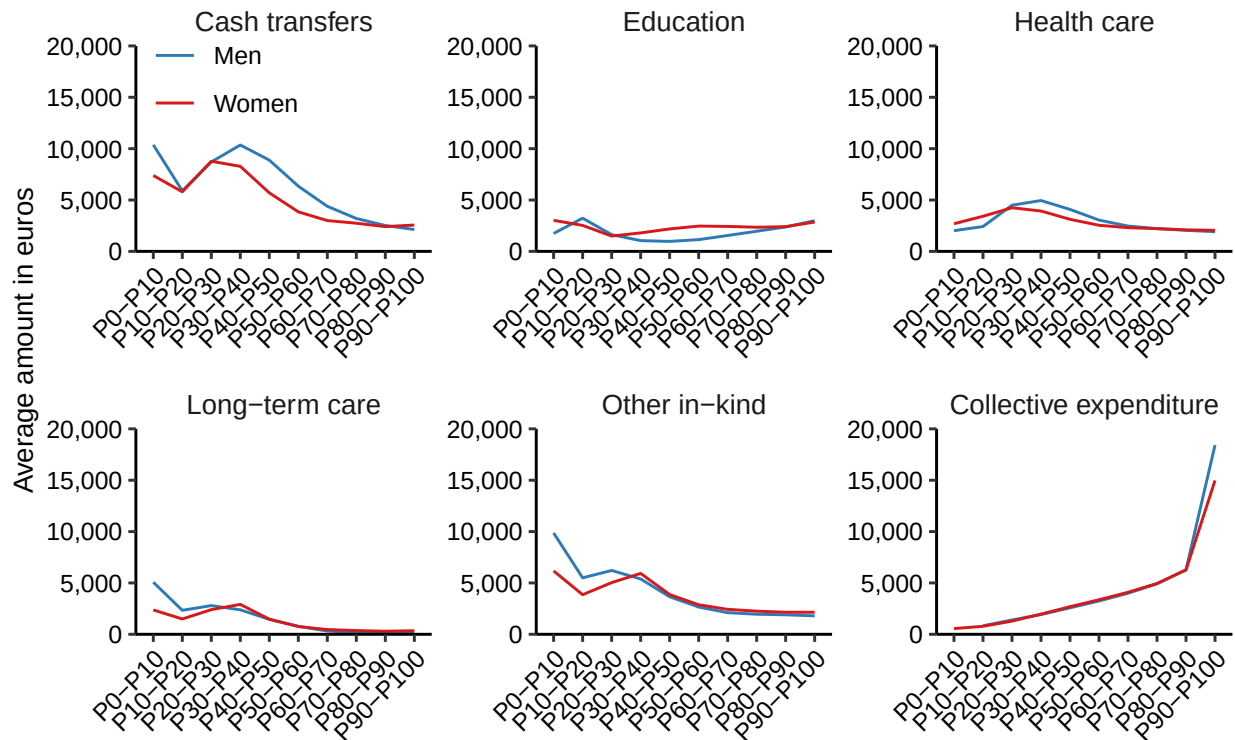


NOTE: This figure shows the share of different regions of residence in each income decile. The unit of analysis is the individual adult and income is split equally among the adult members of a household.



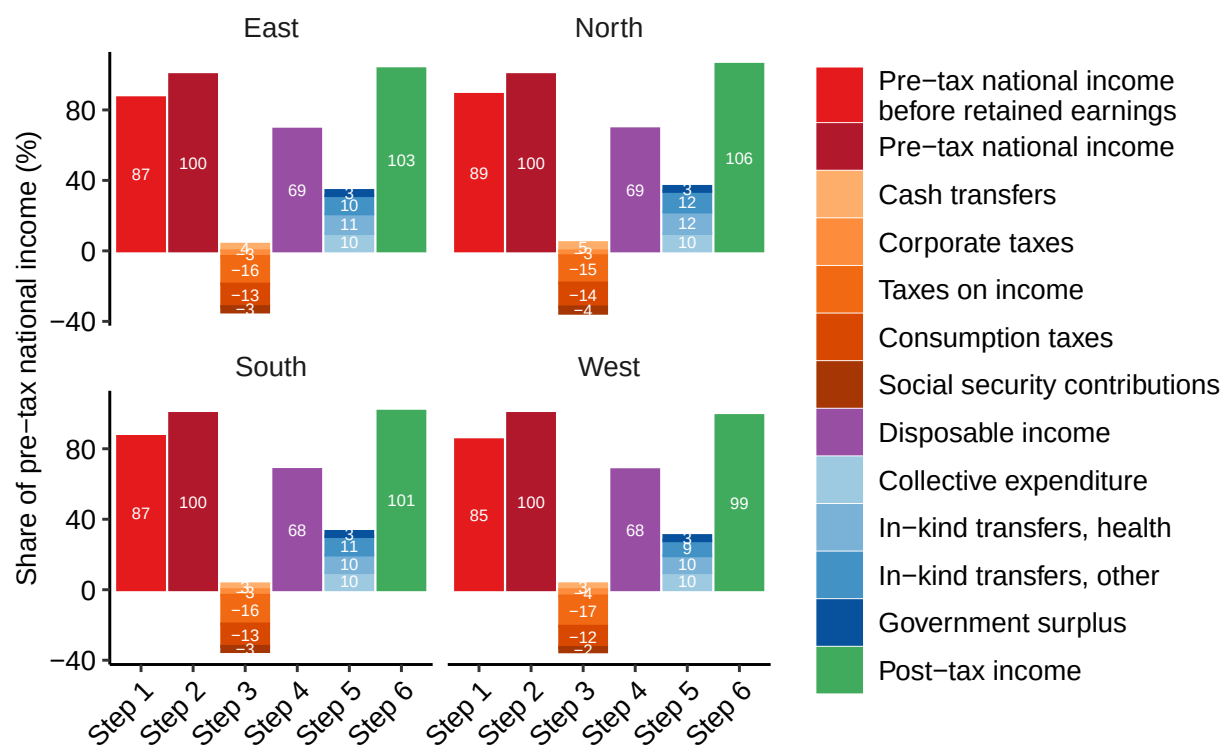
NOTE: This figure shows the share of men and women in each income decile. The unit of analysis is the individual adult and income is assigned to the individual who nominally earns it.

Figure A.39: The receipt of government spending by pre-tax income and gender



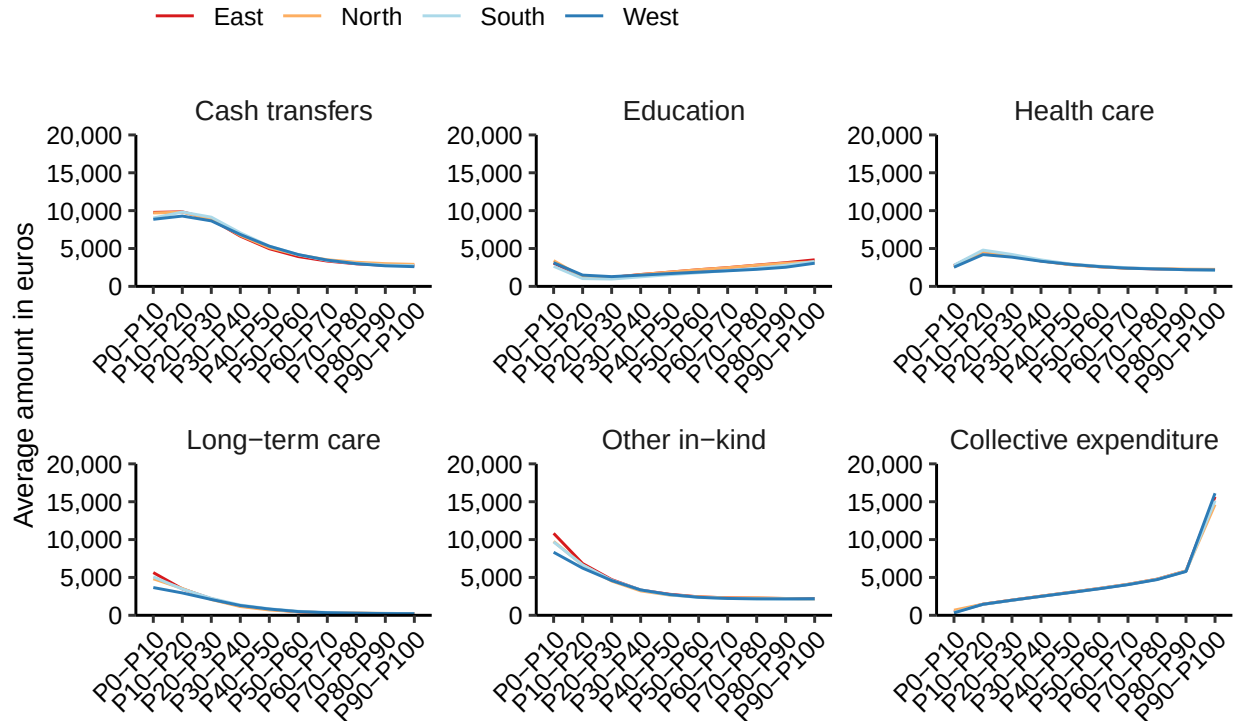
NOTE: This figure shows the amount of in-kind transfers received by each income group in 2016, for men and women separately. The unit of analysis is the individual adult, but, exceptionally, income is assigned to the individual who nominally earns it. Adults are ranked by their pre-tax national income.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

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 g proportional
Households' actual pension contributions	2	12,931	8,844	0.7	Tax records, social security records.	Households' per contribution
Households' actual non-pension contributions	11	66,187	64,900	0.2	Tax records, social security records.	Households' non-pension contribution
Contributions for long-term care	2	14,275	14,016	0.0	Tax records.	Contributions long-term car
Health insurance premiums	5	27,282	26,052	0.2	Tax records.	Health insuran premiums
Households' imputed pension contributions	6	33,716				Pension entitlem
Households' imputed non-pension contributions	0	501				Pension entitlem
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 be in cash
Other social insurance benefits	9	50,841	52,034	-0.2	Tax records, social security records.	Other social insu 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 s
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 inc pension entitlements
Corporate taxes paid by foreign corporations owned by Dutch shareholders	1	8,212				Equity wealth, factor inc 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,
Households' actual non-pension contributions	11	66,187	64,900	0.2	Tax records	Households' actual non-pe contributions
Contributions for long-term care	2	14,275	14,016	0.0	Tax records	Contributions for long-term

NOTE: This table presents the decomposition of taxes in 2016. Social insurance contributions are equal to households' actual non-pension contributions minus contributions for long-term care and health insurance premiums plus employer's actual and imputed pension and non-pension contributions minus payroll taxes for health care. Income taxes are equal to taxes on income, wealth, etc. plus households' actual non-pension contributions minus health insurance premiums.

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. Payroll taxes and health insurance premiums are equal to employers' actual and imputed pension and non-pension contributions plus health insurance premiums.

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
Other social insurance benefits	1	3,584	3,668	-0.0	Tax records, social security records	Other social insurance b
Social assistance benefits in cash	4	20,891	20,643	0.0	Tax records	Social assistance benefits
In-kind transfers	20	117,217				
Education	5	28,311			Administrative records	Enrolment by education
Long-term care	3	17,972	17,617	0.1	Administrative records	Long-term care trans
Health care	7	38,777	34,062	0.8	Insurance records	Health care transfe
Child care	0	2,095	1,989	0.0	Administrative records	Child care transfe
Youth care	1	3,494	2,285	0.2	Administrative records	Youth care transfe
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	21.9
Middle 40%	5,332,947	€32,073	€44,769	46.8	€22,183	€31,349	43.6	€22,916	€31,975	42.8
Top 10%	1,333,237	€65,768	€111,365	29.1	€46,629	€110,849	38.5	€47,238	€111,473	36.8
Top 1%	133,324	€154,625	€325,847	8.5	€163,627	€487,376	16.9	€164,223	€488,035	16.9
Top 0.1%	13,333	€502,561	€1,194,153	3.1	€803,387	€2,174,535	7.6	€804,171	€2,175,178	7.6
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	3.1
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	1.2
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 2.2, 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 pre-tax 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 2.5.3 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

B.2 Institutional details

D Taxation

Personal income taxes The Income Tax Act of 2001 provides the legal framework for the taxation of personal income in the Netherlands.¹ It categorises income into three separate “boxes”.² 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 1968.³ The standard rate is 21%, while the reduced rate that applies to specific product categories is 6% in 2016.⁴ A 0% rate applies to yet another set of goods and services, partly related to cross-border transactions.⁵ 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.⁶ 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.

¹The 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).

²The 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>.

³The 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>.

⁴These product categories are listed in Table I of the Value Added Tax Act of 1968.

⁵Product categories that face a 0% rate are listed in Table II of the Value Added Tax Act of 1968.

⁶The full text of the Excise Act, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0005251/2016-01-01>.

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 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.⁷ 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.⁸ The contribution rate for disability insurance is 5.88%. The rate is set by ministerial decree.⁹ 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.¹⁰ 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.

⁷The full text of the Health Insurance Act, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0018450/2016-01-01>.

⁸The 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>.

⁹The full text of the Disability Insurance Act, effective on 1 January, 2016, is available at <https://wetten.overheid.nl/BWBR0002524/2016-01-01>.

¹⁰The 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>.

Inheritance tax Inheritances and bequests are taxed according to a progressive schedule where the rates depend on the relationship between the two individuals involved.¹¹ For parents transferring wealth to their children, the schedule has two rates of 10% and 20%. In this case, 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.

D 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, 2024b). Pharmaceuticals, medical goods, day-care, 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 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

¹¹The full text of the Inheritance Tax Law, effective on January 1, 2016, is available at <https://wetten.overheid.nl/BWBR0002226/2016-01-01>.

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.3 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.¹²

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 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

¹²<https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/catalogus-microdata> (available in Dutch only).

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 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 contain demographic background information on all individuals and households in the Netherlands, such as age, gender and household type.

Inptab 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.

B.4 Methodological appendix

D 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 are equal to €35.5 billion.¹³ 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.¹⁴ Of this, €12.7 billion was paid out in dividends and

¹³This estimate is part of an internal update of a report on the Dutch current account (De Nederlandsche Bank, 2013).

¹⁴This estimate is part of an internal update of a report on the Dutch current account (De Nederlandsche Bank,

€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.

