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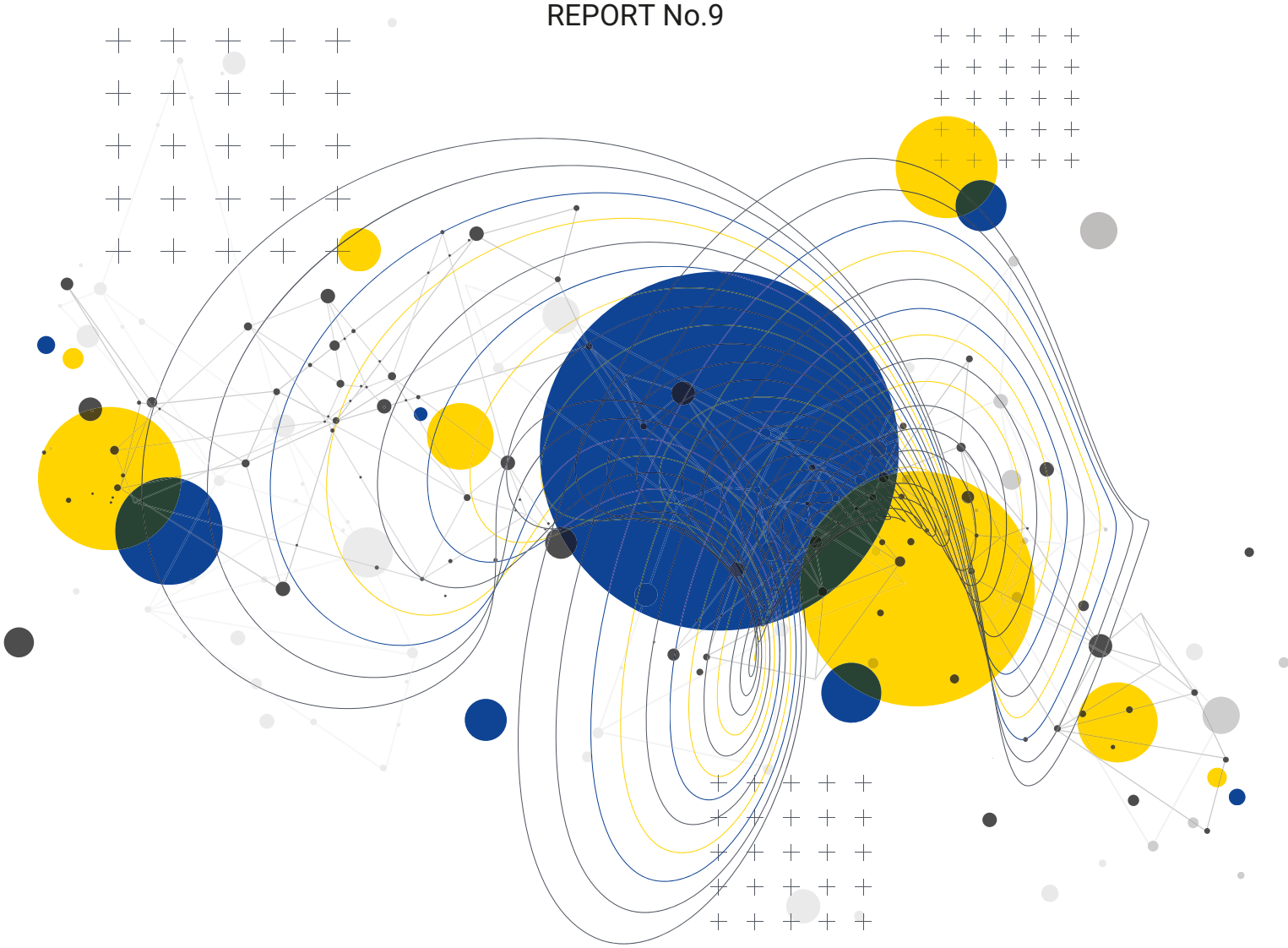

Tax Progressivity and Inequality in Brazil: Evidence from Integrated Administrative Data*

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Abstract

We use population-wide administrative micro-data to provide new estimates of income inequality and effective tax rates by income groups in Brazil, capturing all income and all tax payments. Our data allow us to link businesses to their owners and thus to allocate business income and associated taxes to the corresponding individual firm owners. We provide sharp upward revisions to official inequality estimates: the top 1% earns 27.4% of total income in 2019, one of the highest level recorded in the world. The tax system, which relies heavily on consumption taxes, is regressive: while the average tax rate in the economy is 42.5%, this rate falls to 20.6% for million-dollar earners (roughly the top 0.01% of the distribution), due to the non-taxation of dividends and provisions that reduce corporate tax liabilities. We provide evidence suggesting that inequality in developing countries may be systematically underestimated, as even in Brazil—where dividends are untaxed, and hence incentives to retain income within companies are limited—attributing profits to business owners substantially raises income inequality.

JEL Codes: D3, H2, H3, H5

*Corresponding author: Theo Palomo (theo.ribaspalomo@psemail.eu). All data work for this project involving confidential taxpayer information was done at the Brazilian Tax Authority (*Receita Federal do Brasil*, RFB) facilities, on RFB computers, by RFB tax auditors, and at no time was confidential taxpayer data ever outside of the RFB computing environment. All results have been reviewed to ensure that no confidential information is disclosed. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the *Receita Federal do Brasil* (RFB), the World Bank and its affiliated organizations, the Executive Directors of the World Bank, or the governments they represent. We thank numerous seminar and conference participants for helpful comments and reactions. Funding from the Stone Center at the Paris School of Economics, the European Research Council, the European Commission grant TAXUD/2023/DE/318, and the the Agence Nationale de la Recherche through the program Investissements d'Avenir ANR-17-EURE-0001 are thankfully acknowledged.

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1 Introduction

This paper provides new estimates of income inequality and effective tax rates by income group in Brazil, capturing all income and all tax payments. The key novelty is to use population-wide administrative micro-data, including the universe of individual income tax returns, business tax returns, and linked firm-owner data. It is the first time such data are mobilized to estimate inequality and tax progressivity in Brazil and in a large Global South country more broadly.

These data allow us to address some of the main issues that traditionally limit the ability of researchers to measure inequality. A major challenge is the measurement of business income, the main source of income at the top of the distribution. Business owners can chose to distribute or retain profits in companies. Only distributed income, however, is visible in the data sources traditionally used to study inequality—household surveys and individual income tax returns. Because incentives to retain income in companies vary depending on the specifics on the tax law and other factors, accounting for the totality of business income is key to maximize the comparability of inequality across countries and over time. With the data used in this paper we can link businesses to their owners and thus allocate business income, whether distributed or retained, to the corresponding firm owners. This linking also enables us to provide a first estimate of total effective tax rates by income group taking into account all tax payments, including business taxes. Accounting for business taxes is particularly important in Brazil, a country where dividends are tax free but where the statutory corporate tax rate (34% in 2019) is relatively high in international perspective.

We obtain two main results. First, our new data lead us to provide a sharp upwards revision to official inequality estimates. We find that the top 1% earns 27.4% of total income in 2019. This is 7.1 percentage points higher than the latest estimate obtained using state-of-the-art distributional national accounts methods, which allocates corporate retained earnings based on the distribution of capital income reported in survey data (De Rosa, Flores, and Morgan, 2024). Our estimate is markedly higher because undistributed corporate profits turn out to be much more concentrated than directly observable income sources. This result suggests that income inequality in developing countries may be systematically underestimated, as even in Brazil—where dividends are untaxed, and hence incentives to retain income within companies are limited—attributing profits to business owners based on linked administrative data substantially raises income inequality relative to frontier methods.

Second, we find that despite the high nominal statutory corporate tax rates, effective tax rates are relatively low at the top of the income distribution. While the average tax rate

in the economy is 42.5%, dollar-millionaires—i.e., adults earning at least USD 1 million in income per year, roughly the top 0.01% of the distribution in Brazil—pay 20.6% of their income in taxes, all taxes included. The limited progressivity of income taxes—personal and business combined—is insufficient to offset the regressivity of Brazil's high taxes on consumption. The effective tax rate of Brazilian million-dollar earners is low in international perspective. In the United States (a country with a lower tax-to-GDP ratio than Brazil), people with more than $1 million in income pay on average around 36% of their income in taxes.[1] Effective tax rates for million-dollar earners are also higher in European countries, where macroeconomic rates are comparable to Brazil (see Zucman, 2024, for a review of existing estimates). This suggests that there is scope in Brazil for increasing tax rates on very high income individuals. Because of the high level of income concentration, the budgetary stakes are significant.

This study was made possible thanks to a research collaboration with the Brazilian Tax Authority (*Receita Federal do Brasil*). In the context of this collaboration we were able to analyze administrative micro tax data on personal and business income. Using comprehensive shareholder-registry data, we constructed a 10-level shareholder tree that links corporations to individual owners. This allows us to peer through corporate ownership structures to allocate business income and corporate tax payments to individuals. The data identifies individual beneficiaries for 88% of total corporate profits, after excluding profits attributable to the government and foreign shareholders.

Using these linked data, we construct augmented estimates of income inequality adding corporate retained earnings to income observable in individual tax returns and in household surveys. We call this augmented measure of income "economic income". The mere addition of retained earnings significantly increases income inequality: the top 1% income share increases from 21.7% to 26.9% after the addition of retained earnings. We then make additional improvements and imputations to capture all of national income and maximize comparability with distributional national accounts created in other countries. This second step has barely any effect on income concentration (e.g., the top 1% income share rises from 26.9% to 27.4%). Nearly all our adjustment to official inequality estimates comes from the addition of retained earnings.

The study is organized in three parts. Given our focus on business income and taxes, we begin by documenting the organization and taxation of business activity in Brazil. The type of business tax regime varies by firm size: small and medium enterprises are subject to simplified turnover taxes; upper-middle-sized firms fall under a presumptive regime that applies fixed profitability rates depending on the sector; and large firms pay

[1] This is the average tax rate of million-dollar adult earners (roughly the top 0.2% of the US pretax income distribution) using the updated Piketty, Saez, and Zucman (2018) micro-files.

the standard corporate income tax based on reported profits and full financial accounting disclosure. The availability of simplified regimes for small and medium firms and of tax incentives for large firms lowers the effective corporate tax rate. The average profitable firm in the bottom 90% of the size distribution pays less than 5% of its profits in taxes. Although the top statutory rate on corporate profits is 34%, the average tax rate of the largest 1% of firms is always below 25%: close to one in five even pays less than 1% of profits in taxes. These low rates stem from generous tax benefits that reduce tax liability, even for large, highly profitable firms (Receita Federal do Brasil, 2023; Gobetti, 2025).