D Production taxes

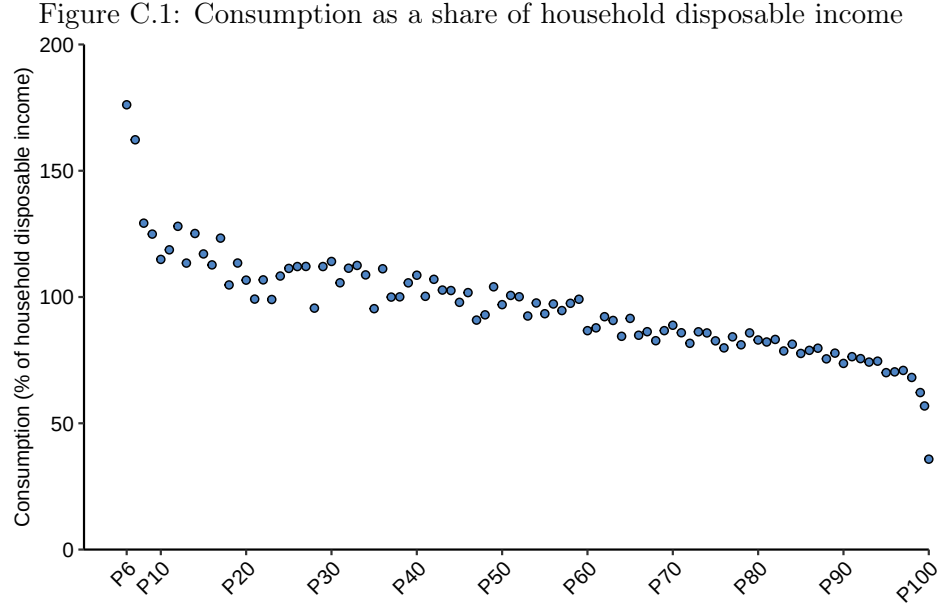
We impute indirect taxes using the 2015 Budget Survey from Statistics Netherlands and the 2016 statutory VAT and excise rates. The Budget Survey is only available in 2015, so we assume consumption patterns remain unchanged in 2016.

In a first stage we simulate the VAT and excise taxes using the Budget Survey data (see Online Appendix B.3). 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 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.

2013).



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.

D 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 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.¹⁵

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.¹⁶ The amount of social support transfers are calculated as follows. Open data¹⁷ 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.¹⁸ The dataset *Jgdhulpbus* contains all provided trajectories for youth care in 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.¹⁹ 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.

¹⁵<https://opendata.cbs.nl/statline/#/CBS/nl/dataset/82789NED/table>

¹⁶Only 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.

¹⁷<https://opendata.cbs.nl/#/CBS/nl/dataset/84580NED/table>

¹⁸We 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 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.

¹⁹<https://opendata.cbs.nl/#/CBS/nl/dataset/83454NED/table?ts=1630489418255>

Appendix C

Appendix to Chapter 3

C.1 Additional tables and figures

Table A.1: Schedule of the withholding tax on wages and the income tax, 2006–2012

Rate (%)	2006	2007	2008	2009	2010	2011	2012
First bracket	34.15	33.65	33.60	33.50	33.45	33.00	33.10
Second bracket	41.45	41.40	41.85	42.00	41.95	41.95	41.95
Third bracket	42.00	42.00	42.00	42.00	42.00	42.00	42.00
Fourth bracket	52.00	52.00	52.00	52.00	52.00	52.00	52.00
Upper threshold (€)							
First bracket	17,046	17,319	17,579	17,878	18,218	18,628	18,945
Second bracket	30,631	31,122	31,589	32,127	32,738	33,436	33,863
Third bracket	52,228	53,064	53,860	54,776	54,367	55,694	56,491

Note: The thresholds and rates are taken from the tax authority's annual wage tax manuals, *Handboek Loonheffingen 2007–2012* (Belastingdienst, 2007, 2008, 2009, 2010, 2011, 2012).

Table A.2: Schedule of the withholding tax on wages and the income tax, 2013–2019

Rate (%)	2013	2014	2015	2016	2017	2018	2019
First bracket	37.00	36.25	36.50	36.55	36.55	36.55	36.65
Second bracket	42.00	42.00	42.00	40.20	40.80	40.85	38.10
Third bracket	42.00	42.00	42.00	40.20	40.80	40.85	38.10
Fourth bracket	52.00	52.00	52.00	52.00	52.00	51.95	51.75
Upper threshold (€)							
First bracket	19,645	19,645	19,822	19,922	19,982	20,142	20,384
Second bracket	33,363	33,363	33,589	33,715	33,791	33,994	34,300
Third bracket	55,991	56,531	57,585	66,421	67,072	68,507	68,507

Note: The thresholds and rates are taken from the tax authority's annual wage tax manuals, *Handboek Loonheffingen 2013–2019* (Belastingdienst, 2013, 2014, 2015, 2016, 2017, 2018, 2019).

Table A.3: Schedule of the corporate and dividend tax, 2006–2012

Corporate tax							
Rate (%)	2006	2007	2008	2009	2010	2011	2012
First bracket	25.5	20.0	20.0	20.0	20.0	20.0	20.0
Second bracket	29.6	23.5	25.5	25.5	25.5	25.0	25.0
Third bracket		25.5					
Upper threshold (€)							
First bracket	22,689	25,000	275,000	200,000	200,000	200,000	200,000
Second bracket		60,000					
Dividend tax							
Rate (%)							
First bracket	25.0	22.0	25.0	25.0	25.0	25.0	25.0
Second bracket		25.0					
Upper threshold (€)							
First bracket		250,000					
Corporate + dividend tax							
Combined rate (%)							
Lower bound	44.125	37.600	40.000	40.000	40.000	40.000	40.000
Upper bound	47.200	44.125	44.125	44.125	44.125	43.750	43.750

Note: The thresholds and rates are taken from the Corporate Tax Act 1969 and the Income Tax Act 2001.

Table A.4: Schedule of the corporate and dividend tax, 2013–2019

Corporate tax							
Rate (%)	2013	2014	2015	2016	2017	2018	2019
First bracket	20.0	20.0	20.0	20.0	20.0	20.0	19.0
Second bracket	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Third bracket							
Upper threshold (€)							
First bracket	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Second bracket							
Dividend tax							
Rate (%)							
First bracket	25.0	22.0	25.0	25.0	25.0	25.0	25.0
Second bracket		25.0					
Upper threshold (€)							
First bracket		250,000					
Corporate + dividend tax							
Combined rate (%)							
Lower bound	40.000	37.600	40.000	40.000	40.000	40.000	39.250
Upper bound	43.750	43.750	43.750	43.750	43.750	43.750	43.750

Note: The thresholds and rates are taken from the Corporate Tax Act 1969 and the Income Tax Act 2001.

Table A.5: Sectoral composition of employees in 2012 (ISIC, 2-digit level)

Industry, ISIC 2 (%)	Above €150,000	Below €150,000
Wholesale trade	14	7
Activities of head offices; management consultancy activities	13	2
Financial service activities	12	2
Human health activities	7	7
Computer programming, consultancy and related activities	5	2
Insurance, reinsurance and pension funding	3	1
Legal and accounting activities	2	2
Manufacture of chemicals and chemical products	2	1
Retail trade	1	6
Manufacture of food products	1	2
Warehousing and support activities for transportation	1	1
Education	0	7
Public administration and defence; compulsory social security	0	7
Employment activities	0	6
Residential care activities	0	6
Social work activities without accommodation	0	4
Land transport and transport via pipelines	0	3
Specialised construction activities	0	3

Note: This table shows the distribution of employees across industries in 2012, separately for those paid above and below €150,000. Employees are grouped into industries based on their employer's 2-digit International Standard Industrial Classification (ISIC).

Table A.6: Sectoral composition of employees in 2012 (ISIC, 3-digit level)

Industry, ISIC 3 (%)	Above €150,000	Below €150,000
Activities of head offices	11	1
Monetary intermediation	10	2
Hospital activities	6	5
Computer programming, consultancy and related activities	5	2
Wholesale of household goods	3	2
Insurance	2	1
Wholesale of information and communication equipment	2	1
Accounting, bookkeeping and auditing activities; tax consultancy	1	1
Management consultancy activities	1	1
Other specialised wholesale	1	1
Temporary employment agency activities	0	6
Administration of the state and the economic and social policy of the community	0	5
Primary education	0	3
Provision of services to the community as a whole	0	3
Secondary education	0	3
Other social work activities without accommodation	0	2
Retail sale of other goods in specialised stores	0	2
Social work activities without accommodation for the elderly and disabled	0	2

Note: This table shows the distribution of employees across industries in 2012, separately for those paid above and below €150,000. Employees are grouped into industries based on their employer's 3-digit International Standard Industrial Classification (ISIC).

Table A.7: Sectoral composition of owner-managers in 2012 (ISIC, 2-digit level)

Industry, ISIC 2 (%)	Above €150,000	Below €150,000
Legal and accounting activities	14	5
Activities of head offices; management consultancy activities	11	15
Human health activities	9	3
Wholesale trade	8	10
Financial service activities	2	8
Retail trade	1	6
Activities auxiliary to financial services and insurance activities	1	4
Real estate activities	1	3
Specialised construction activities	0	5
Architectural and engineering activities; technical testing and analysis	0	3
Computer programming, consultancy and related activities	0	3
Advertising and market research	0	2

Note: This table shows the distribution of owner-managers across industries in 2012, separately for those paid above and below €150,000. Owner-managers are grouped into industries based on their employer's 2-digit International Standard Industrial Classification (ISIC).

Table A.8: Sectoral composition of owner-managers in 2012 (ISIC, 3-digit level)

Industry, ISIC 3 (%)	Above €150,000	Below €150,000
Management consultancy activities	7	10
Medical and dental practice activities	7	2
Legal activities	6	2
Accounting, bookkeeping and auditing activities; tax consultancy	3	3
Activities of head offices	2	5
Activities of holding companies	1	5
Wholesale of household goods	1	2
Architectural and engineering activities and related technical consultancy	0	3
Computer programming, consultancy and related activities	0	3
Trusts, funds and similar financial entities	0	3
Activities auxiliary to financial services	0	2
Construction of residential and non-residential buildings	0	2
Retail sale of other goods in specialised stores	0	2
Wholesale of other machinery, equipment and supplies	0	2

Note: This table shows the distribution of owner-managers across industries in 2012, separately for those paid above and below €150,000. Owner-managers are grouped into industries based on their employer's 3-digit International Standard Industrial Classification (ISIC).

Table A.9: Sectoral composition of the self-employed in 2012 (ISIC, 1-digit level)

Industry, ISIC 1 (%)	Above €150,000	Below €150,000
Human health and social work activities	51	9
Professional, scientific and technical activities	17	16
Agriculture, forestry and fishing	6	10
Wholesale and retail trade; repair of motor vehicles and motorcycles	5	14
Information and communication	3	4
Manufacturing	1	4
Transportation and storage	1	4
Construction	0	15
Accommodation and food service activities	0	6
Other service activities	0	5
Administrative and support service activities	0	4
Arts, entertainment and recreation	0	4

Note: This table shows the distribution of the self-employed across industries in 2012, separately for those paid above and below €150,000. Self-employed individuals are grouped into industries based on their 1-digit International Standard Industrial Classification (ISIC).

Table A.10: Sectoral composition of the self-employed in 2012 (ISIC, 2-digit level)

Industry, ISIC 2 (%)	Above €150,000	Below €150,000
Human health activities	50	7
Activities of head offices; management consultancy activities	10	5
Crop and animal production, hunting and related service activities	6	10
Legal and accounting activities	2	3
Computer programming, consultancy and related activities	2	2
Retail trade	1	8
Wholesale trade	1	4
Architectural and engineering activities; technical testing and analysis	1	2
Specialised construction activities	0	9
Construction of buildings	0	5
Food and beverage service activities	0	5
Other personal service activities	0	4
Creative, arts and entertainment activities	0	3
Wholesale and retail trade and repair of motor vehicles and motorcycles	0	2
Warehousing and support activities for transportation	0	0

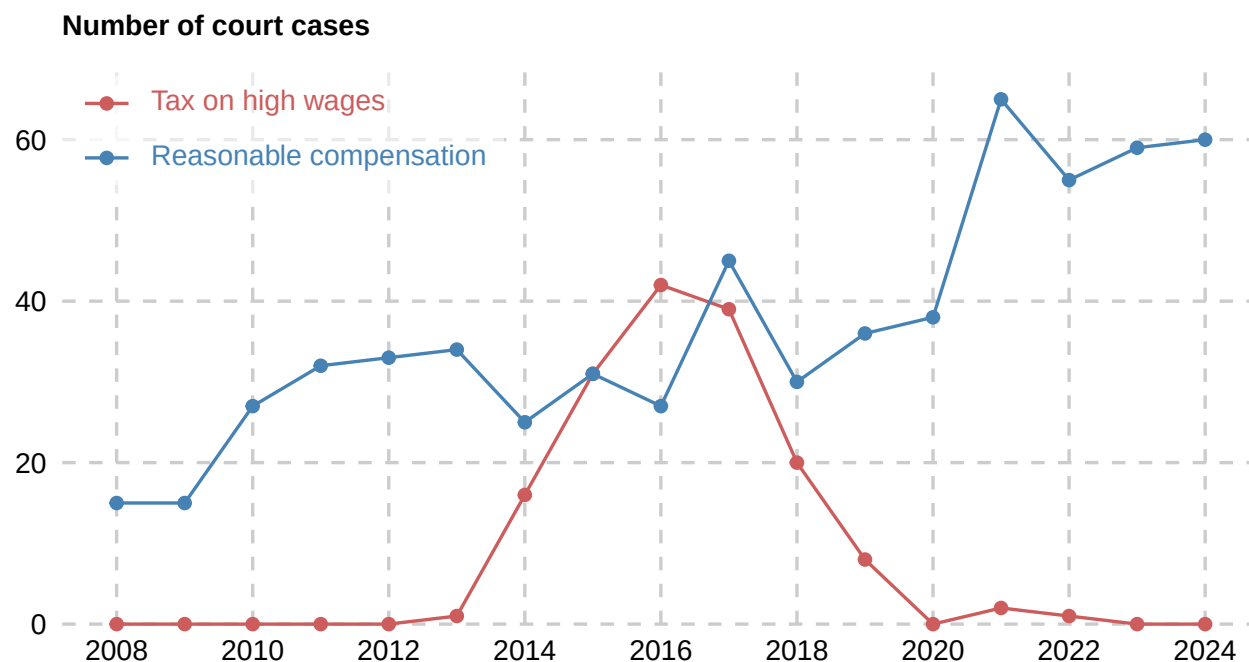
Note: This table shows the distribution of the self-employed across industries in 2012, separately for those paid above and below €150,000. Self-employed individuals are grouped into industries based on their 2-digit International Standard Industrial Classification (ISIC).