In the second part, we analyze the linked firm–owner dataset. By identifying the ultimate beneficiaries of business income, we assign most undistributed profits and business tax payments to individuals. This allows us to examine the progressivity of the combined personal and business income tax system. We construct effective tax rates as a ratio of individual and business taxes paid to economic income. The personal income tax is progressive up to the 99th percentile; it then sharply drops to just 1.6% for the top 0.001%. The decline arises because the main income sources at the top—distributed and undistributed business income—are not taxed under the personal income tax. By contrast, the business income tax is moderately progressive and acts as a backstop to the personal income tax. Combining personal and business income taxes delivers effective tax rates of 4.3% for P89–P90, 10.1% for P99–P99.1, 11.5% for P99.9–P99.91, and 13.9% for P99.99–P99.991, before easing to 13.1% for the top 0.001%.

In the third part, we combine tax records, household surveys, and national accounts to estimate income inequality and effective tax rates for the entire Brazilian population. Income inequality in Brazil is both high in absolute terms and markedly above earlier estimates: the top 1% earns 27.4% of total pretax national income. This reflects high concentration among the ultra-rich: the top 0.1% (150,000 individuals) share is equal to 12.4%, while the top 0.01% (15,000 individuals) share is 6.1%. Most Brazilians face high effective tax rates between 45% and 50%, due to high consumption taxes, but this rate drops to 26.2% for the top 1%. Our tax rates exclude the fraction of consumption taxes paid out of transfer income, ensuring that effective tax rates are meaningful at the bottom of the distribution (Saez and Zucman, 2023). Naturally, taxes are only one side of government intervention in the economy; at the bottom of the distribution cash transfers play an important role in lifting consumption possibilities. We leave the analysis of the progressivity of government spending to future work. The objective of the present research is to quantify the effective tax rate of the rich and to put them in the context of the overall high tax take of Brazil and of comparable studies in other countries.

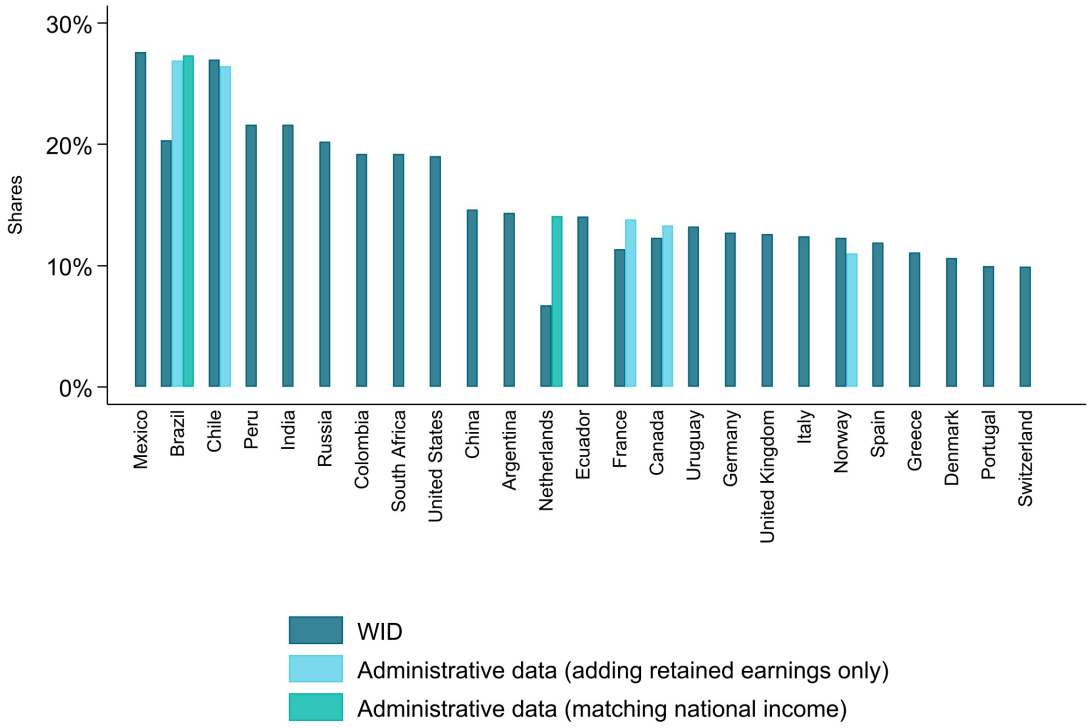
Contribution to the literature. Our paper contributes to the literature on inequality and tax progressivity in several ways.

First, we build on a rich literature on inequality and taxation in Brazil. Gobetti and Orair (2016) and Fernandes, Campolina, and Silveira (2019) use personal income tax (PIT) tabulations to assess the distributional effects of taxation. Medeiros, Souza, and Castro (2015) and Souza (2016) were pioneers in combining tax tabulations with household surveys to estimate income inequality, although their approach excluded undistributed business income. More recently, De Rosa, Flores, and Morgan (2024) reconcile previous estimates with national accounts. They incorporate business income based on standard assumptions used in the distributional national accounts literature. These studies all rely on tax tabulations. Our study is the first to use administrative micro tax data. It improves on earlier work in several respects: linking personal income tax (PIT) and corporate income tax (CIT) returns to allocate retained earnings and business income taxes to the actual firm-owners; linking PIT and withholding income tax (WHT) returns to measure income and taxes withheld; and minimizing assumptions–such as couple composition at the top–since these features are directly observed in our data.

Second, we contribute to the literature on the measurement of top incomes. Business profits account for virtually all income at the very top of the distribution. There have been attempts to construct augmented measures of income inequality accounting for the totality of business profits (distributed plus retained) using shareholder registries or similar data in Canada (Wolfson et al., 2016), Chile (Fairfield and Jorratt De Luis, 2016), France (Bach et al., 2023b), Honduras (Del Carmen et al., 2025), the Netherlands (Bruil et al., 2025), and Norway (Alstadsæter et al., 2016; Aaberge et al., 2024). With the exception of the work of Del Carmen et al. (2025) in Honduras, these studies cover OECD countries; our paper is the first to cover a large Global South country. What makes Brazil particularly interesting (beyond its size) is that researchers have access to granular income tax tabulations, inequality measured with these data is already very high, incentives to retain earning in companies are limited (since dividends are tax free), and yet linking firms to their owners leads to a sharp jump in measured income concentration. The key insight is that even when top earners face zero tax at the margin on distributed profits, inequality can be significantly higher than what can be inferred from individual income data alone.[2] One possible explanation is that firms may retain earnings for reasons other than tax-related, e.g., due to costly access to outside capital. This raises the possibility that inequality in Global South countries may be systematically underestimated.

[2]Allocating retained earnings also leads to an increase in inequality in Norway before 2005, when the country did not have a dividend tax (Alstadsæter et al., 2016; Aaberge et al., 2024). However, there were incentives for firm owners to minimize dividend distributions to avoid the wealth tax (which was capped at a fraction of income) while no such incentive exists in Brazil.

Figure 1: Top 1% pretax income share across the world: comparing estimates



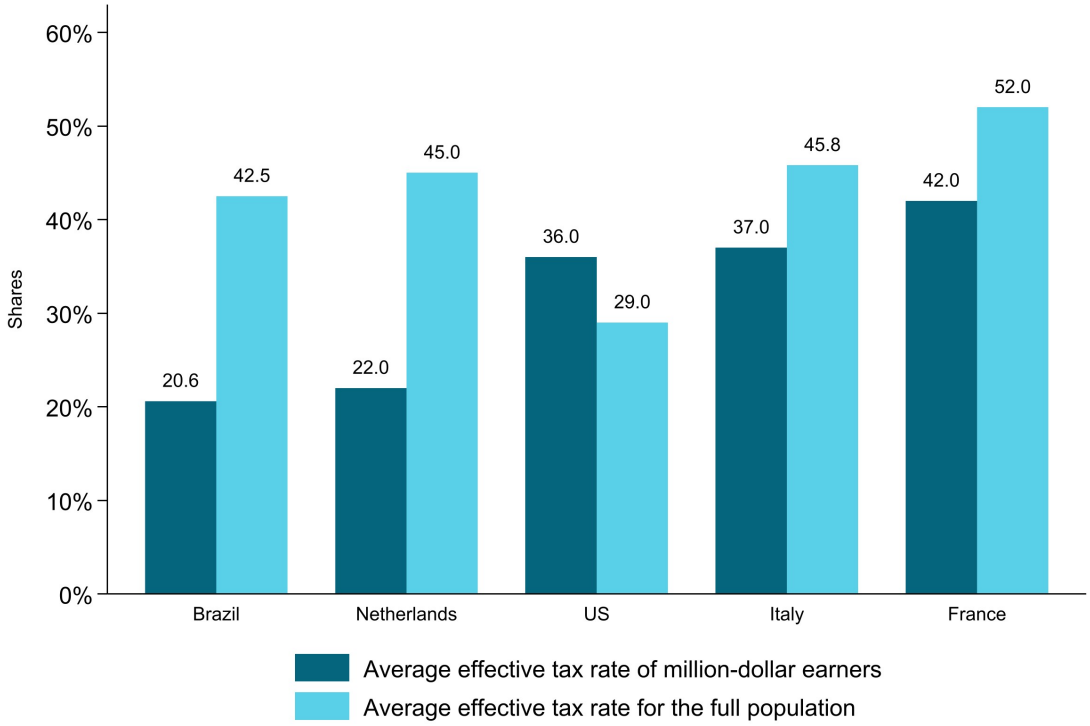
Notes: This figure compares estimates of the share of pretax income earned by the top 1%. WID estimates are taken from the World Inequality Database (`WID.world`) and make assumptions about income sources not directly visible in tax returns or household survey data (e.g., retained earnings) to capture 100% of national income. Studies based on administrative data are those cited in the text and observe the distribution of retained earnings using linked business-owner registries. Data are for 2019 (except for Chile: 2009; Canada: 2011; the Netherlands: 2016; and Norway: 2004, before the introduction of a dividend tax; the Norwegian estimate is taken from Alstadsæter et al. (2016)). In high-income countries, administrative data usually lead to higher levels of income concentration than in WID estimates obtained using standardized distributional national accounts techniques. We find that this pattern is also present in Brazil, but that it is particularly pronounced, even though the dividend tax rate is zero. This suggests that distributional national accounts may underestimate inequality in developing countries.

When registry data are not available, researchers must rely on some observable income sources to proxy the distribution of retained earnings, with often a high weight put on dividends.[3] Distributional National Accounts estimates, collected in the World Inequality Database `WID.world`, rely on such imputation methods. In high-income countries, the use of administrative shareholder registry data leads to similar or higher levels of income concentration than in WID estimates obtained using standardized distributional national accounts techniques. In Brazil, the registry data deliver a sharp upwards adjustment (Figure 1). The overall picture that begins to emerge is that global inequality might be higher than previously thought.

[3]In Brazil, De Rosa, Flores, and Morgan (2024) use capital income reported in survey data; in the United States, Piketty, Saez, and Zucman (2018) allocate half of retained earnings proportionally to dividends and half proportionally to realized capital gains; Auten and Splinter (2024) put a higher weight (3/4) on dividends.

Third, we contribute to the nascent literature trying to estimate comprehensive effective tax rates with a focus on the top of the distribution (Saez and Zucman, 2019; Bach et al., 2023b; Ring, Seim, and Zucman, 2025; Bruil et al., 2025; Balkir et al., 2025). Our paper is the first study to use administrative data to estimate the effective tax rates of ultra-high-net-worth individuals in a large Global South country. The results show that effective tax rate on million-dollar earners tend to be low in an international perspective, as shown by Figure 2, especially compared to the average macroeconomic tax rate in the economy.