Table A.11: Sectoral composition of the self-employed in 2012 (ISIC, 3-digit level)

Industry, ISIC 3 (%)	Above €150,000	Below €150,000
Medical and dental practice activities	46	2
Management consultancy activities	9	5
Other human health activities	3	5
Animal production	2	5
Computer programming, consultancy and related activities	2	2
Architectural and engineering activities and related technical consultancy	1	2
Growing of non-perennial crops	1	2
Legal activities	1	1
Building completion and finishing	0	5
Construction of residential and non-residential buildings	0	5
Other personal service activities	0	4
Creative, arts and entertainment activities	0	3
Other education	0	3
Restaurants and mobile food service activities	0	3
Retail sale of other goods in specialised stores	0	3
Accounting, bookkeeping and auditing activities; tax consultancy	0	2
Support activities for transportation	0	0

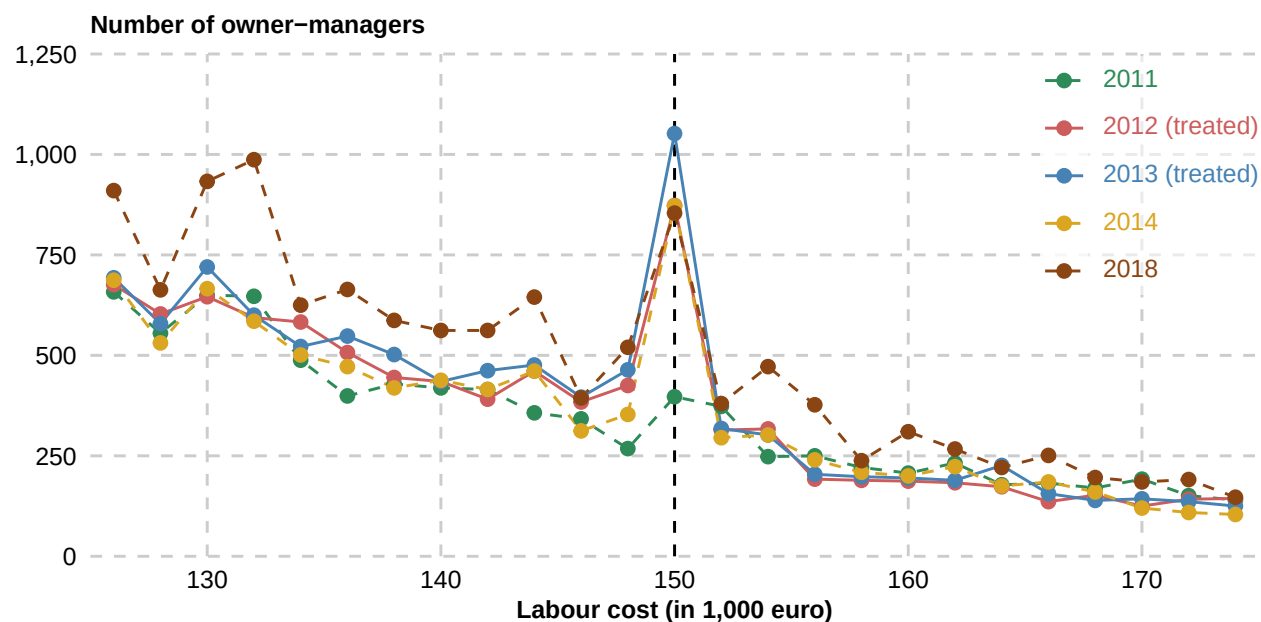
Note: This table shows the distribution of the self-employed across industries in 2012, separately for those paid above and below €150,000. Self-employed individuals are grouped into industries based on their 3-digit International Standard Industrial Classification (ISIC).

Figure A.1: The number of court cases over the surtax on high wages (red) and “reasonable compensation” (blue)



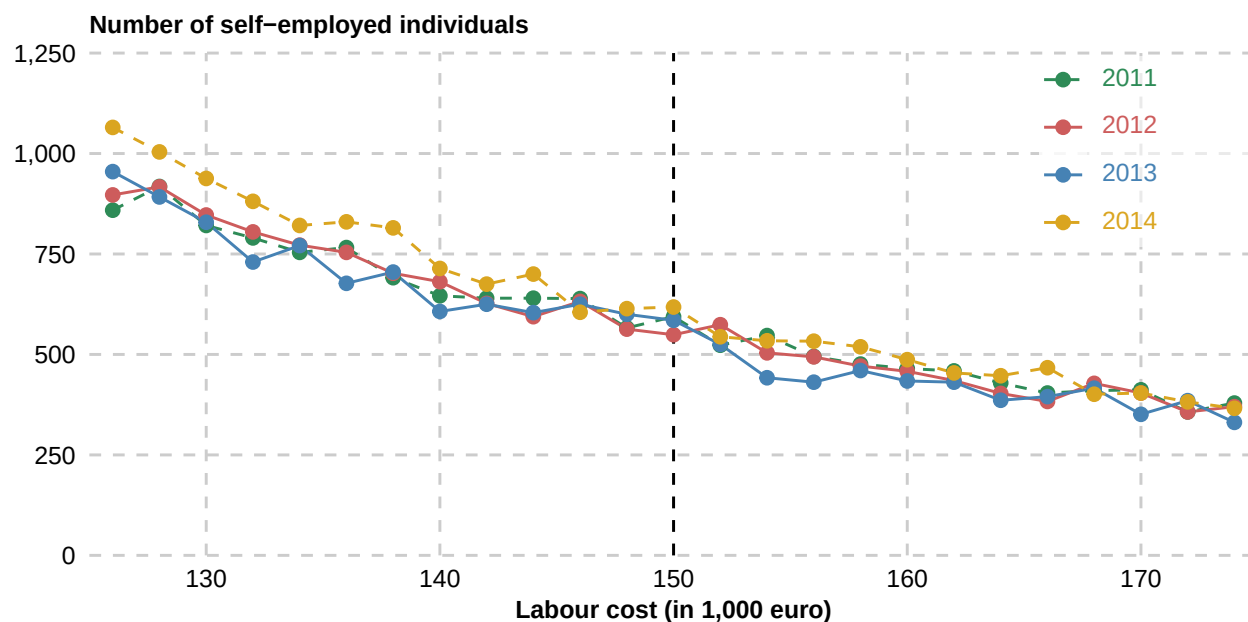
Note: This figure plots the annual number of published court cases related to the surtax on high wages (red) and to the minimum compensation rules for owner-managers (“reasonable compensation”, blue). Counts are based on searches in the Dutch case-law database *Rechtspraak.nl*.

Figure A.2: Number of owner-managers across the labour cost distribution



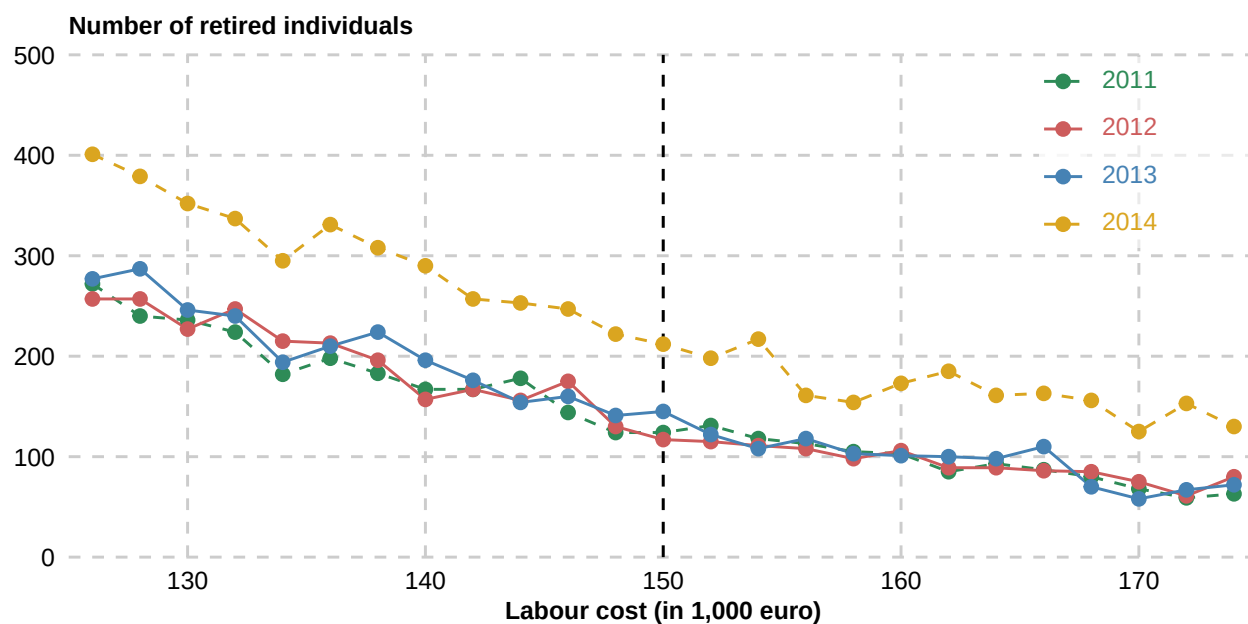
Note: This figure groups owner-managers into €2,000 bins of labour costs and plots the bin counts for 2011–2014 and 2018.

Figure A.3: Number of self-employed individuals across the labour cost distribution



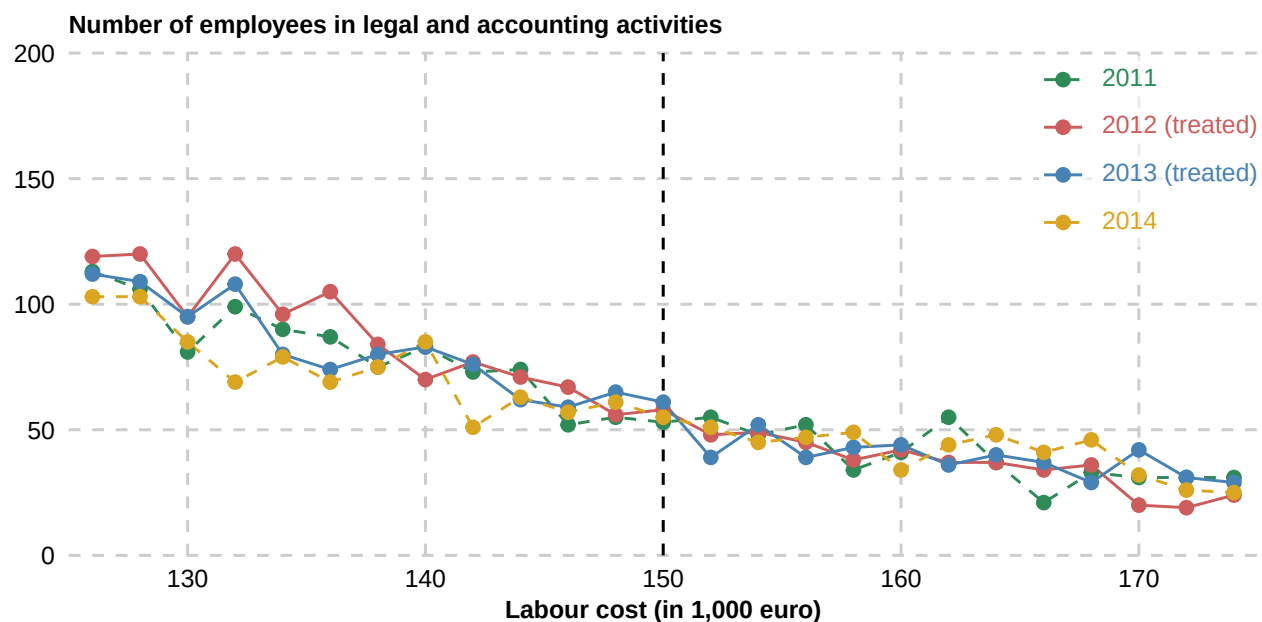
Note: This figure groups self-employed individuals into €2,000 bins of labour costs and plots the bin counts for 2011–2014.

Figure A.4: Number of retired individuals across the retirement income distribution



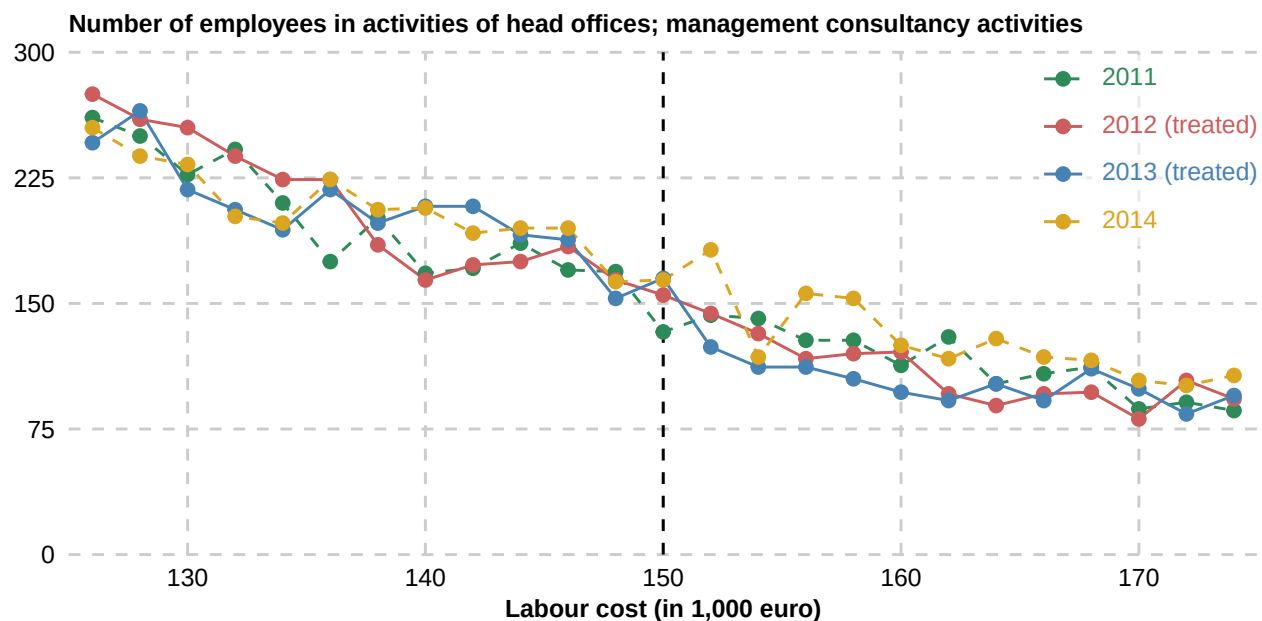
Note: This figure groups retired individuals into €2,000 bins of labour costs and plots the bin counts for 2011–2014.