Figure 2: Effective tax rate of million-dollar earners: comparing estimates



Notes: This figure compares estimates of total effective tax rates of million-dollar earners (i.e., individuals with more than $1 million in pretax income) in five recent studies that all follow the same methodology to construct comprehensive effective tax rates (the current-tax analysis of Saez and Zucman, 2023). Data for the Netherlands are from Bruil et al. (2025) and capture the top 0.1% of the pretax national income distribution; data for France are from Bach et al. (2023b), capture the top 0.1% of the economic income distribution and exclude consumption taxes; data for the United States are from Piketty, Saez, and Zucman (2018), updated, and capture the top 0.2% of the pretax national income distribution; data for Italy are from Guzzardi et al. (2023) and capture the top 0.1% of the pretax national income distribution. In all cases the chosen quantiles are close to $1 million, except Italy which is a bit lower (about $700,000). In all cases the average effective tax rate for the full population is the ratio of total taxes to total national income.

Last, we add to the distributional national accounts (DINA) literature by refining assumptions and methods.[4] Closest to us is the work by Bruil et al. (2025) that uses Dutch

[4]See studies for the United States (Piketty, Saez, and Zucman, 2018; Bozio et al., 2024), China (Piketty, Saez, and Zucman, 2018), Europe (Blanchet, Chancel, and Gethin, 2022), South Africa (Chatterjee, Czajka, and Gethin, 2023), France (Bozio et al., 2024), Latin America (De Rosa, Flores, and Morgan, 2024), the

administrative data (including linked business-owner data) to construct improved estimates of inequality, including distributions of total national income and comprehensive effective tax rates. Among our contributions to this body of work, we use detailed wealth declarations in personal income tax returns to measure debt and imputed rent directly for top earners. For other groups, we combine Central Bank debt tabulations with household survey information to impute rents. We also rely on detailed consumer survey data to estimate the distribution of indirect taxes, applying product-specific rates and adjusting for informal consumption following Bachas, Gadenne, and Jensen (2023).

The rest of this article is organized as follows. Section 2 presents Brazil's tax system. Section 3 describes the data and methodology. Section 4 uses administrative records to examine the taxes paid by firms, and links them to their owners to estimate the income and taxation of top earners. Section 5 constructs Distributional National Accounts (DINA) to allocate all income and taxes in national accounts to individuals. Section 6 concludes.

2 The Tax System in Brazil

Brazil collected approximately 33% of GDP in tax revenue in 2019 (Tesouro Nacional do Brasil, 2019), among the highest in Latin America and similar to the average of European countries. Indirect taxes on consumption were the largest component (14% of GDP), followed by Personal Income Taxes (5%) and Corporate Income Taxes (3%). Social Security Contributions represented an additional 9% of GDP in revenue.[5] Below we provide a brief summary of the tax system, and refer readers to Appendix C for details.

Indirect Taxation The largest contributor to consumption taxes in Brazil is the Tax on the Circulation of Goods and Services (*ICMS*), a state-level Value-Added Tax with varying rates that collects 7% of GDP in revenue. The bulk of remaining indirect taxation are federal, turnover-based taxes and "contributions", such as the Contribution for the Financing of Social Security (COFINS), the Tax on Industrialized Products (IPI); and the Program of Social Integration (PIS).[6]

Personal income taxation (PIT) Brazil's PIT is characterized by relatively low statutory rates, a narrow tax base, and significant exemptions that limit its redistributive capac-

Netherlands (Bruil et al., 2025), and Honduras (Del Carmen et al., 2025). As emphasized by, e.g., Clarke and Kopczuk (2025) ad hoc distributional assumptions may introduce biases.

[5] Social security contributions (SSC) are levied on labor income. Under the general rule, employers pay a flat rate of 20% on total labor income, while employees pay a progressive rate ranging from 8% to 11% on labor income up to the annual social security ceiling (R$ 75,912.85 in 2019).

[6] In 2024, Brazil enacted a major tax reform that will replace most of these indirect taxes with a dual VAT, administered by the federal government and the states. The reform is expected to be gradually implemented, starting in 2026, over seven years.

ity. Labor income is taxed after deduction at progressive rates that range from 7.5% to a highest marginal rate of 27.5%. In 2019-2022, incomes below R$ 22,847[7] were untaxed and the highest marginal tax rate applied to incomes above R$ 55,976. At 27.5%, the highest marginal income tax rate is similar to the average of 30% across Latin American countries, while the exemption threshold was quite low–it was equivalent to 50% of gross national per capita income, versus approximately 140% on average in Latin America (Bergolo, Londoño-Vélez, and Tortarolo, 2023).[8] Some capital income, such as capital gains and income from financial investments, are taxed at reduced rates. Several income sources are fully exempt from taxation–the most important of which is dividends. In that regard, Brazil is one of the few countries in the world, together with smaller nations such as Estonia and Singapore, that fully exempt paid dividends from personal taxation.

Business Taxation Firms in Brazil are taxed under three main regimes. The largest corporations, including all financial institutions and publicly traded companies, are taxed under the "Real Profit" regime, which requires firms to file detailed accounting information. This regime taxes profits at up to 34%, based on a corporate income tax rate of 25% and a so-called Social Contribution on Net Profits of 9%. Firms with yearly gross revenue below R$78 million can instead choose the presumptive tax regime, which taxes presumptive rather than accounting profits. The rates vary by economic activity.[9] Finally, firms with revenue below R$ 4.8 million can choose the simplified (*Simples*) regime, paying a single turnover tax that replaces most federal, state and municipal taxes. Firms under this regime are classified into five main economic sectors, each with distinct tax brackets and progressive marginal tax rates.[10]

3 Data and Methodology

This section presents primary data sources and the methodology employed. For a detailed exposition, see Appendix B for household survey data and Appendix C for tax records.

[7] Approximately USD 5,700, using the end-of-year market exchange rate of USD 1 = R$ 4.03.
[8] Since then, the exemption threshold was adjusted, more recently to R$ 36,000 in August 2025.
[9] 8% on retail and wholesale, and 16% for most services.
[10] Since 2009, taxpayers can also register as Individual Microentrepreneurs (MEI), a regime for individual entrepreneurs with at most one employee and revenue below R$81,000.

3.1 Data

3.1.1 Administrative Tax Records

This paper leverages detailed data from the Brazilian Tax Authority (*Receita Federal do Brasil*). For individuals, we rely on data from Personal Income Tax (PIT) returns.[11] Income subject to withholding tax (e.g. 13th salaries and other taxed capital income) must be declared in PIT returns, but is informed net of tax; we then link these to Withholding Income Tax (WHT) returns to recover total gross income.[12] In 2019, approximately 38 million individuals filed a PIT declaration, close to 30% of working-age adults.[13] In our benchmark analysis, we exclude income from asset transfers (e.g. donations or inheritance) and capital gains, the latter to avoid double-counting with undistributed profits.

For firms, we use data from businesses' tax returns for Brazil's three main tax regimes:[14] Real Profit, Presumptive Profit, and *Simples*. In 2019, 3.6 million firms filed tax declarations in these regimes. All firms in the Real Profit regime and 86% of those in the Presumptive Profit file detailed accounting information, which we use to compute economic profits in line with the multi-country micro analysis in Bachas et al. (2025). For all firms in the *Simples* regime and the subset of firms in the Presumptive regime which only reports turnover, we impute size and sector specific profit rates using Presumptive regime firms that file detailed financial data (see section C.3.2 in Appendix C for details).

To link corporations to their owners, we rely on two main sources of information: the Dataset on Shareholders and Administrators (*Quadro de Sócios e Administradores – QSA*) from the National Register of Corporations (*Cadastro Nacional de Pessoas Jurídicas*), and the registers Y600 and X450 from the Tax Accounting Bookkeeping (ECF).[15] Section 3.2 details how we use these data to attribute undistributed profits to individual owners, parsing through layers of corporate ownership.

[11] In Portuguese, *Declaração de Imposto de Renda de Pessoa Física (DIRPF).*

[12] In Portuguese, *Declaração de Imposto de Renda Retido na Fonte (DIRF).*

[13] In 2016-2022, individuals with taxable income above R$ 28,559 were mandated to file; but filing is also mandatory for taxpayers with high exempt or withheld income, as well as high gross wealth. Since 2014, the PIT declaration for many filers is pre-filled: information from third-parties such as withholding of wages and capital income, as well as some types of allowable deductions, are automatically included in a pre-filled declaration by the tax authority. Taxpayers might amend the declaration, correcting or adding information.

[14] This primarily includes forms within the *Escrituração Contábil Fiscal (ECF)* and the *Declaração de Informações Socioeconômicas e Fiscais (DEFIS).* The ECF, or Tax Accounting Bookkeeping, is an electronic ancillary obligation, part of Brazil's Public Digital Bookkeeping System (SPED). It was introduced in 2014 to replace the former Corporate Income Tax Return (DIPJ). The ECF requires companies to report all information used in determining the Corporate Income Tax (IRPJ) and Social Contribution on Net Profit (CSLL), consolidating accounting and tax data into a digital format. It is mandatory for all entities taxed under the Real Profit and Presumptive Profit, and must be filed annually through SPED by July for the preceding fiscal year.

[15] The Registers Y600 (Identification and Remuneration of Partners, Shareholders, Officers, and Board Members) and X450 (Payments/Remittances related to Services, Interest, and Dividends to Domestic and Foreign Beneficiaries) are among the registers of the Tax Accounting Bookkeeping (ECF), an electronic tax obligation required for firms under the Real Profit and Presumptive Profit taxation regimes.

3.1.2 Survey Data

The reference household survey data are drawn from the *Pesquisa Nacional por Amostra de Domicílios Contínua* (PNADC). Approximately 211,000 households were interviewed each quarter since 2012, providing representative estimates at the national level and for each of Brazil's five macro-regions. Although PNADC constitutes the main source of information on household income, including for informal labor income, it does not collect data on household consumption. To address this limitation, we employ the latest wave of the Consumer Expenditure Survey (POF) from 2017–2018. The POF is the primary data source on household consumption patterns and on the products and weights that compose the baskets used to construct Brazil's consumer price index.

3.1.3 Other Sources

The Distributional National Accounts (DINA) analysis also draws on National Accounts data from the *Instituto Brasileiro de Geografia e Estatística* (IBGE) and tabulations from the *Sistema de Informações de Créditos* (SCR) at the Central Bank of Brazil. The latter provides comprehensive information on loans issued to individuals by banks and other regulated financial institutions, disaggregated by loan type and income group.