Figure A.5: Number of employees in legal and accounting activities (M69)



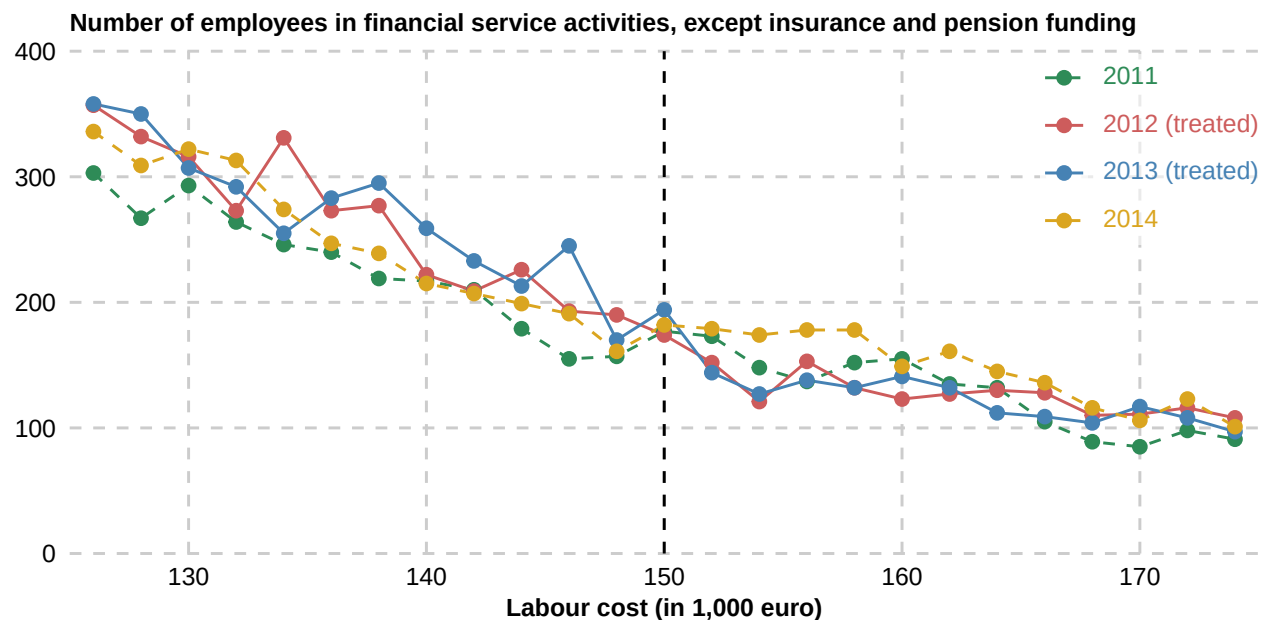
Note: This figure groups employees in legal and accounting activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.6: Number of employees in activities of head offices; management consultancy activities (M70)



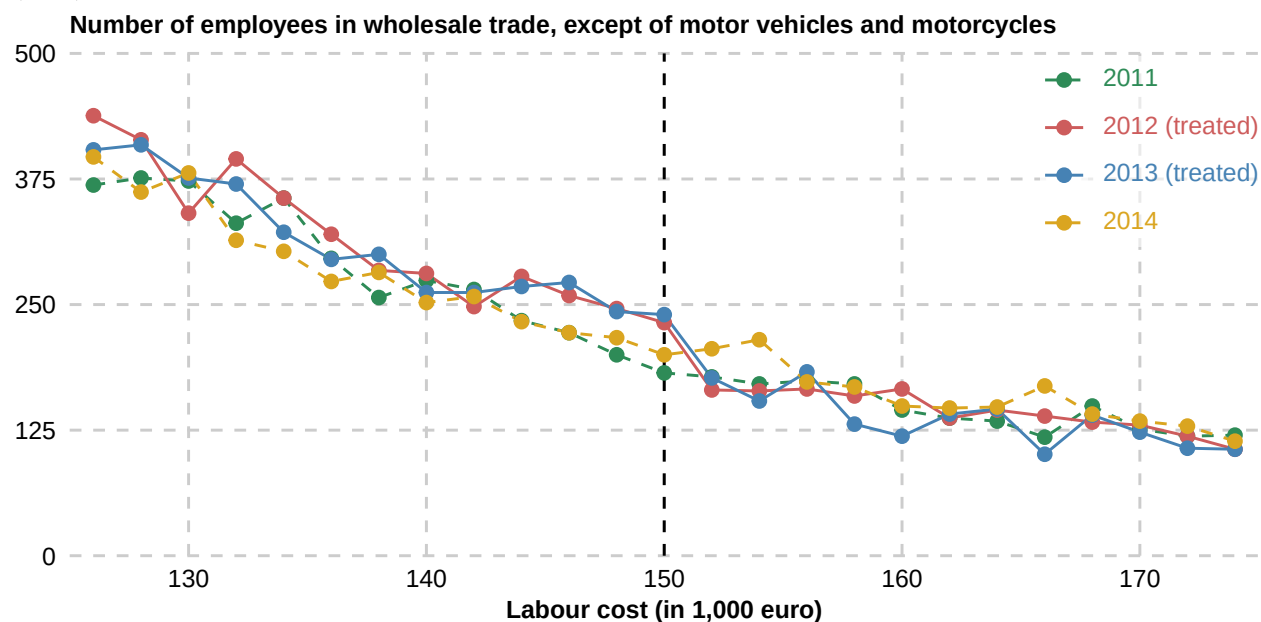
Note: This figure groups employees in activities of head offices; management consultancy activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.7: Number of employees in financial service activities, except insurance and pension funding (K64)



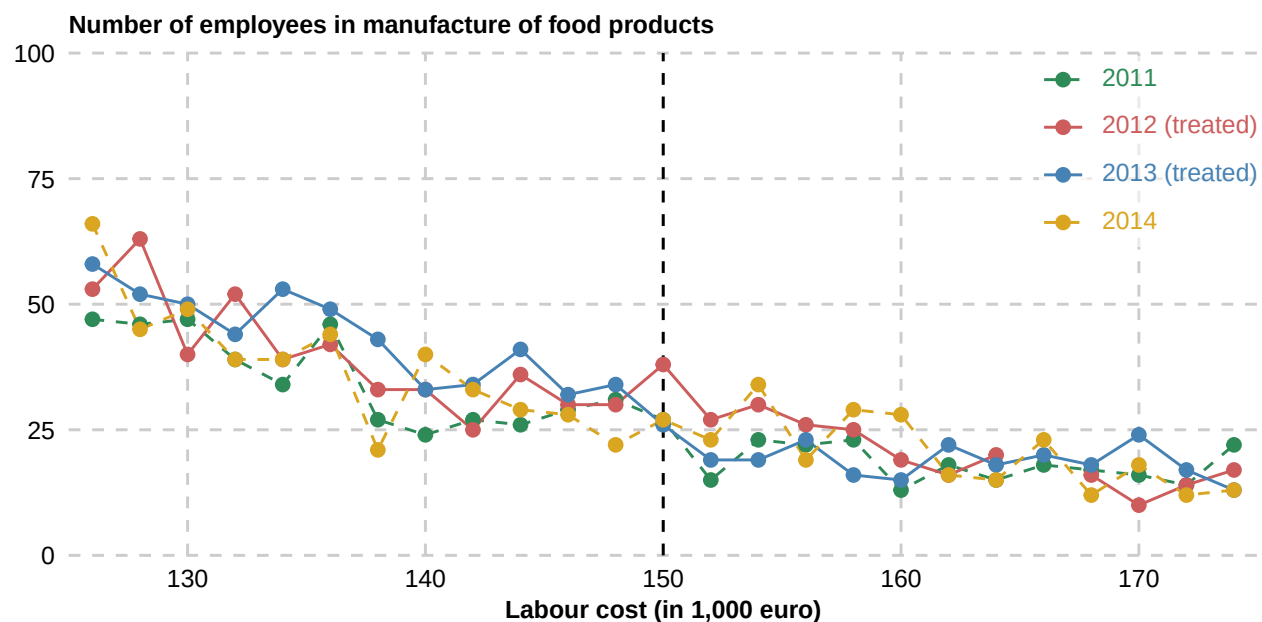
Note: This figure groups employees in financial service activities, except insurance and pension funding into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.8: Number of employees in wholesale trade, except of motor vehicles and motorcycles (G46)



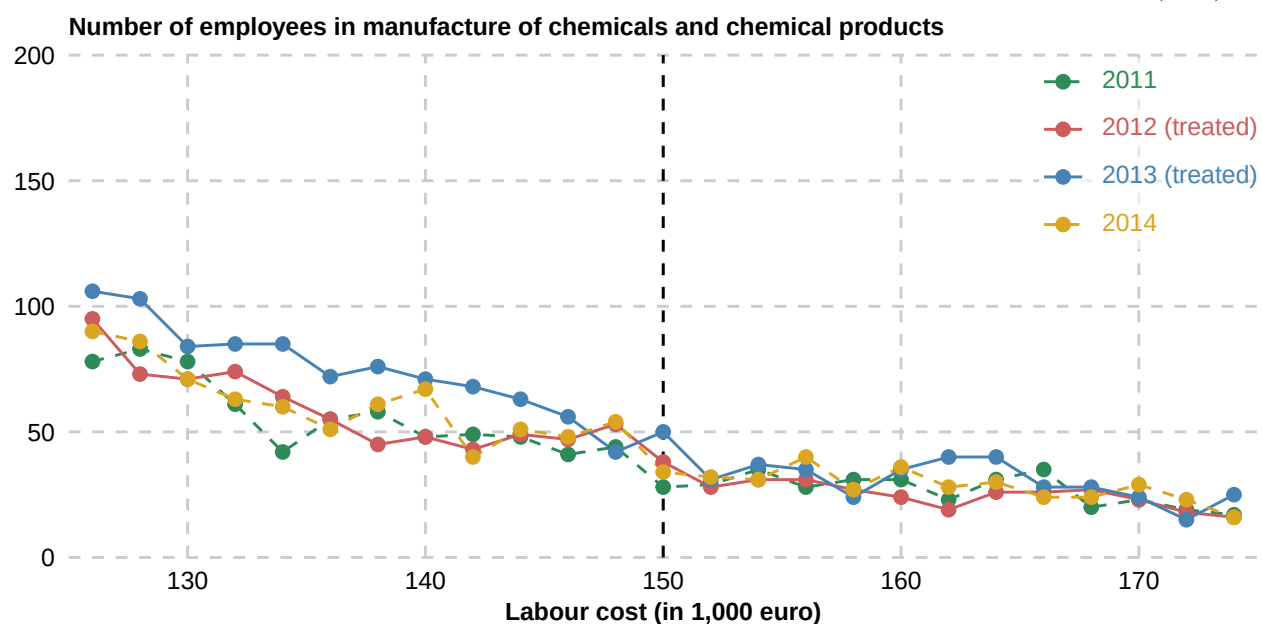
Note: This figure groups employees in wholesale trade, except of motor vehicles and motorcycles into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.9: Number of employees in manufacture of food products (C10)



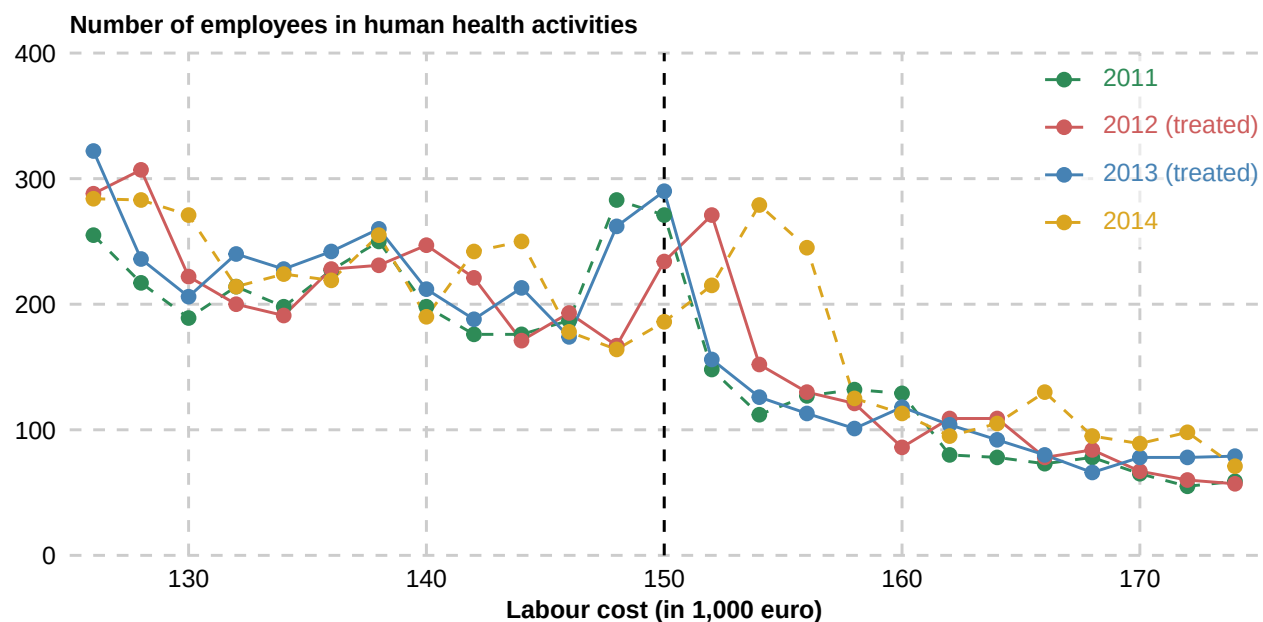
Note: This figure groups employees in manufacture of food products into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.10: Number of employees in manufacture of chemicals and chemical products (C20)



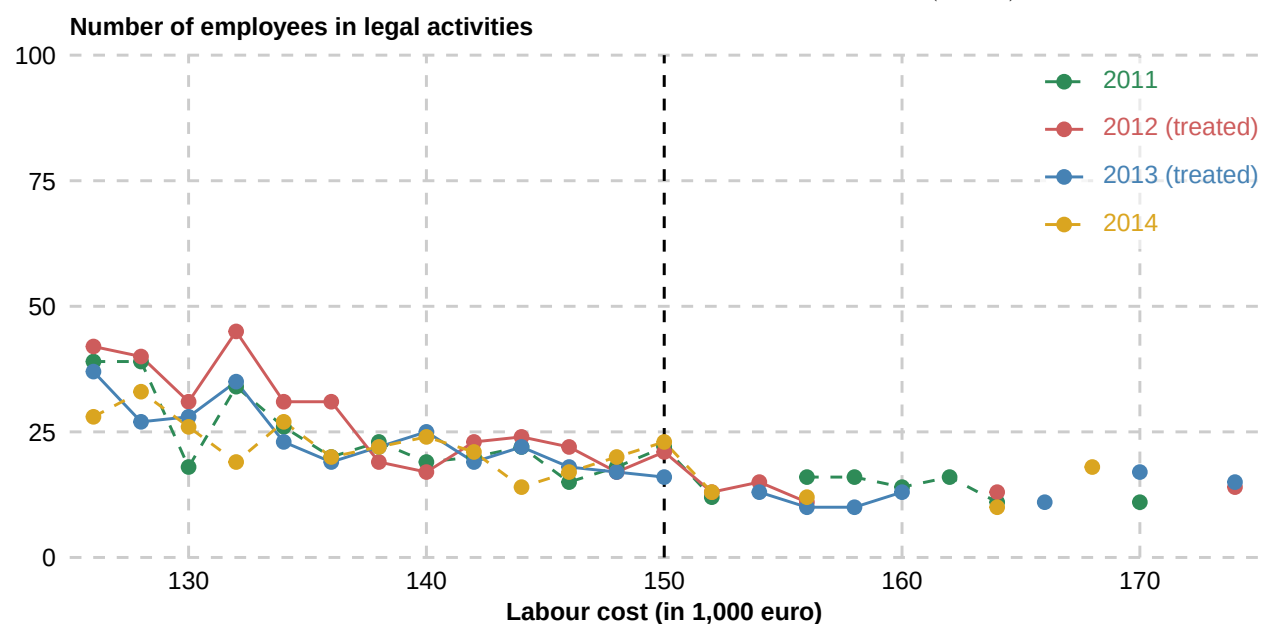
Note: This figure groups employees in manufacture of chemicals and chemical products into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.11: Number of employees in human health activities (Q86)



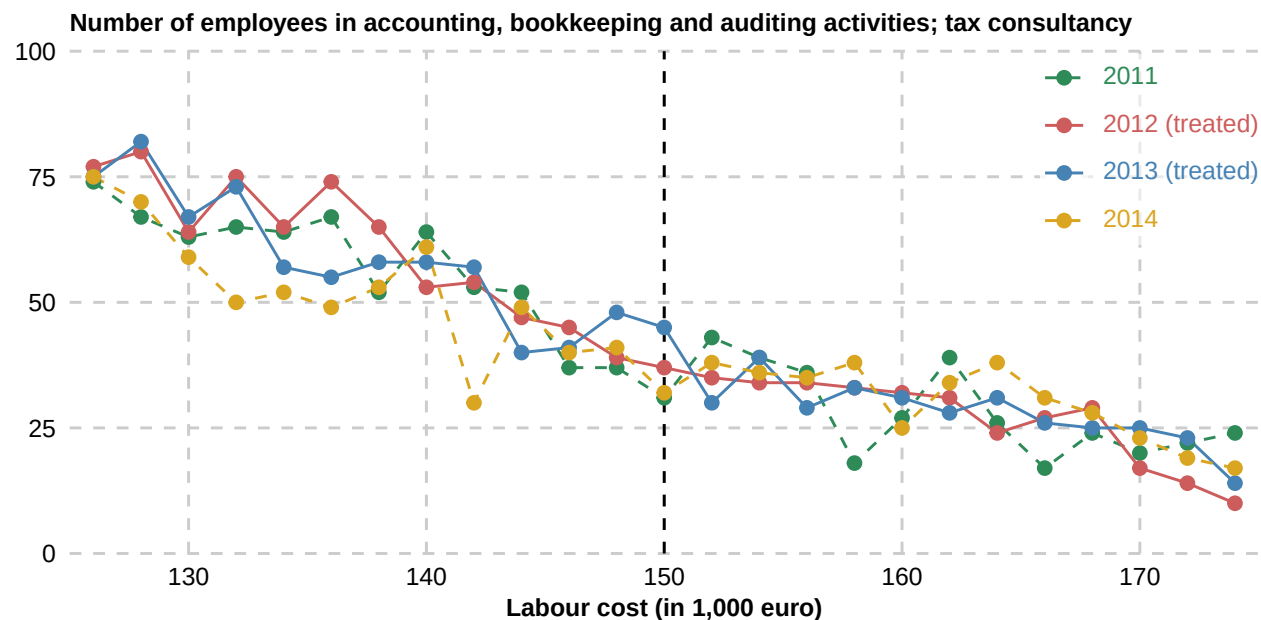
Note: This figure groups employees in human health activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.12: Number of employees in legal activities (M691)



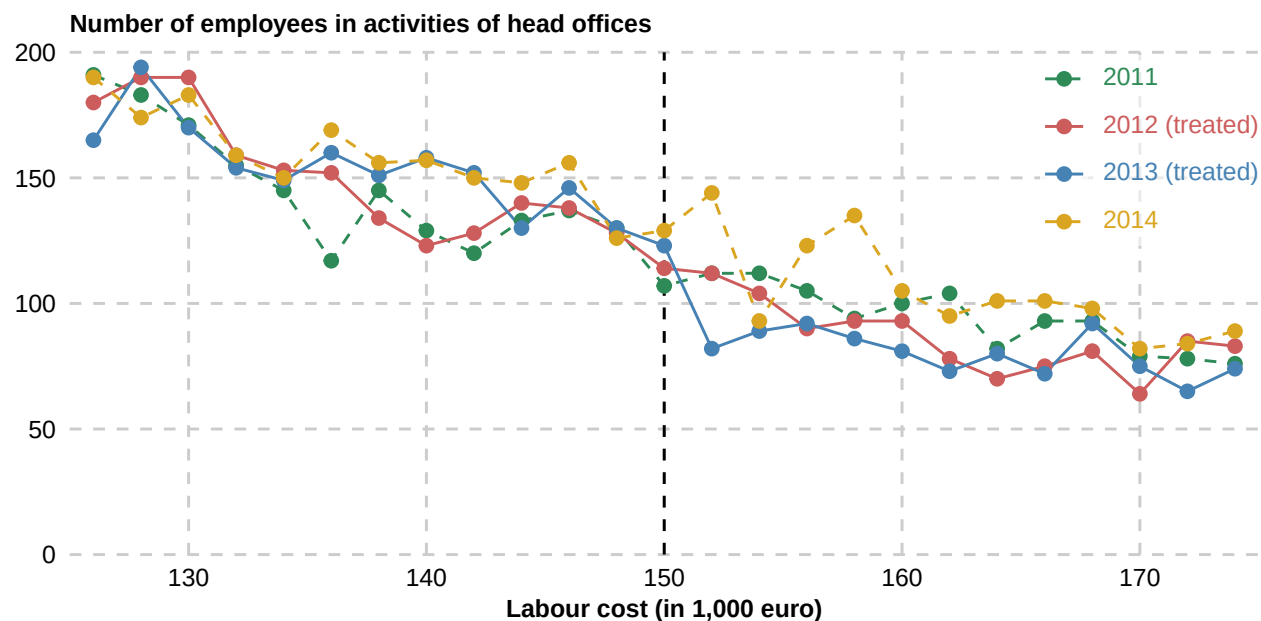
Note: This figure groups employees in legal activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.13: Number of employees in accounting, bookkeeping and auditing activities; tax consultancy (M692)



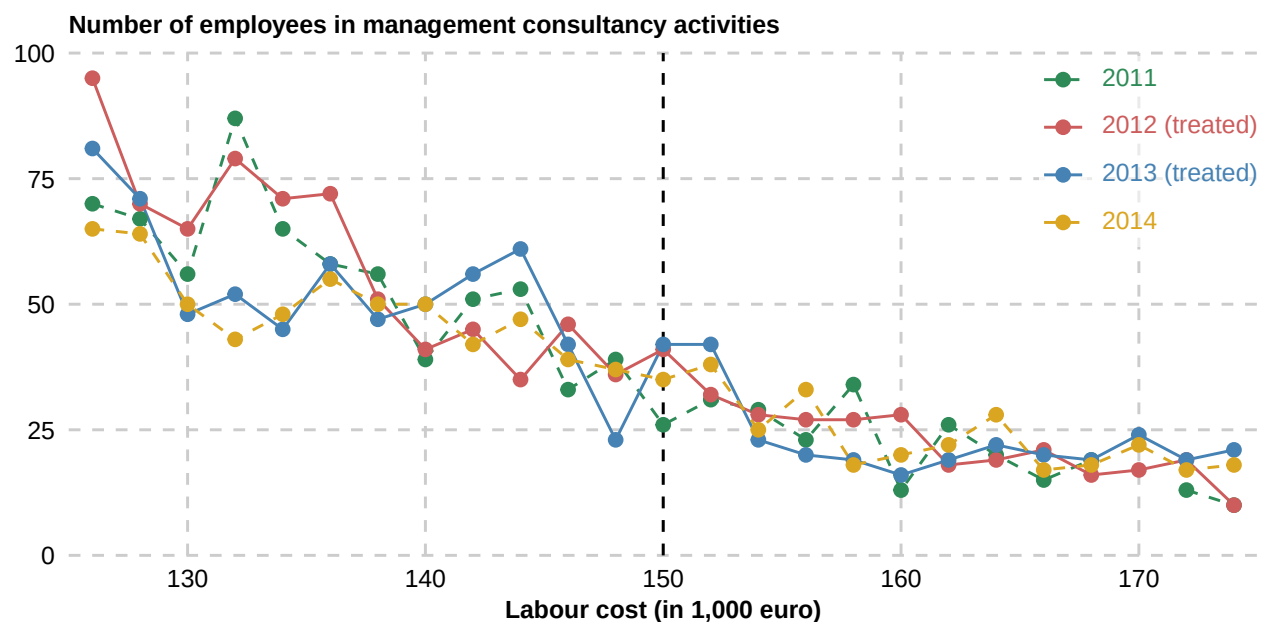
Note: This figure groups employees in accounting, bookkeeping and auditing activities; tax consultancy into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.14: Number of employees in activities of head offices (M701)



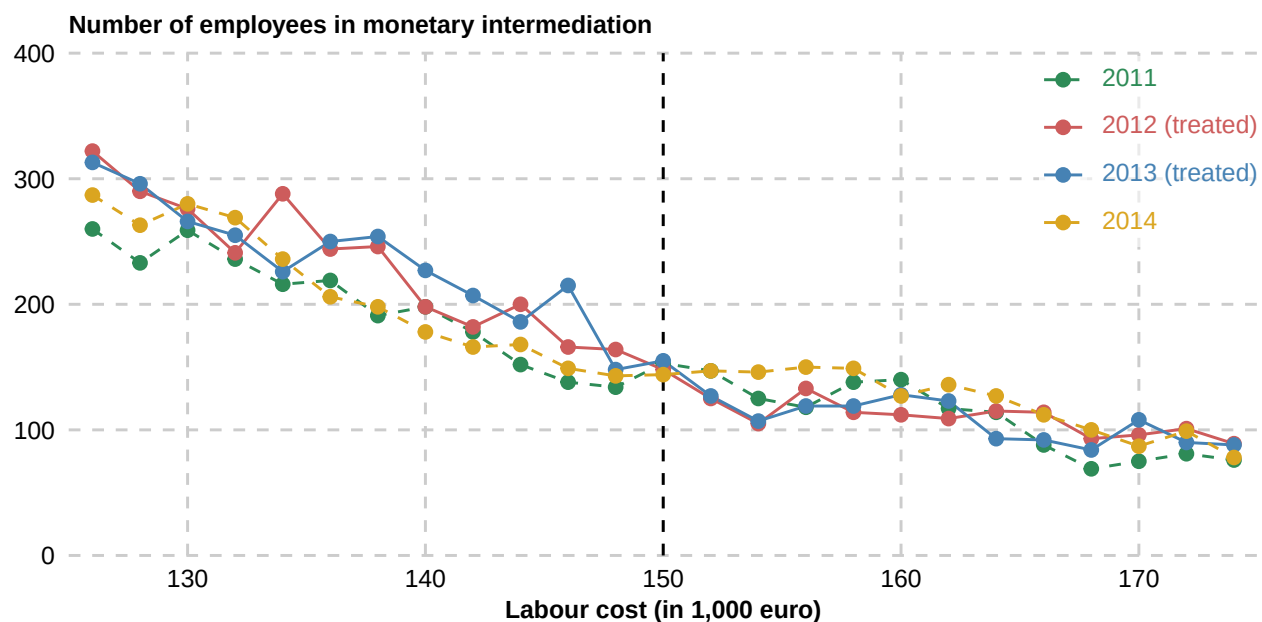
Note: This figure groups employees in activities of head offices into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.15: Number of employees in management consultancy activities (M702)