3.2 Assigning Corporate Ownership to Individual Shareholders

Assigning undistributed profits to corporate owners requires a comprehensive dataset identifying each shareholder and their ownership share, as to proportionally allocate corporate profits. This information is available in the corporate shareholder registries described above.[16] We start by building a complete list of corporate shareholders and their participation for all active firms in 2019. Corporate shareholders can be resident individuals (*Pessoas Físicas*), domestic corporations (*Pessoas Jurídicas*), government entities, and foreign entities. Since our goal is to assign undistributed profits to resident individuals, we iterate to parse up to ten layers of corporate ownership and identify individual shareholders. We then attribute to each individual their total shareholding across all firms in which they are direct or indirect owners. The final shareholder dataset contains 6.5 million individuals that are direct or indirect shareholders of the 3.6 million corporations.

The vast majority of Brazilian firms are closely held by few individuals: one million have a single individual shareholder and 2.1 million have two, only 75,000 corporations (2% of all firms) have more than five individual shareholders. At the other extreme, some

[16]For firms in the Presumptive and Simples regimes, we use information from the QSA dataset as of December 31, 2019. For firms in the Real Profit regime, we use the 2019 Y600 form, which requires firms to report their 999 largest shareholders. The Y600 form is more reliable than the QSA for larger firms because, in the QSA, corporations may report directors and board members instead of shareholders.

large listed corporations exhibit highly dispersed ownership, with more than 100,000 direct and indirect shareholders. Shareholding patterns are similarly skewed: nearly 70% of individuals hold equity in just one firm, while at the other end, the top 5% of shareholders own stakes in 17 or more firms, and the most prolific investors in over 2,000 firms.

For the vast majority of firms, we can identify the full set of individual shareholders. For over 90% of them, the individuals we identify as direct or indirect shareholders own 100% of their shares, meaning that we can fully attribute their undistributed profits to individuals. Nonetheless, as discussed in subsection 4.2, we track a lower percentage of individual shareholders for the largest corporations, partly because they are owned by foreign entities, and partly because of their opaque shareholder structures.

3.3 Distributional National Accounts (DINA)

3.3.1 Conceptual Framework

In Section 5, we build Distributional National Accounts (DINA) for Brazil (Piketty, Saez, and Zucman, 2018; Blanchet et al., 2021). This methodology allows us to compare inequality across countries consistently and to allocate all national income and taxes to individuals, providing a comprehensive picture of how macroeconomic growth is distributed across income groups. Our population of interest is adults, aged 20 or older, with couples' incomes split equally. This adjustment assumes that married couples share income equally, yielding a conservative estimate of income concentration by ensuring intra-household resource sharing is not underestimated.

3.3.2 Combining Administrative Tax Records and Survey Data

Since our objective is to measure the income distribution and allocate taxes across the entire population, we combine administrative tax records with survey data. This approach accounts for the remaining of the population that does not file PIT, including informal workers, the unemployed, and low-income individuals. Specifically, our procedure involves three steps: (i) harmonizing income concepts in tax records and survey data, distinguishing labor income, distributed capital income, mixed income, and pensions; (ii) identifying potential tax filers in the survey as well as taxpayers with income below the mandatory filing threshold; and (iii) sequentially replacing survey observations with tax records, starting from the highest-income individuals and applying sampling weights to preserve population totals, until all tax filers are integrated into the combined dataset.[17]

[17]Methods such as the BFM correction (Blanchet, Flores, and Morgan, 2022) are appropriate when tax data consist of aggregate tabulations. In our case, however, the detailed micro-administrative tax data allow a direct approach that preserves data quality. See Appendix D for details on the methodology.

3.3.3 Income Concepts

Our analysis is based on three main income concepts: (i) *Fiscal Income*, (ii) *Economic Income*, and (iii) *Pretax National Income*. Fiscal income consists of the income reported in the combined tax and survey dataset, where withheld income in PIT returns is grossed up using withholding tax returns, and where we exclude income from asset transfers and capital gains. Economic income simply adds the retained earnings allocated to firms' owners to their fiscal income.

To reach pretax national income, we first rescale the components of economic income–labor income and pensions, mixed income, distributed capital income, and undistributed profits–to their respective national accounts aggregates. Next, we add the income components that not directly reported. First, we add imputed rents. For tax data observations, we use housing values reported in wealth declarations to estimate homeowners' imputed rents. For survey observations, we predict imputed rents for owner-occupied dwellings using a machine-learning model trained on rented dwellings. We then subtract employer social security contributions, which we estimate according to statutory contribution rules and which we assume are borne by labor income, as is standard in the literature (Saez and Zucman, 2023). We also subtract interest paid by households. For tax data observations, we distribute interest payments using non-collateralized debt reported in wealth declarations. We then combine this measure with data on debt by income level and loan type from the *Sistema de Informações de Crédito* (SCR) provided by the Central Bank of Brazil to include collateralized debt, which is not covered in tax returns. For survey observations, we use SCR data on debt disaggregated by income level.[18] After subtracting these items, we account for additional minor components (see Section E.3 in Appendix E), and deduct capital depreciation, to obtain personal national income. Finally, to derive pretax national income, we add government income–primarily government factor income and the social insurance net surplus–which we distribute proportionally to personal national income.[19]

3.3.4 Taxes

We assign taxes following the distributional current-tax analysis from Saez and Zucman (2023). This approach ignores tax shifting: labor income taxes are borne by workers, capital income taxes by the the corresponding asset owners, and indirect taxes by consumers.

[18] See Appendix B for details.

[19] Pensions, social security contributions, and unemployment insurance are included in pretax national income, making it more comparable internationally and less sensitive to variations in age structure and unemployment rates. However, this approach excludes the redistributive component of social security, thereby understating a portion of government redistribution.

Taxes on consumption Similar to most Global South countries, consumption taxes generate the largest share of Brazil's revenue (inclusive of social security contributions) 43% in 2019 (Tesouro Nacional do Brasil, 2019). Their allocation is thus crucial to the study of tax progressivity. To estimate the consumption taxes paid by households, we use the last wave of the consumer expenditure survey: (i) we adjust indirect taxes for informal purchases, excluding goods purchased in the informal sector, following the methodology of Bachas, Gadenne, and Jensen (2023); (ii) we aggregate the thousands of consumption items into the 127 product categories of the input–output matrix and apply the effective indirect-tax rates estimated by Silveira et al. (2022); (iii) we link the resulting household-level taxes in POF to our reference survey, PNADC, with a machine-learning model (see Appendix B for details); (iv) finally, we allocate each household's tax burden to its members in proportion to their share of household income, and apply average rates for tax data observations by income group. The resulting values are rescaled to national accounts aggregates, and adjusted for cash transfers to avoid understating consumers' ETRs.[20]

Our method to allocate consumption taxes thus accounts for heterogeneity in product tax rates and allows the composition of consumption baskets to vary across households. Moreover, it captures variation in consumption-to-income shares across the income distribution and adjusts for purchases made in informal markets.

Taxes on labor and capital income We directly observe PIT and taxes withheld in taxpayers' returns, and allocate business taxes to firm owners in proportion to their shares. Employee SSC are also reported directly on PIT returns. To estimate employer SSC and employee SSC for survey observations, we use information from the SSC legislation.[21] All SSC are allocated to the corresponding workers (Saez and Zucman, 2023). Together, consumption, income and payroll taxes account for over 90% of total tax revenue in 2019. Appendix E.4 further details our allocation procedures and the allocation of other taxes.

4 Effective Taxation of Top Earners: Evidence from Administrative Data Integrating Corporate Ownership

This section examines corporate-level taxation and the composition of individual incomes, underscoring the role of undistributed profits. It then documents the effective tax rates paid by individuals on their economic income, which combines all income sources.

[20] In practice, this amounts to multiplying each adult i's indirect taxes by the ratio of i's pretax national income to i's pretax national income plus cash transfers.

[21] For the estimation of SSC on survey observations, we are indebted to Pedro H. G. Ferreira de Souza for sharing his detailed work based on Brazilian legislative changes.

4.1 How much taxes on business income do corporations pay?

Before attributing undistributed profits and corporate income taxes to individuals, we describe the effective tax rates paid by firms in Brazil. A distinctive feature of the Brazilian tax system is that it fully exempts distributed dividend from taxation. The exemption of distributed dividends was introduced in 1996 with the stated aim of integrating firm- and shareholder-level taxation, and thus avoiding double taxation of corporate profits.[22] As a result, Brazil remains one of the few large economies in the world that applies a zero tax rate on dividends,[23] and incentives to retain income within companies are limited.

We start by classifying firms into size fractiles, proxied by turnover, and measure effective corporate tax rates (ETRs) across the size distribution. To zoom in on the very top, we create 127 nested fractiles—structured like Russian dolls—allowing progressively finer distinctions among the largest firms. We first assign firms to percentiles of the size distribution, creating 100 percentiles in total. The top percentile is then divided into 10 fractiles, each representing 0.1% of firms. This upper 0.1% is further subdivided into 10 fractiles of 0.01% each, and the top 0.01% is itself divided into 10 fractiles representing 0.001% of firms. The highest fractile corresponds to the 26 largest firms in Brazil measured by turnover. Figure A.2 shows the level of turnover for firms at each fractile.

We define effective tax rates as the ratio of a firm's income tax liability to its economic profit. The numerator–income taxes–is the sum of Corporate Income Taxes (IRPJ) and Social Contribution on Net Profit (CSLL). For the *Simples* regime, which replaces multiple taxes with a single turnover tax, we only consider the share legally attributed to IRPJ and CSLL: this is a fraction of the total tax rate, as the rest covers mainly indirect taxes. The denominator–economic profit–is calculated differently for the profit versus turnover tax regime. For firms filing detailed accounting information, we start from Earnings Before Taxes (EBT) and make several adjustments to approximate economic profits.[24] For firms only declaring turnover, such as all *Simples* filers, we impute profits using observed profit margins for similar corporations in the Presumptive regime.

Figure 3a presents average ETRs for profitable firms across the size distribution. It shows that despite a statutory rates of 34% in the Real Profit regime, average effective

[22] Explanatory Memorandum MF No. 325/1995, which accompanied Law No. 9,249/1995: "With respect to the taxation of profits and dividends, a complete integration between individuals and legal entities is established, whereby such income is taxed exclusively at the corporate level and exempted upon distribution to beneficiaries. In addition to simplifying controls and discouraging tax evasion, this mechanism also encourages investment in productive activities, given the equal treatment and applicable rates."

[23] We also note that the literature finds limited effects of dividend taxation on firm investment (Yagan, 2015; Bach et al., 2023a; Bilicka, Güçeri, and Koumanakos, 2025).

[24] Our main adjustments serve to neutralize the effect of IFRS valuation adjustments, such as fair value and impairment assessments; adjustments for the share of profit or loss in investments accounted for using the equity method, temporary foreign exchange gains or losses, and provisions, all of which are recognized in profit or loss (i.e. book income) as reported under financial accounting. See details in C.3.2 in Appendix C.

rates are below 25% across the full firm distribution, and fall within the largest 1% corporations. The relationship between firm size and ETRs is inversely U-shaped: the average ETRs are below 5% until the 75% percentile of the distribution (firms with yearly revenue up to R$750,000). From that point on, average ETRs steadily increase until a peak at 25% for firms at the 99th percentile. Within the top 1% largest firms–those with yearly revenue above R$40 million–the average effective rate steadily declines to around 15% among the 3,000 largest firms in the top 0.1%.[25] Figure A.4 present average ETRs by economic sector.[26] A similar pattern of decreasing effective rates for the largest firms has been documented across many countries, and in those a large part of that reduction is explained by the availability of tax incentives (e.g. tax credits, income exemptions and tax holidays in special economic zones) (Bachas et al., 2025).

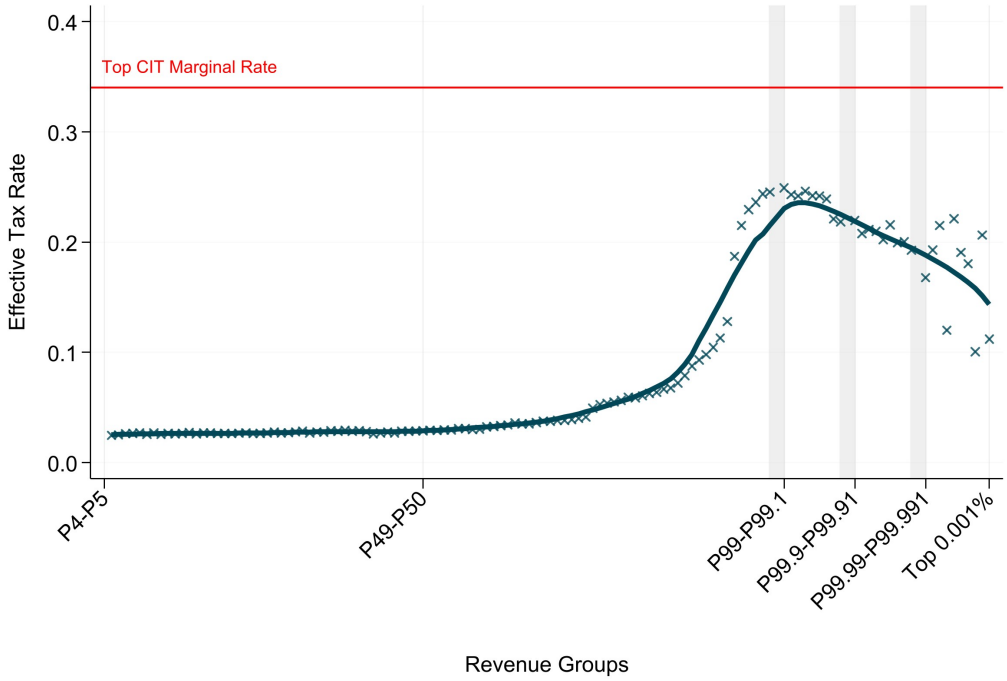
Although the largest 0.01% firms exhibit an average ETR of about 15%–far below the 34% statutory rate–average rates mask pronounced heterogeneity, especially at the top of the size distribution. Figure 3b plots the share of firms in each fractile paying less than 1% in effective tax rates, only considering firms with positive economic profits. Close to three-quarters of firms in the bottom half of the size distribution pay income taxes that represent less than 1% of their profits. As firms grow, this share declines to below 5% at the 85th percentile and then increases to around one in five for the top 1% largest firms. A substantial share of firms–including many of the largest–pay income taxes that are trivial relative to their economic profits: among the top 0.001% largest firms, 60% pay ETRs below 10% and 36% pay below 5%.[27]

[25] Despite methodological differences, the average ETRs around 15% for the largest firms in Brazil are similar to the estimates from Pires, Marques, and Bergamin (2023) for publicly traded companies in Brazil.

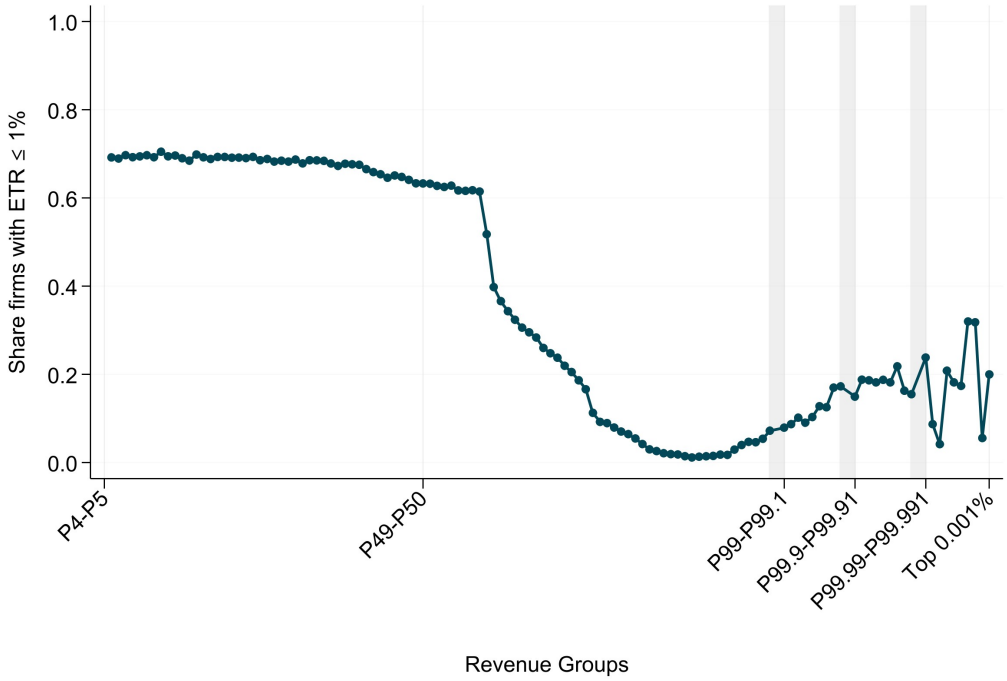
[26] It restricts the analysis to firms in the Presumptive and Real Profit regimes, for which economic sectors are better recorded. The patterns are broadly similar, with the ETR increasing until the 99th percentile and then falling at the top–yet the levels of average ETRs are higher across the distribution, since we do not include *Simples* firms which pay low rates. We highlight two sectors. The agribusiness sector, key in Brazil, which receives extensive tax benefits: this can be seen via the low ETRs among its largest firms. Second, firms in the finance and insurance sector face a higher marginal corporate tax rate of up to 45%. Consistently, we document somewhat higher ETRs for these firms across the entire distribution, albeit average ETRs are always well below even the 34% statutory rate of non-financial firms.

[27] See Figure A.5a and Figure A.5b for the shares of firms paying less than 5% and 10% in ETRs.

Figure 3: Corporate Effective Tax Rates Across the Firm Size Distribution



(a) Average Effective Tax Rate by Fractile



(b) Share of Firms with Effective Tax Rate Below 1% of Their Profits

Notes: These figure present measures of effective tax rates (ETR) across the distribution of corporations by turnover. Panel (a) presents average ETR for each of the 127 fractiles of revenue, while panel (b) presents the share of firms in each fractile that report ETRs below 1%, conditional on firms reporting positive economic profits. Effective Tax Rates are defined as the ratio between CIT and economic profits. ETRs are winsorized two-sided at the 1st and 99th percentiles and average ETRs are simple averages across all firms in the fractile.

What explains the low effective business tax rates across the entire distribution? First, the tax regimes to which firms belong change across the size distribution. Figure A.3a shows that *Simples* firms represent close to 90% of firms in the bottom half of the distribution and those in presumptive regime the remaining 10%. Firms in the *Simples* regime in that size-range benefit from low marginal tax rates, explaining why many pay an ETR below 1%.[28] *Simples* participation slowly declines–to approximately 60% at the 92th percentile–where the highest marginal rate for Simples starts (R$ 3.6 million) and then quickly decreases to zero as firms hit the *Simples* ceiling (R$ 4.8 million).[29] Above that level, the participation of firms in the Real Profit Regime grows quickly and approaches 100% within the top 1%, as Presumptive regime firms also reach their revenue cap (R$ 78 million). The shape of ETRs across the distribution is driven in part by these composition effects. In Figure A.3b we plot the ETRs separately for firms in each regime, keeping the size fractiles constant. Within the Presumptive and Real Profit regimes, we also observe an inverse U-shaped relationship between firm size and ETRs: ETRs first increase as firms grow and then decline within the top 1% largest firms.

The Real Profit regime concentrates the 1% largest firms and declare over 80% of total revenue, close to half of aggregate profits and 70% of tax liability (Table A.2). The Real profit regime's moderate aggregate ETR of 17% is explained by a range of tax expenditures that reduce firms' tax liability well below the statutory rate of 34%. Figure 4 documents the level and composition of all tax provisions, which overwhelmingly benefit Real Profit firms. In 2019, tax provisions amounted to R$ 110 billion. These provision include tax credits–which directly reduce firms' income tax liability–as well as other provisions that reduce the taxable profits. For the latter, we calculate the Reais benefit of base-reducing provisions by applying the statutory rate of 34%. Almost all these provisions benefited the top 1% largest firms, and half of the total benefit only 260 firms. Overall, specific programs that reduce corporate taxable income–such as tax incentives for R&D and for specific industries–account for 40% of these provisions. The second major tax reduction factor is the interest on equity allowance (*JCP*) (R$35 billion)–a provision that allows firms to deduct profit distributions to shareholders from their taxable profit, as returns on equity.[30] Finally, carryover losses (R$ 20 billion) and accelerated depreciation provisions (R$

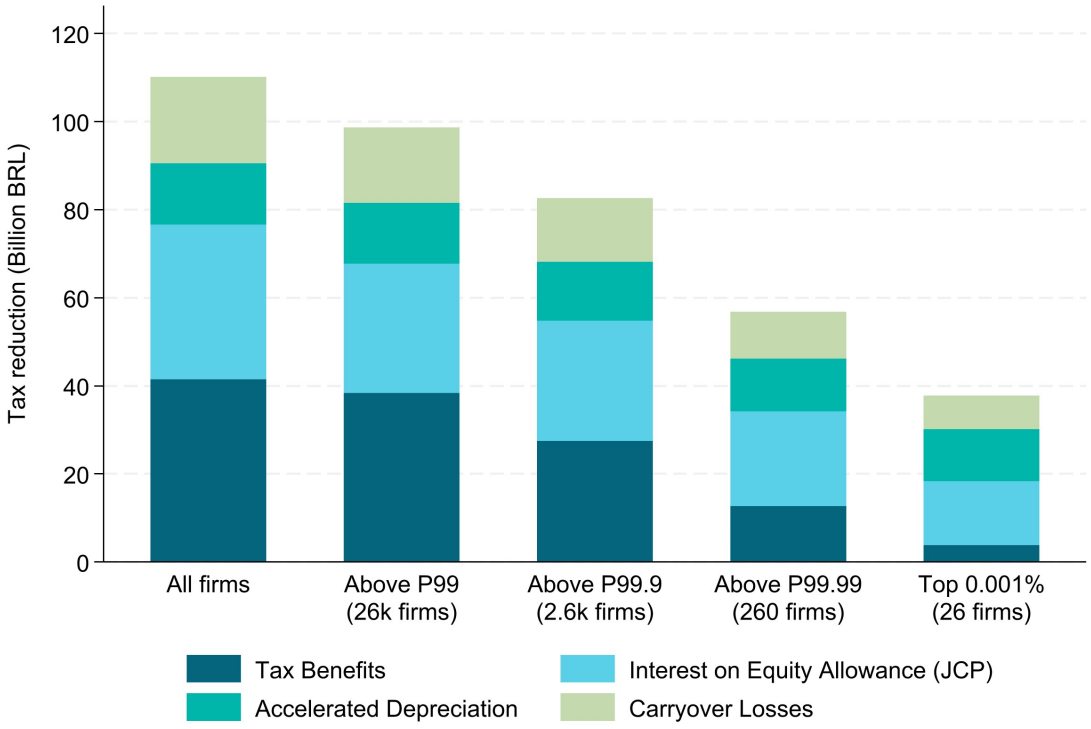
[28]The sudden drop in the share of firms paying ETRs below 1% around the 60th percentile coincides with the threshold for the third bracket in *Simples*.