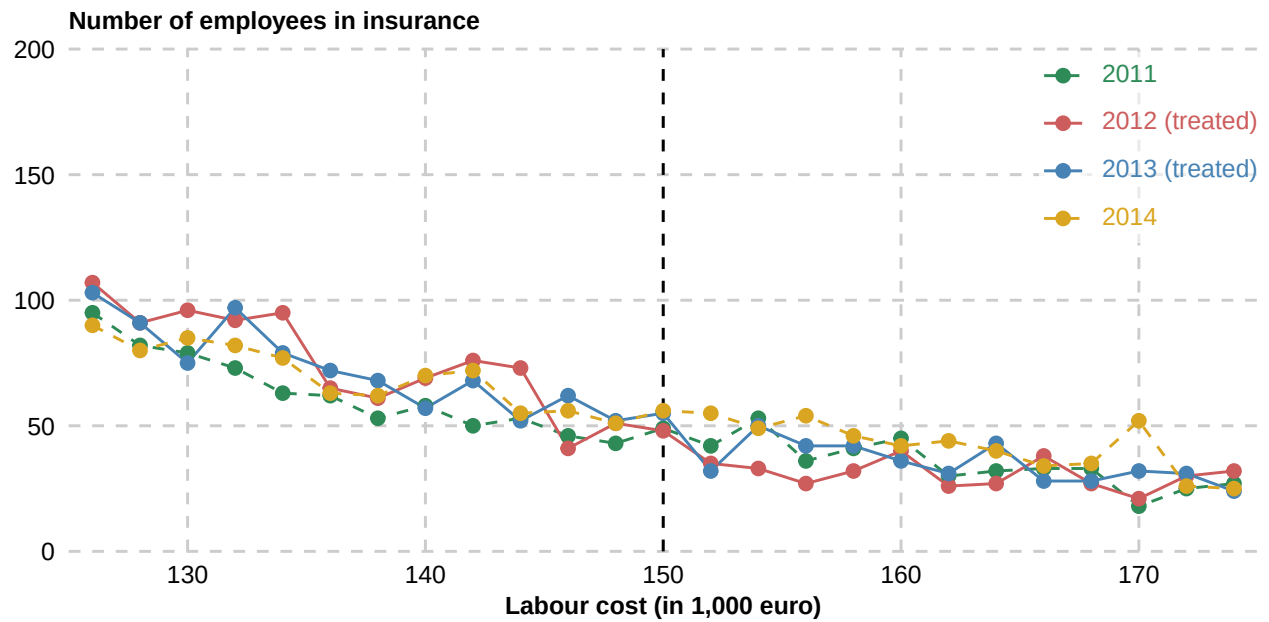
Note: This figure groups employees in management consultancy activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.16: Number of employees in monetary intermediation (K641)



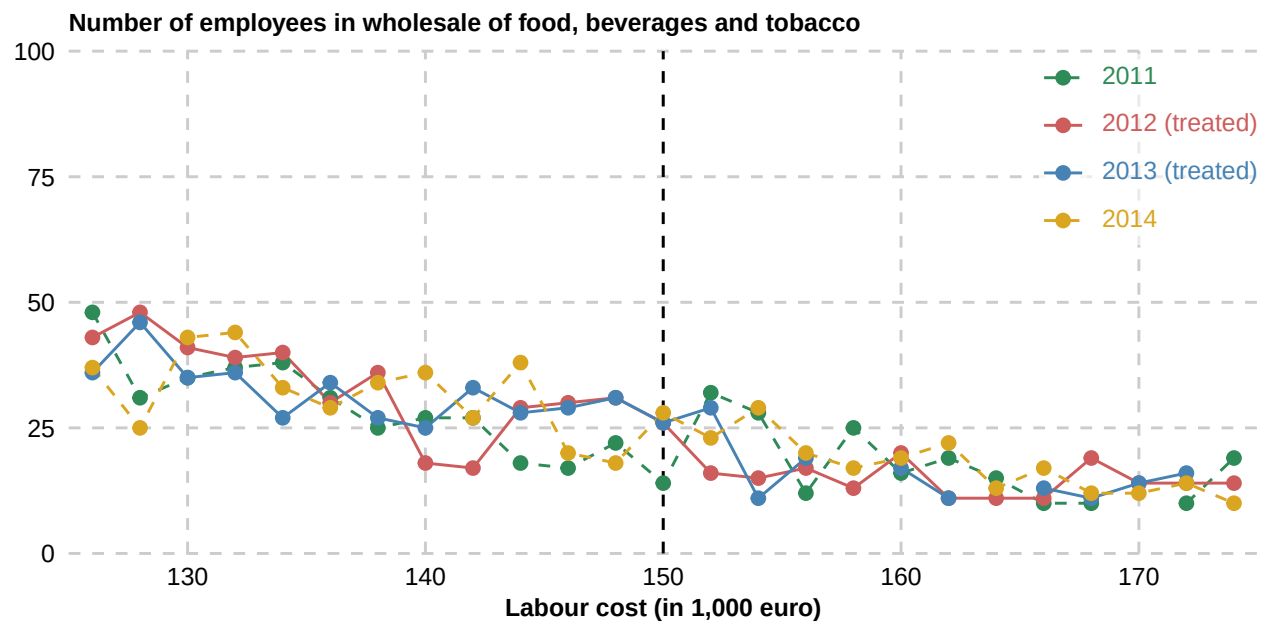
Note: This figure groups employees in monetary intermediation into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.17: Number of employees in insurance (K651)



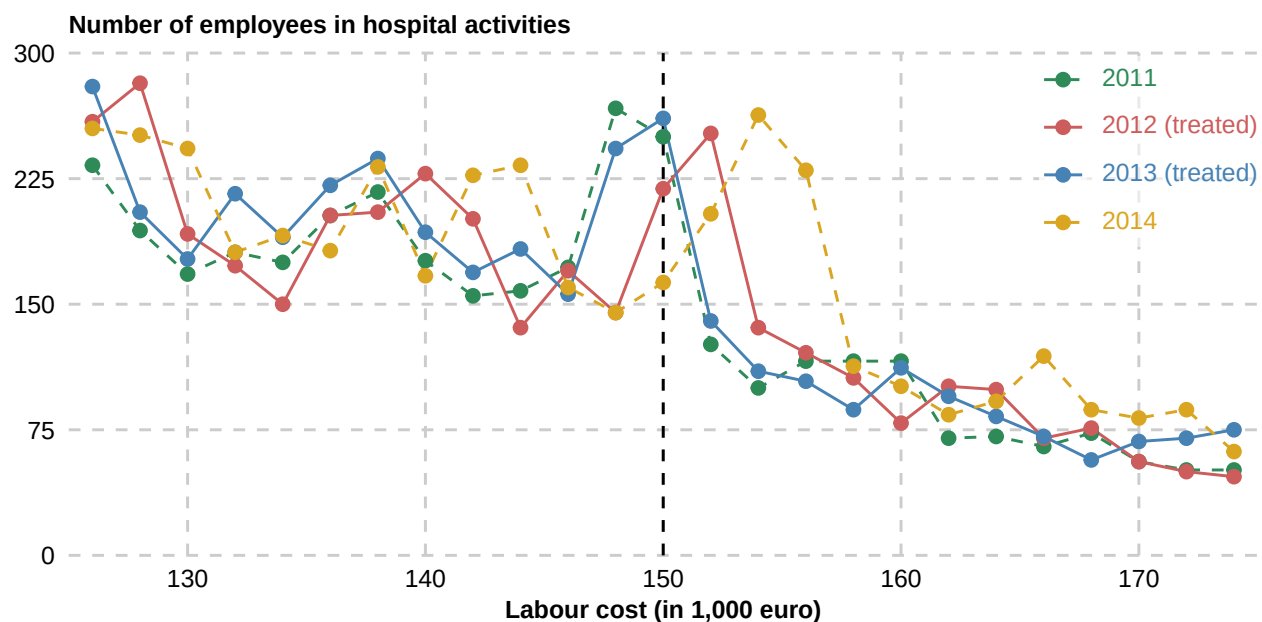
Note: This figure groups employees in insurance into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.18: Number of employees in wholesale of food, beverages and tobacco (G463)



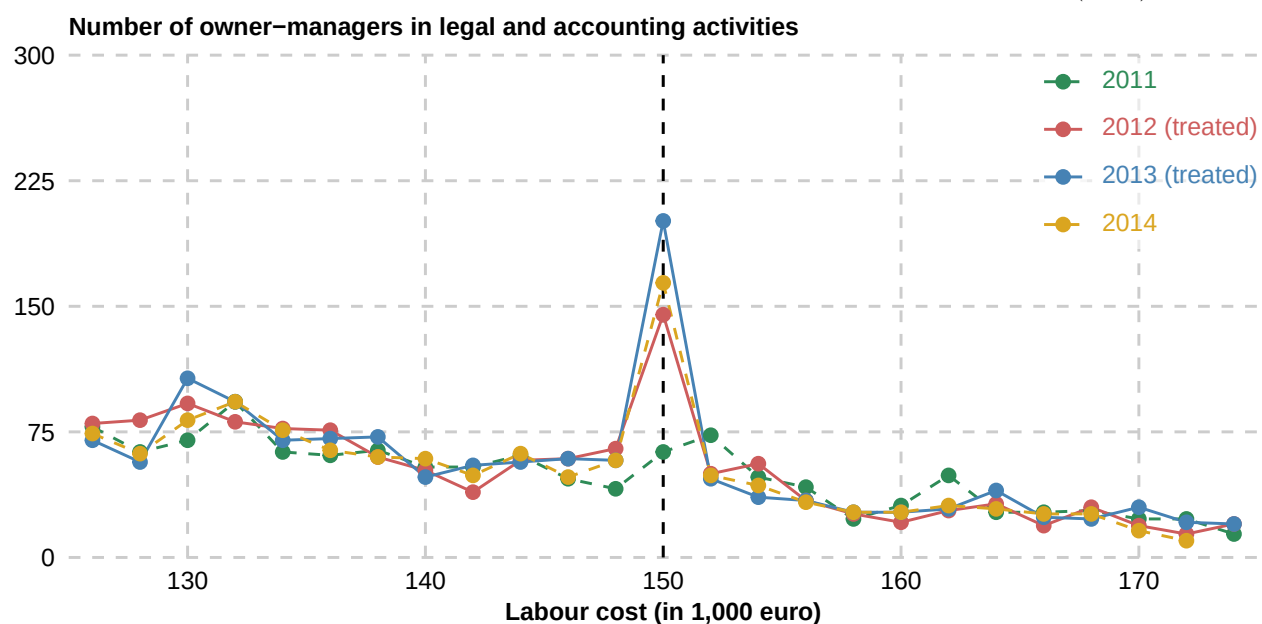
Note: This figure groups employees in wholesale of food, beverages and tobacco into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.19: Number of employees in hospital activities (Q861)



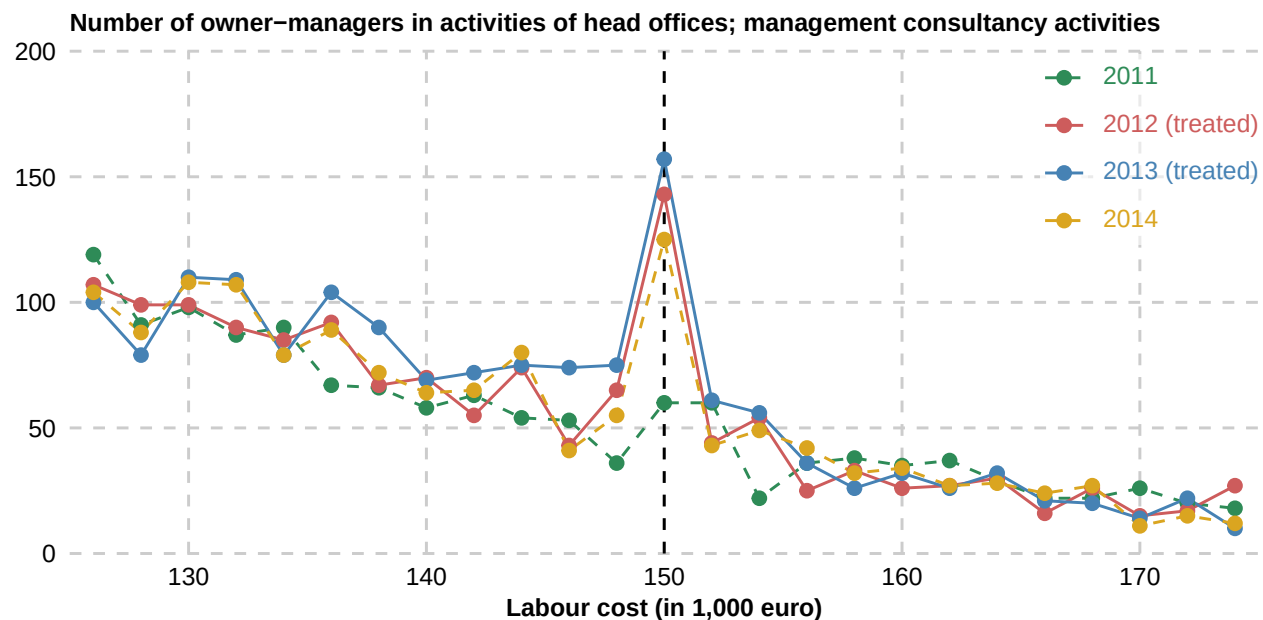
Note: This figure groups employees in hospital activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.20: Number of owner-managers in legal and accounting activities (M69)



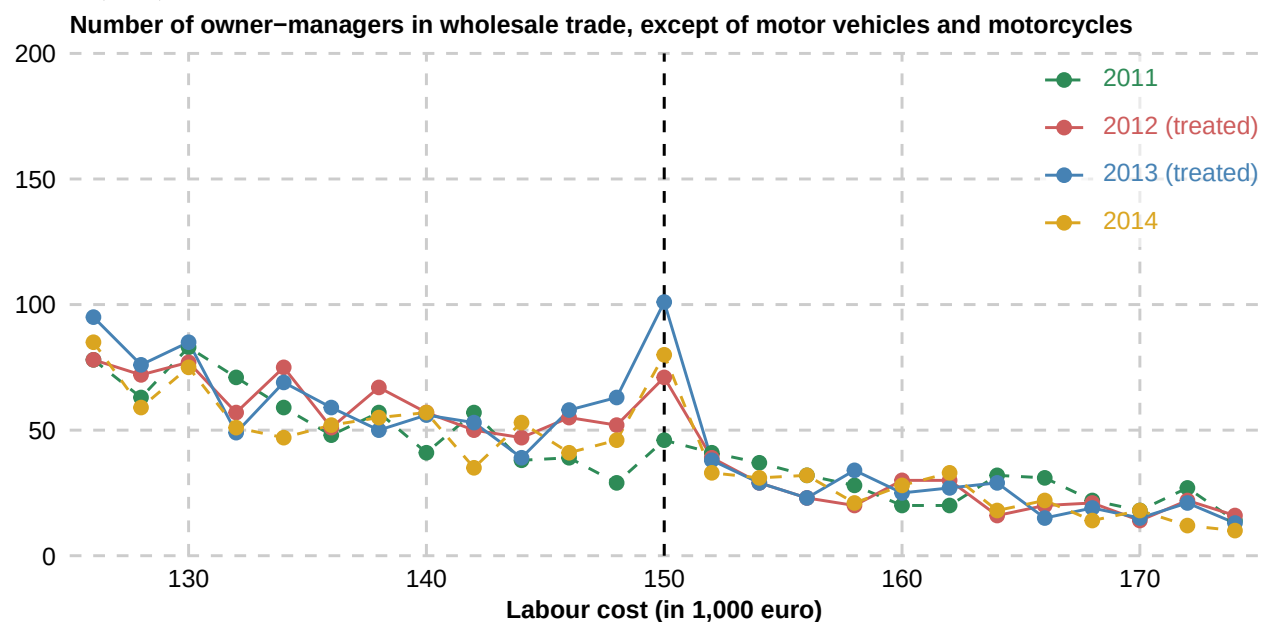
Note: This figure groups owner-managers in legal and accounting activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.21: Number of owner-managers in activities of head offices; management consultancy activities (M70)



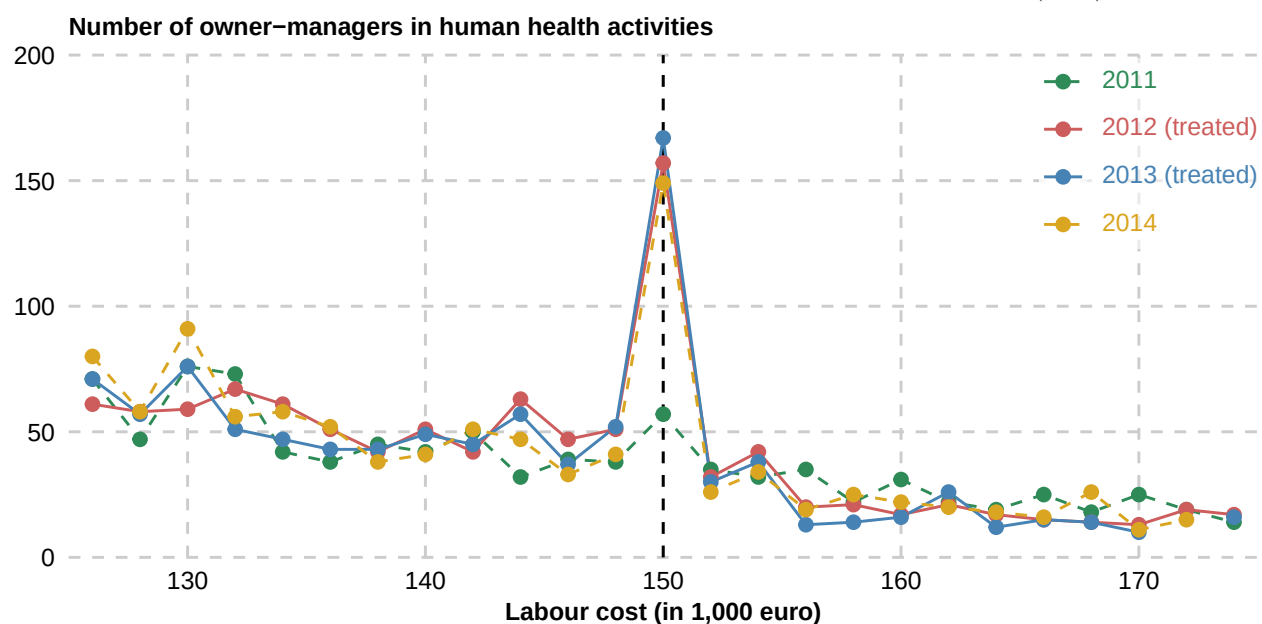
Note: This figure groups owner-managers in activities of head offices; management consultancy activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.22: Number of owner-managers in wholesale trade, except of motor vehicles and motorcycles (G46)



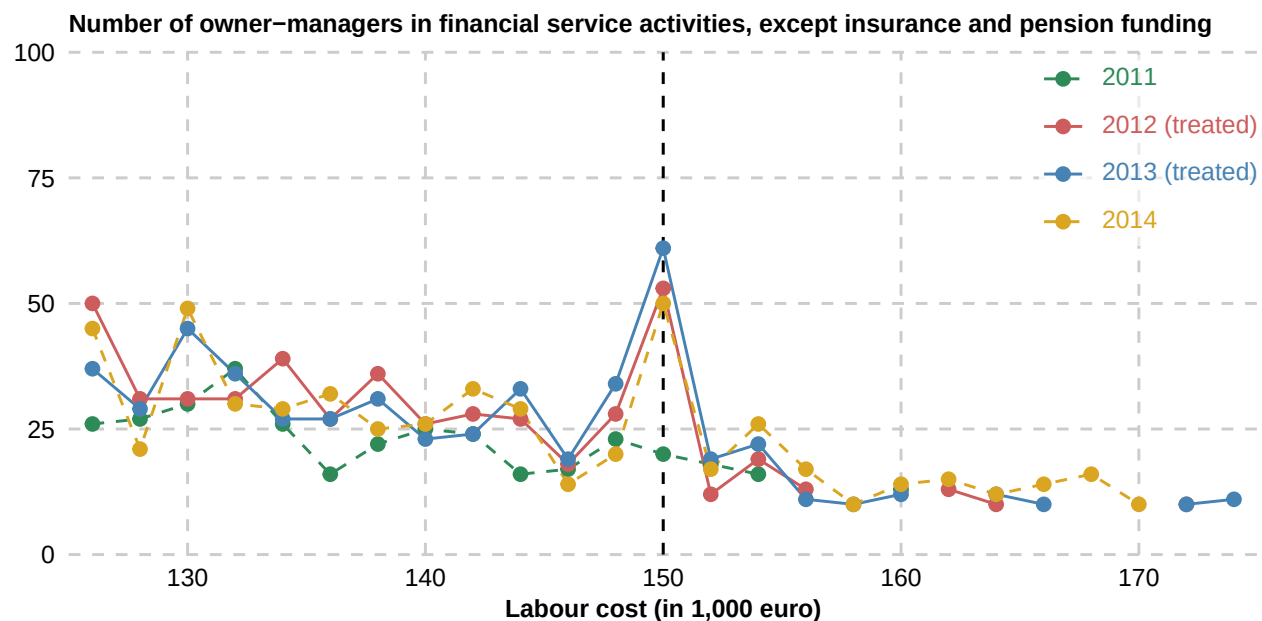
Note: This figure groups owner-managers in wholesale trade, except of motor vehicles and motorcycles into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.23: Number of owner-managers in human health activities (Q86)



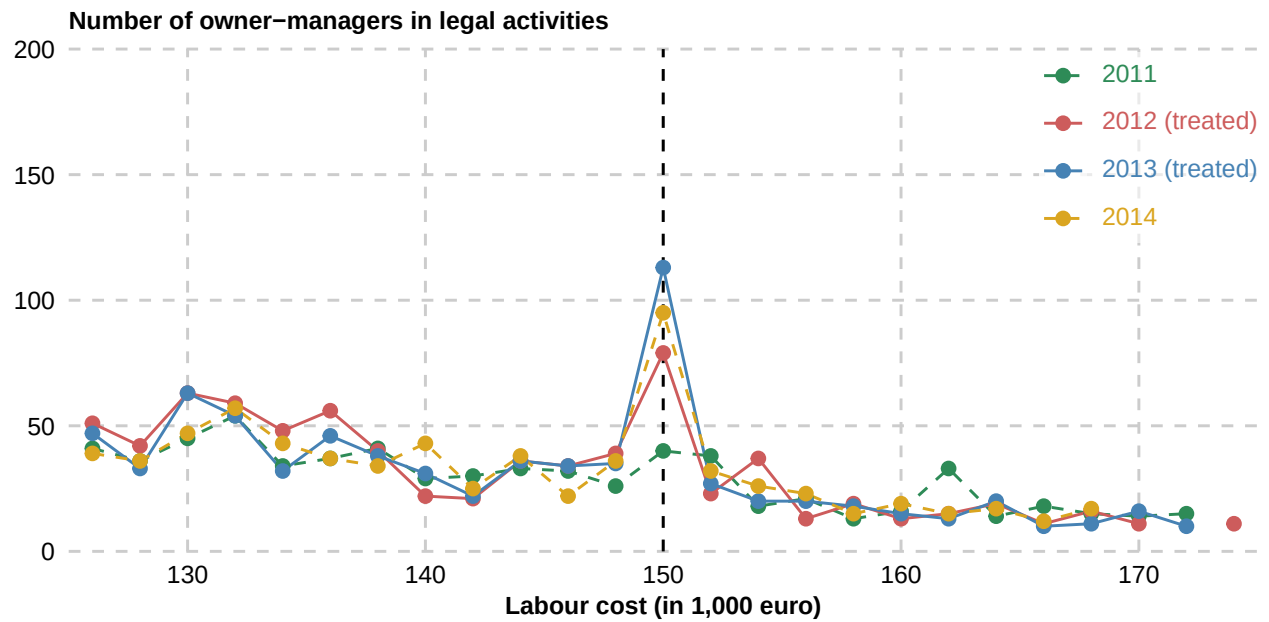
Note: This figure groups owner-managers in human health activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.24: Number of owner-managers in financial service activities, except insurance and pension funding (K64)



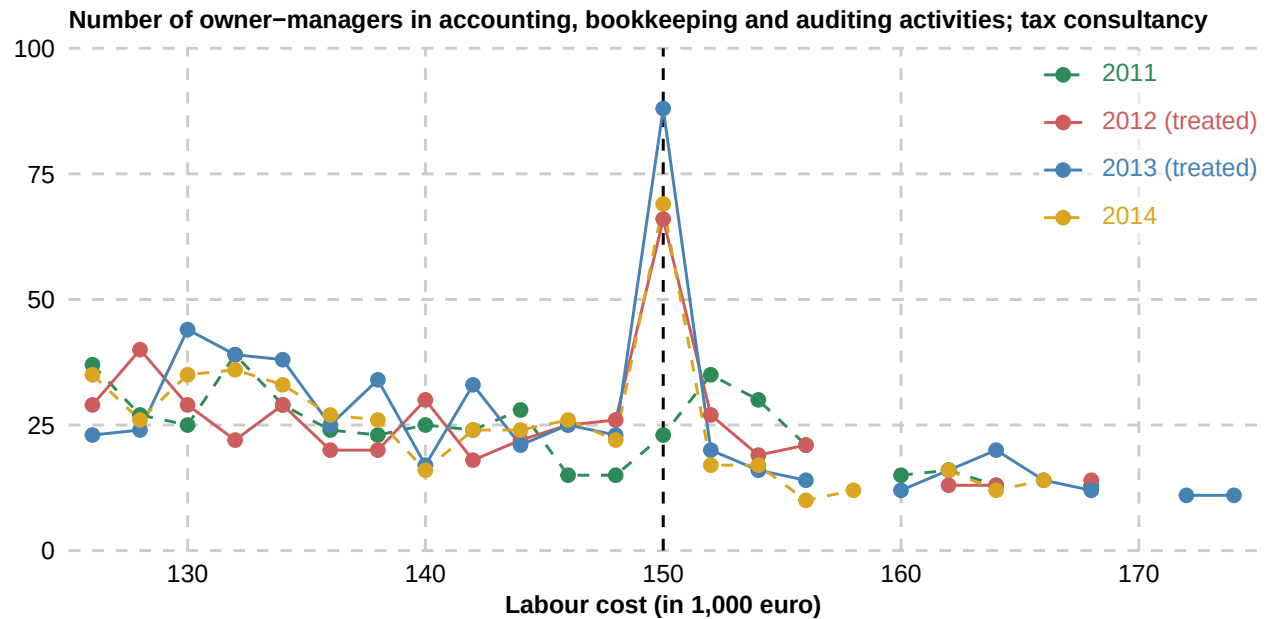
Note: This figure groups owner-managers in financial service activities, except insurance and pension funding into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.25: Number of owner-managers in legal activities (M691)



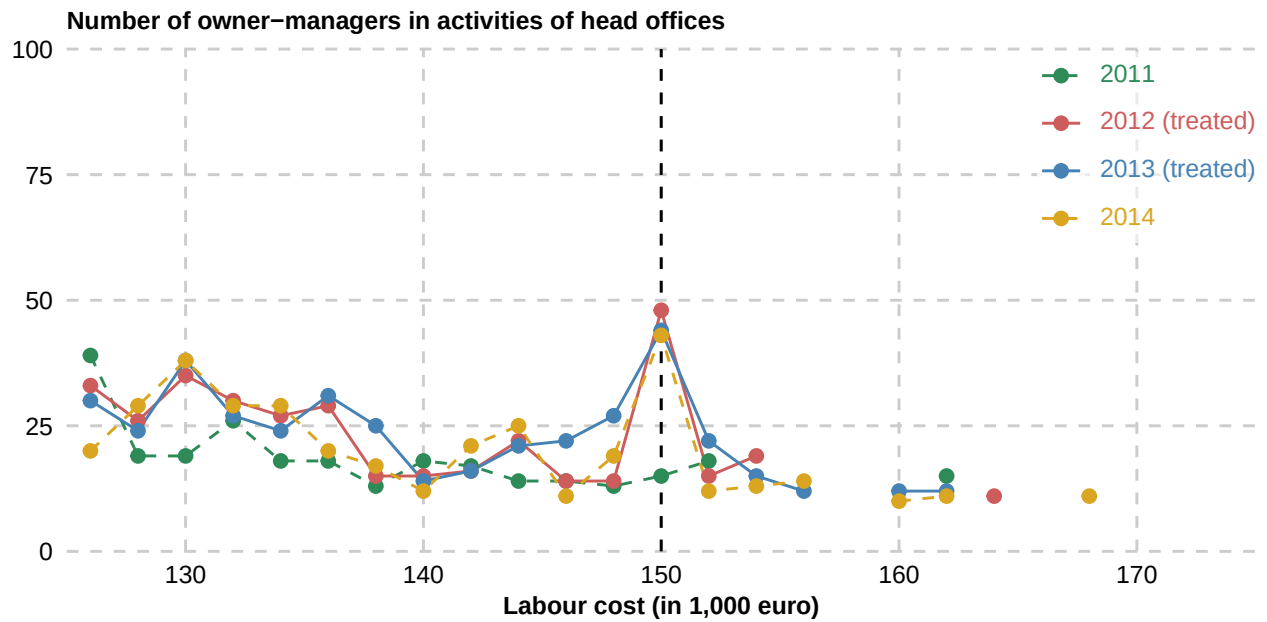
Note: This figure groups owner-managers in legal activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.26: Number of owner-managers in accounting, bookkeeping and auditing activities; tax consultancy (M692)