[29]Declaring revenue above R$ 3.6 million not only places firms in the highest marginal rate but also entails several additional obligations for firms, such as separately paying the Brazilian state VAT (*ICMS*).

[30]The stated goal of this provision is to reduce the debt bias of corporate income taxes, which allow for the deduction of paid interest but not return to equity. The amount of JCP that can be distributed is calculated using long-term interest rates applied to adjusted book value and capped as a share of profits. *JCP* income is taxed at 15% at the individual level. See Gobetti (2025) for a broader discussion on the design of *JCP* in Brazil and how it compares with international experiences.

12 billion) explain the remaining totals.[31]

Figure 4: Tax Provisions Reducing the Corporate Effective Tax Rate



Notes: This figure presents total amounts of tax reduction provisions (in billions of Brazilian Reais) for 2019. We show aggregates of provisions for all firms; and separately for those in the top 1%; top 0.1%; top 0.01% and top 0.001% in terms of revenue. We decompose the total tax reduction items in four groups: Tax benefits (industry or program-related provisions); Interest on Equity Allowance (JCP); Carryover losses; and Accelerated depreciation provisions. To express all values of benefits in terms of tax reductions, we multiply values by 0.34 when these provisions are additions or exclusions of the levels of taxable profit.

It is important to note that this analysis only captures the effective tax rates that can be measure from firms' reported financial accounts. The estimated ETRs fall below statutory tax rates primarily because of legal provisions embedded in the tax code. They do not reflect tax evasion or tax avoidance strategies, notably profit shifting, which are known to be significant in Brazil (Torslov, Wier, and Zucman, 2023). Transfer mispricing practices, for instance, reduce reported sales and inflate costs; if these could be systematically identified and adjusted for, then reported profits–the denominator of the ETR–would rise, implying even lower effective tax rates than those presented here. Such practices might also help

[31] Figure A.6a documents that the composition of tax provisions changes as we focus on larger firms: while *JCP* represents close to one-quarter of total reductions in the top 1% largest firms, it grows to 40% among the top 0.01%. Accelerated depreciation provisions become more relevant at the top, and both of these grow at the expense of other tax benefits. These provisions are also sector-specific: in Figure A.6b, we show the levels and composition of provisions across economic sectors. More than half of total benefits accrue to firms in three industries: energy, finance and insurance, and agribusiness. Different sectors rely on different provisions, with accelerated depreciation being the major provision for capital-intensive energy industries; *JCP* the main one for finance; and specific tax benefits accrue to agribusinesses.

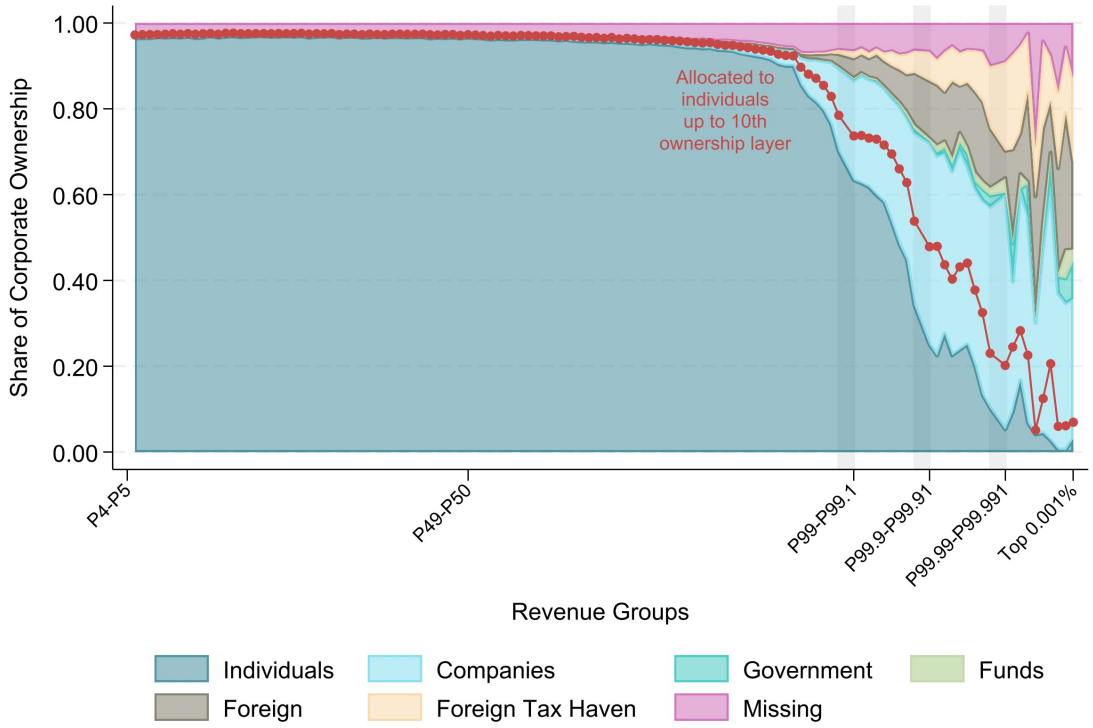
explain the relatively high share of firms reporting losses or zero profits (See Table A.2).

4.2 Linking Corporations to their Shareholders

In this section, we use the shareholder tree to link firms to their owners. This linkage enables us to assign retained profits to owners, providing a more accurate measure of individual economic income, unaffected by firms' dividend-distribution policies. Likewise, we attribute business income taxes paid at the corporate level to the corresponding owners, allowing us to estimate comprehensive effective tax rates for Brazilian top earners.

Linking firms to their owners First, we show that we can allocate most profits to domestic shareholders. Figure 5 plots the share of participation that can be assigned to a resident individual (red line), following the iterative process of parsing through layers of corporate ownership. The figure also presents the composition of the first layer of direct shareholders. We partition shareholders in domestic individuals, domestic companies, government entities, pension and investment funds, foreign entities (based on tax havens and elsewhere), and missing. A feature of the data worth highlighting is the quality of the shareholder registry: across the full distribution of firm size, we observe close to 100% of the shares of all firms assigned to some direct shareholder–the small missing component, which is constantly less than 10% in all distribution, is explained by firms not reporting any shareholders or reporting participation that sums to less than 100%.

Figure 5: Corporate Ownership Along the Firm Size Distribution



Notes: This figure presents, in the red line, the average share of corporate ownership that we are able to attribute to resident individuals, after parsing through up to ten layers of corporate ownership. The colors in the background represent the share of direct ownership by type of shareholders: domestic individuals; domestic corporations; government entities; investment and pension funds; foreign owners not in tax havens and foreign owners in tax havens; and the average missing share, for which we lack information on direct shareholders. Firms are split in 127 fractiles of revenue, up to the top 0.001% largest firms by revenue.

Second, our ability to distribute ownership shares to *resident individuals* depends on the nature of corporate shareholders. For the bottom 90% of firms, mostly from the *Simples* regime, we attribute close to 100% of their shares to a resident. This number decreases for the top 1% largest firms, as firms from the Real Profit regime–with more complex ownership structures–become dominant. Consider firms just within the top 0.1% of size: resident individuals directly own only 19.5% of their shares, while 44% is owned by other corporations, and 25% by foreign shareholders. The ownership not observed accounts for 7.5%, and the remaining 4% are attributable to the government and to investment funds. While resident individuals hold just 19.5% of shares directly, iterating through corporate ownership layers allows us to assign 37.5% of shares to them via indirect holdings. Table A.2 shows that, across all firms, this approach allows us to allocate 54% of economy-wide profits (R$ 800 billion) to ultimate individual shareholders. This represents 88% of the profits attributable to households—that is, total profits net of the shares held by foreign firms and the Brazilian government.

The shareholdership data is not a beneficial ownership registry and thus presents limi-

tations. First, foreign shareholders play a significant role, particularly among the top 0.1% largest firms. However, Brazilian residents may also hold stakes in domestic firms through foreign entities. Ideally, such ownership would be reassigned to residents whenever the foreign entities are ultimately owned by them, but the shareholders of these entities are unobservable. Second, some corporate shareholders may themselves be owned by foreign entities, thereby breaking the shareholder tree. Third, we identify a few "closed loops" in ownership—firms holding shares in each other–which prevent us from allocating those shares to individuals. Finally, we trace individual shareholders through up to 10 layers of corporate ownership; since few new individual owners appear beyond levels 4–5, we capture most ownership, though extremely complex structures may still be missed.

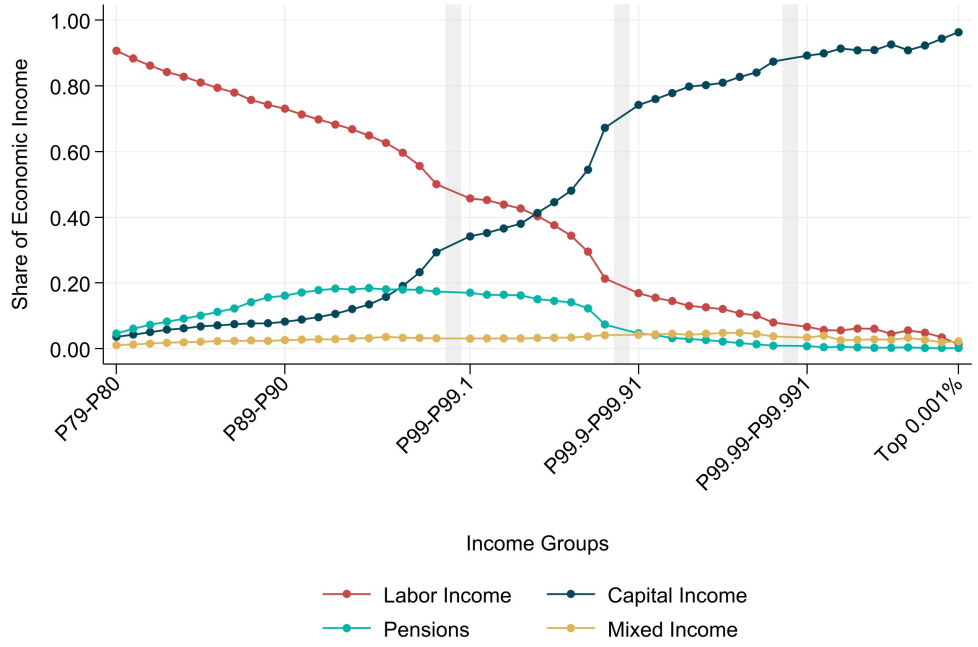
Composition of Economic Income Having assigned corporate profits and taxes to their individual owners, we can now describe the components of economic income and the effective income tax rates. Figure 6a displays the components of economic income, which equals adjusted income reported by taxpayers in PIT returns plus undistributed profits allocated to firm owners (see Section 3.1). The figure focuses on the top 20% of adults: those required to file tax returns since their income exceeds the exemption threshold. Among adults in the 80th to 99th percentiles, with an annual economic income between R$ 36,000 and R$ 374,000, labor income constitutes the bulk of earnings. Within the top 1% (annual economic income above R$ 374,000), capital income steadily displaces labor income: it represents 74.2% of total income at the top 0.1% threshold (annual income above R$ 1.4 million), 89.2% at the top 0.01% threshold, (annual income above R$ 7.0 millions), and nearly all income for the top 0.001% (annual income above R$ 36.3 millions).[32]

Capital income has two components: the portion distributed–mainly dividends–and the portion retained within the firm–undistributed profits (retained earnings). Figure 6b breaks capital income into these two components by income group.[33] Considering only distributed capital income reported in PIT returns omits a large share of top earners' economic income. Undistributed profits become a relevant source of income for taxpayers above the 95th percentile and reach 55.5% of total income for the top 0.001%, while distributed capital income represents 40.8%. Thus, when only using fiscal income–the concept ignoring undistributed profits–the top 0.001% (the richest 1,500 individuals) has an average annual income of R$ 50.7 millions, and the top 0.0001% (the richest 150 individuals) an income of R$ 202.6 millions. When retained earnings are included, average annual income more than doubles to R$ 111.9 and R$ 491.6 millions, respectively. Studies that ignore undistributed profits severely underestimate top incomes and, income inequality.

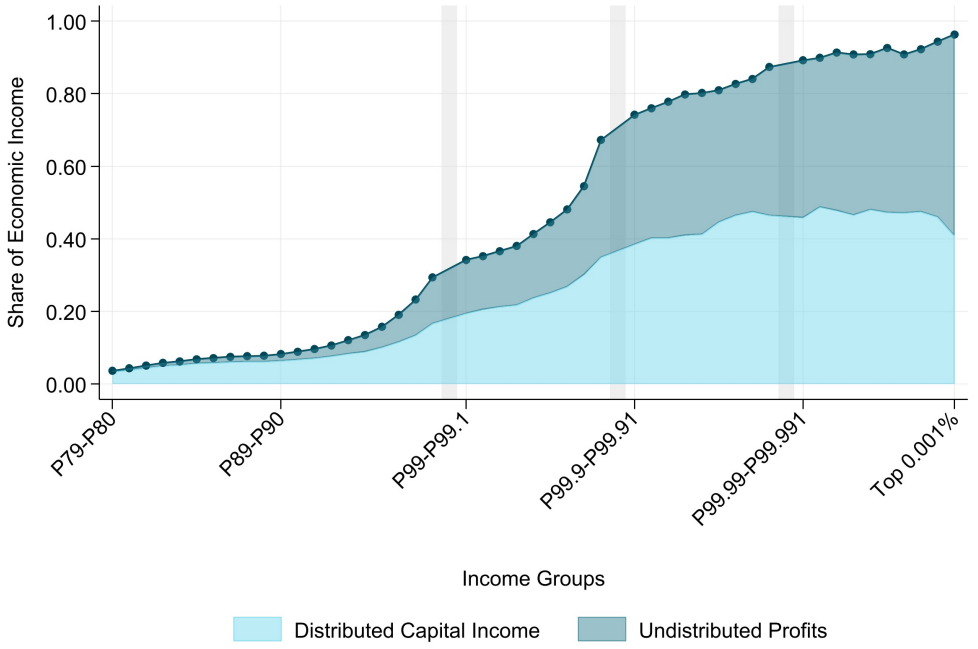
[32]These values are in nominal terms for our reference year, 2019. For descriptive statistics on the threshold and average income for different economic and fiscal income fractiles, see Table A.1.

[33]For a more detailed decomposition of capital income in tax records, see Figure A.1 in Appendix A.

Figure 6: Economic Income Composition by Groups (Tax Data)



(a) Economic Income Composition



(b) Capital Income Composition

Notes: The figure decomposes economic income by economic income group. We display results for the top 20% of adults–roughly the share whose income exceeded the PIT filing-exemption threshold, corresponding to about 25.5 million individuals in 2019. Economic income is the sum of adjusted income reported in PIT returns and undistributed profits allocated to firm owners via our shareholder tree. Panel (a) splits the income into labor income, capital income, pensions, and mixed income; where mixed income is largely earnings of individual entrepreneurs (*Microempreendedor Individual*, MEI). Panel (b) breaks capital income into its two primarily components: distributed capital income, mainly dividends, and undistributed profits originating from firms in the *Simples*, Presumptive Profit, and Real Profit regimes.

Direct Taxation of Economic Income Because business profits constitute the main income source for top earners, it is essential to include business income taxes in the analysis to avoid understating the taxes paid by the rich. Figure 7a shows ETRs for the combined income tax by economic income groups, after allocating business income taxes to firm owners. We first examine the PIT, shown in the bottom shaded area. The PIT remains progressive up to the 99th percentile, and then becomes regressive: within the top 1%, its rate sharply drops, from 8.6% for P99–P99.1 to 1.6% for the top 0.001%. This decline reflects the income composition at the top: PIT exempt dividends and undistributed profits.

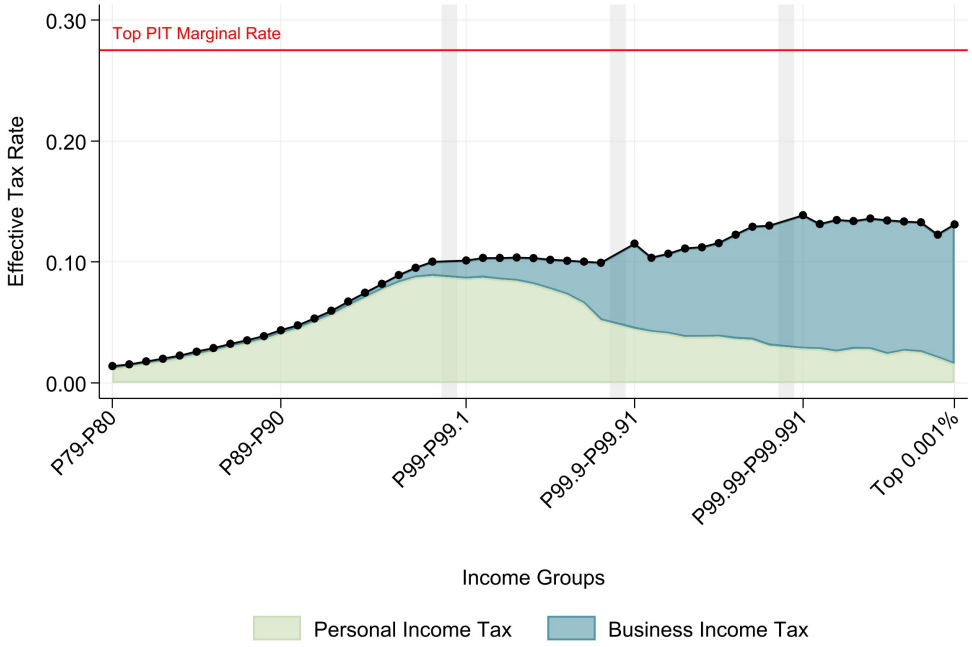
By contrast, the business income tax allocated to individuals–shown in the top shaded area–is relatively progressive with respect to economic income, but it levels off across the top 0.01%, with only modest increases thereafter.[34] Its ETR rises from 1.5% at P99–P99.1, to 7.0% at P99.9–P99.91, to 11.0% at P99.99–P99.991, and then only to 11.5% at the top 0.001%. Yet, this ETR remains substantially below the maximum statutory CIT rate of 34% applicable to the Real and Presumptive Profit regimes. Part of the gap reflects the composition of ownership: special regime firm owners (*Simples* and Presumptive Profit) dominate up to the top 0.01% (see Figure A.1). However, even at the very top–where most undistributed profits originate from the Real Profit regime–the ETR remains well below statutory rates. This reflects the availability of corporate tax provisions, such as tax benefits and accelerated depreciation, which lower CIT liabilities. Figure 7b illustrates the role of firm-level tax provisions for individuals. It plots the value of these items–allocated proportionally to ownership–as a share of individual's income, along the distribution of economic income. Firm-level tax provisions accrue mainly to the very wealthy: they amount to 18.6% of the top 0.001%'s economic income, with tax benefits alone accounting for 9.1%.

Considering personal and business income taxes in combination, the progressivity of income taxation is moderate, with near-flat ETRs at the top 0.01% (dotted line in Figure 7a).[35] Income tax ETRs rise from 4.3% for P89–P90, to 10.1% for P99–P99.1, to 11.5% for P99.9–P99.91, and to 13.9% for P99.99–P99.991, before easing to 13.1% for the top 0.001%. In the next section, we incorporate all income sources and taxes from the national accounts to document the distribution of the overall Brazilian tax system.

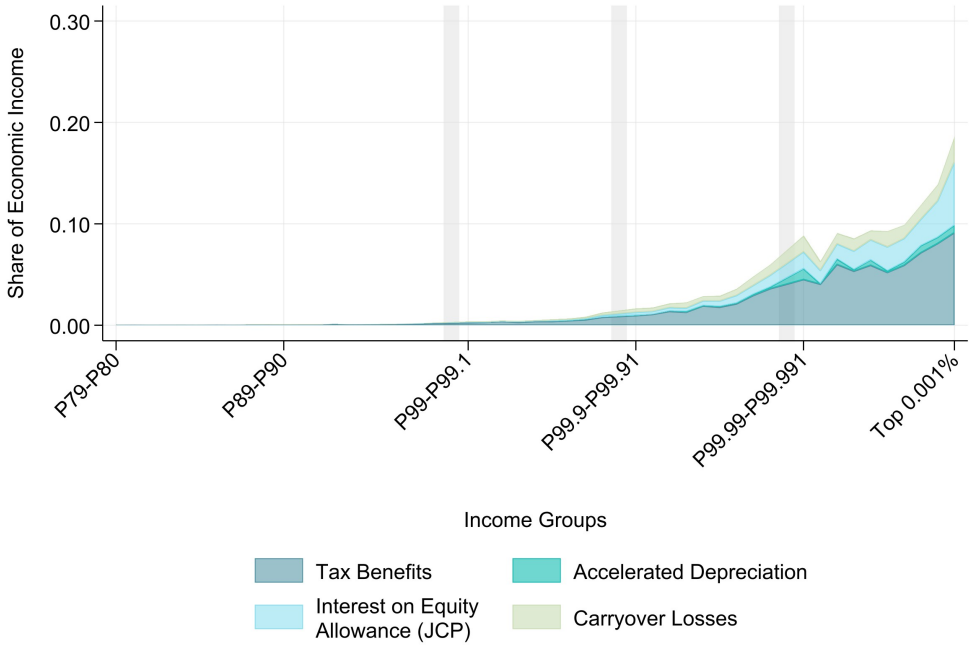
[34] Figure 5 shows that a large part of shares at the very top of the revenue distribution are held by foreign shareholders–both in tax-haven and non-haven jurisdictions. Figure 3a also shows that these very large firms have lower ETRs and drive the regressivity of business taxes at the top of the firm-size distribution. If some of these "foreign" shareholders are in fact top-income Brazilian residents holding shares via offshore companies, this could further reduce the business income tax ETR at the individual level at the very top.