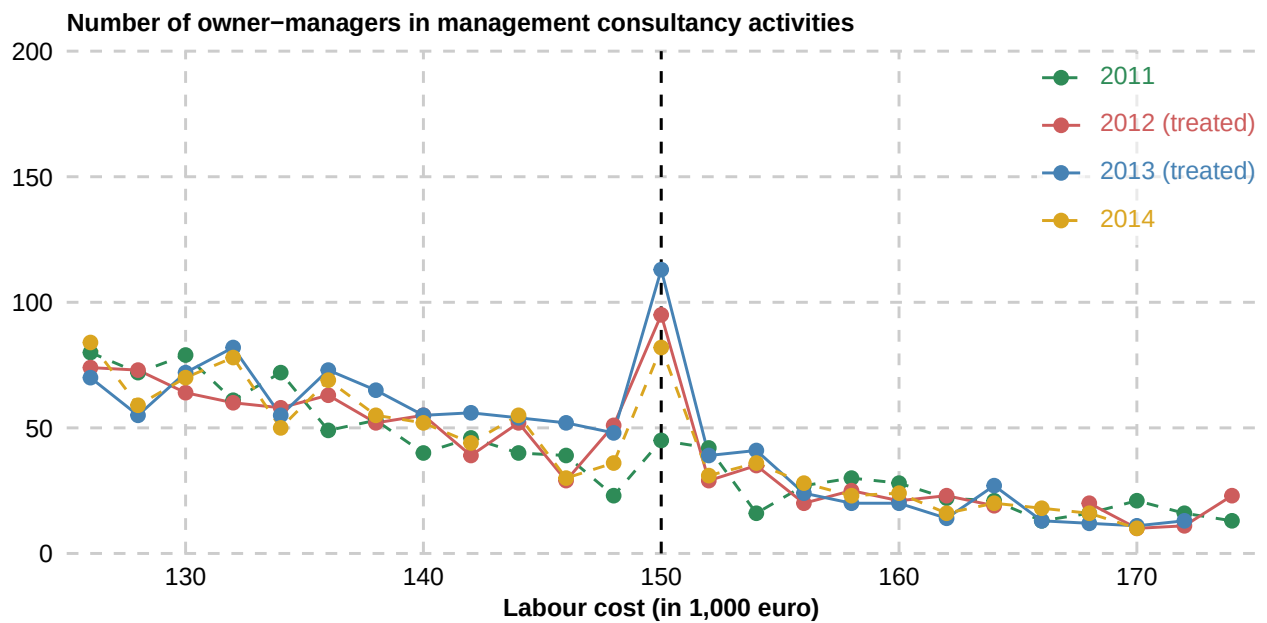
Note: This figure groups owner-managers in accounting, bookkeeping and auditing activities; tax consultancy into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.27: Number of owner-managers in activities of head offices (M701)



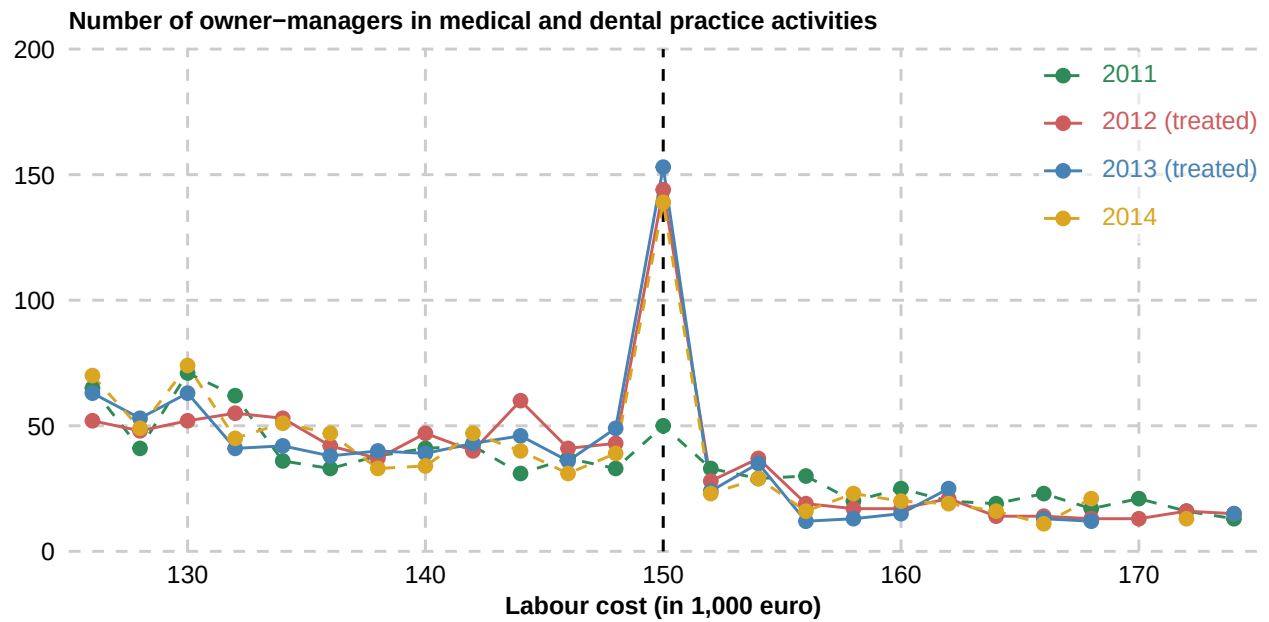
Note: This figure groups owner-managers in activities of head offices into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.28: Number of owner-managers in management consultancy activities (M702)



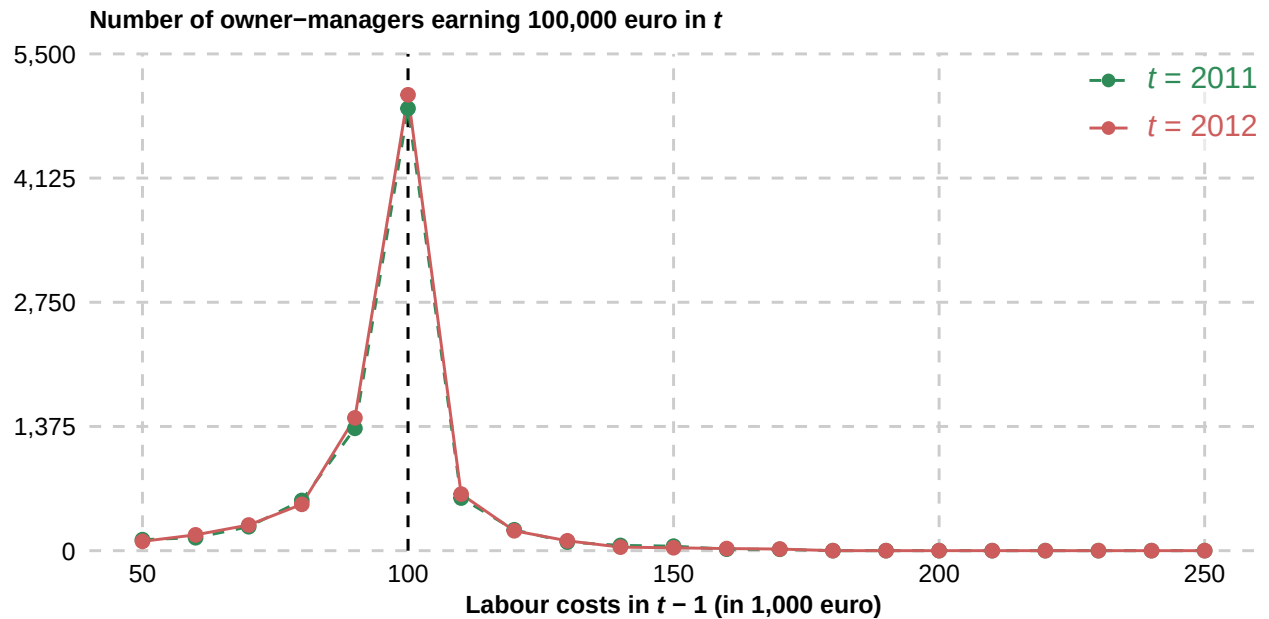
Note: This figure groups owner-managers in management consultancy activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.29: Number of owner-managers in medical and dental practice activities (Q862)



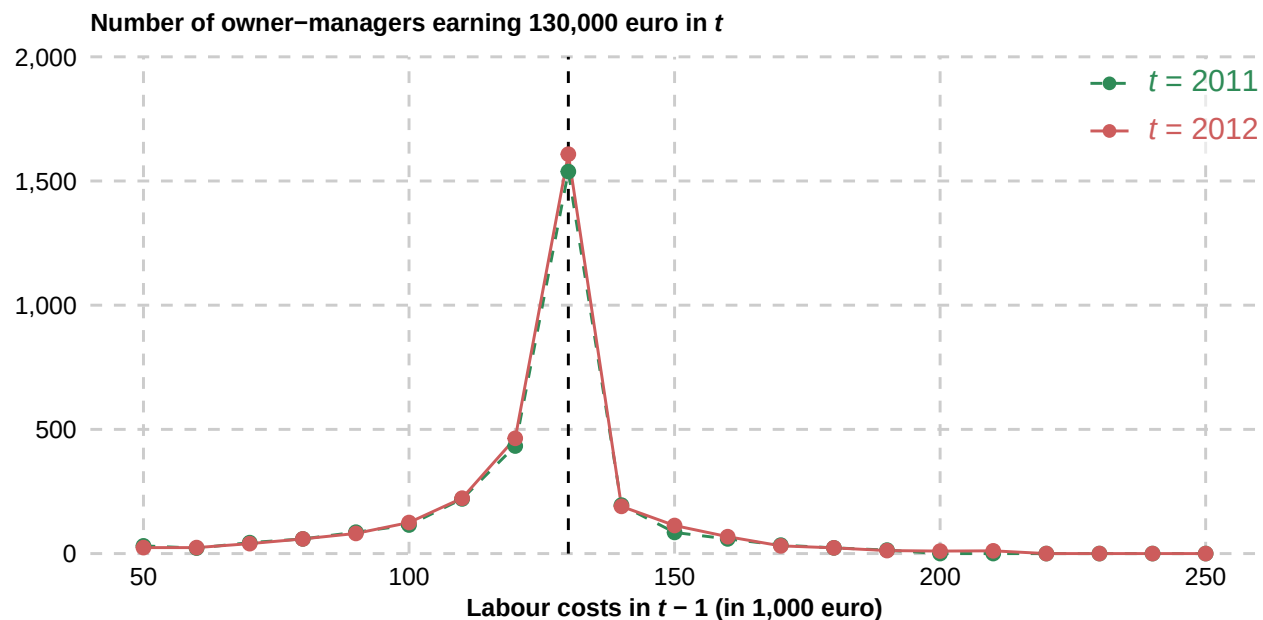
Note: This figure groups owner-managers in medical and dental practice activities into €2,000 bins of labour costs and plots the bin counts for each year in 2011–2014.

Figure A.30: Number of owner-managers earning €100,000 in t across the $t-1$ labour cost distribution



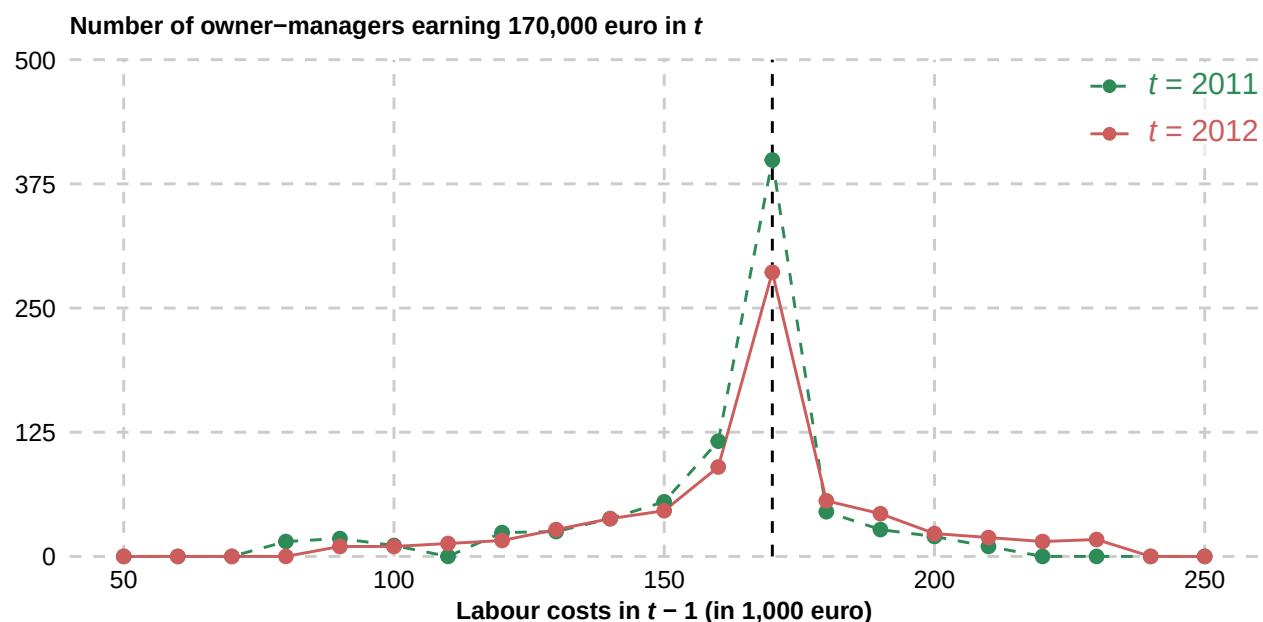
Note: For all owner-managers at €100,000 in year t , the figure shows their position in the prior-year ($t-1$) labour cost distribution. Bins are €10,000.

Figure A.31: Number of owner-managers earning €130,000 in t across the $t-1$ labour cost distribution



Note: For all owner-managers at €130,000 in year t , the figure shows their position in the prior-year ($t-1$) labour cost distribution. Bins are €10,000.

Figure A.32: Number of owner-managers earning €170,000 in t across the $t-1$ labour cost distribution



Note: For all owner-managers at €170,000 in year t , the figure shows their position in the prior-year ($t-1$) labour cost distribution. Bins are €10,000.