[35] See Figure A.7 for the distribution of the main PIT deductions by economic income.

Figure 7: Effective Income Tax Rate



(a) Effective Income Tax Rate: Personal and Business Combined



(b) Share of Economic Income Untaxed due to Firm-Level Tax Provisions

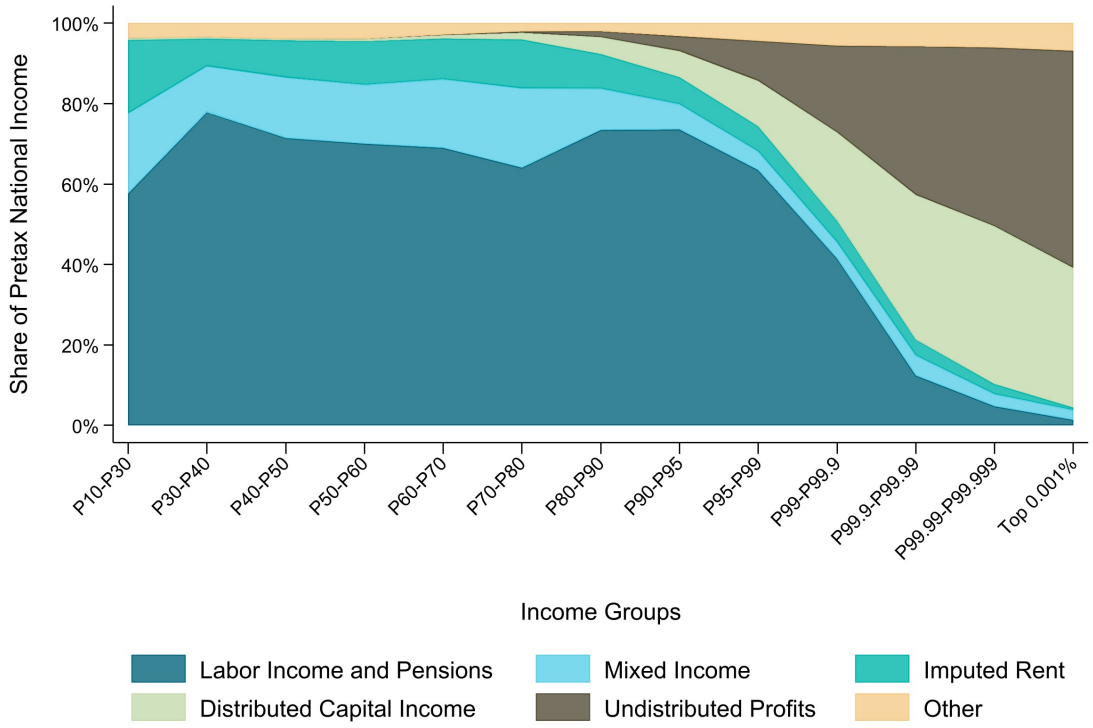
Notes: This figure plots effective tax rates (ETRs) and deductions by economic income group. Results cover the top 20% of adults–roughly the 25.5 million whose 2019 income exceeded the PIT filing-exemption threshold. Economic income is the sum of adjusted income reported in PIT returns and undistributed profits allocated to firm owners via our shareholder tree. Panel (a) shows personal income taxes–IRPF (declared personal income tax) and IRRF (withholding at source)–and business income taxes–IRPJ (corporate income tax) and CSLL (social contribution on net profit). It also marks the top PIT statutory marginal rate (27.5%). Panel (b) reports tax provisions on business income tax returns. To express all values in terms of tax base reduction, we divide values by 0.34 when these provisions are direct additions or exclusions of taxes due.

5 Effective Taxation in Brazil: Evidence from Distributional National Accounts

5.1 Pretax Income Distribution

This section extends our analysis beyond top earners to cover the entire Brazilian adult population for 2019. By integrating tax records, household surveys, and national accounts, we allocate all income sources and taxes recorded in national accounts to individuals. We construct Distributional National Accounts (DINA) (Piketty, Saez, and Zucman, 2018) to provide a comprehensive view of inequality and taxation in Brazil. This ensures cross-country comparability and consistency with macroeconomic aggregates.

Figure 8: Pretax National Income Decomposition by Income Groups



Notes: The figure decomposes Pretax National Income by income group. Labor income and Pensions refers mainly to salaries and pensions net of employee social security contributions (SSC). Mixed income is shown net of the consumption of fixed capital (CFC) attributable to the mixed income. Distributed capital income covers the distributed share of capital income net of the CFC assigned to operating surplus. The undistributed profits category comprises corporations' retained earnings plus investment income disbursements; retained earnings are allocated to firm owners via the shareholder tree, while investment income disbursements follow the same distribution as distributed capital income. The residual other component combines interest paid and pretax income from government and non-profit institutions serving households (NPISH). Interest is allocated using Central Bank and wealth return microdata; the NPISH and government items are distributed neutrally, in proportion to total personal income. See more details in the Online Appendix E.

Income Sources Figure 8 decomposes pretax national income by income group: the aggregate consisting of all the gross income, inclusive of pensions benefits and deducted of employee social security contributions, before taxes and transfers are applied.[36] Income composition differs sharply between bottom and top groups. For individuals with income between the P10–P90 of the distribution, labor income and pensions are the largest component, representing 69.6% of pretax income. Mixed income and imputed rents follow accounting for 14.7% and 10.4%, respectively. The sizable mixed income share reflects Brazil's extensive informal sector, where lower-income adults are disporportionately employed. By contrast, imputed rents are sizeable since home-ownership is widespread: more than two-thirds of households own their dwellings.[37]

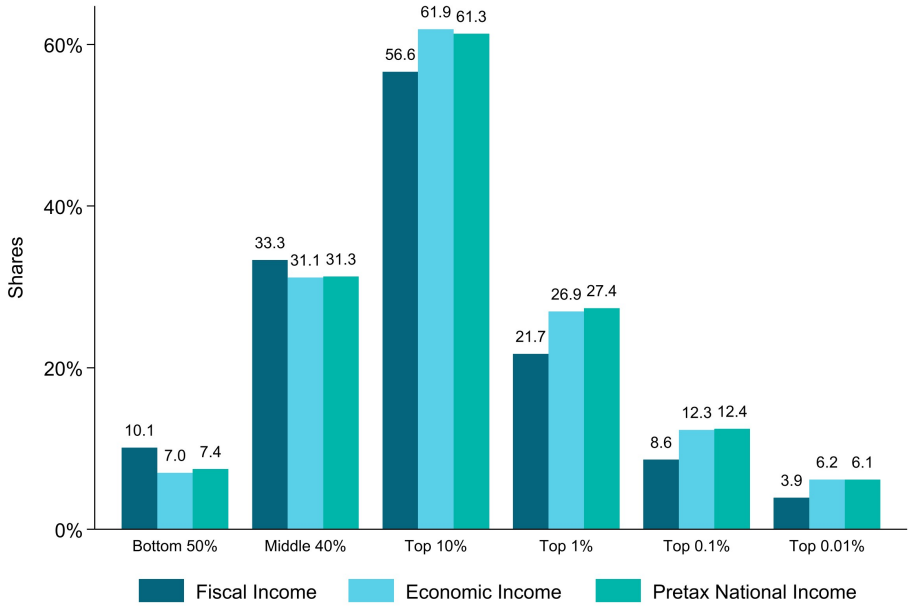
For top income groups, the composition of income markedly changes. While distributed capital income accounts for only 1.9% of pretax income for the bottom groups (P10–P90), its share rises to 34.7 % for the top 0.001%. Undistributed profits become the dominant income component for the richest, rising from 9.9% for P95–P99 to 54.0% for the top 0.001%. This pattern underscores the importance of business income at the top–both distributed capital income and undistributed profits–and discussed in Section 4.

Income Concentration Figure 9a shows the income shares of the main income concepts across income groups. Fiscal income is the adjusted income reported in PIT returns for tax data observations and in the survey for survey observations. Economic income is constructed by adding the undistributed profits allocated to firm owners to fiscal income. Both concepts are defined prior to rescaling to national accounts totals and reflect what is recorded in the survey and tax data, after the adjustments described in Section 3. Finally, pretax national income is obtained by rescaling the components of economic income to their corresponding macro aggregates, and adding the remaining components needed to reach national income–such as interest paid, government income, and employee social security contributions–before any taxes and transfers.

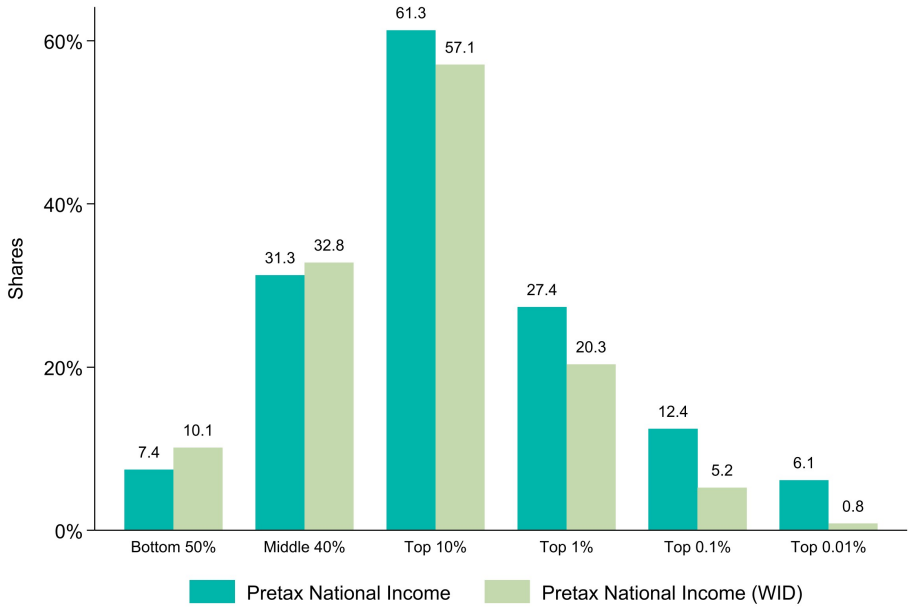
A comparison of fiscal and economic income shares highlights the central role of undistributed profits for very wealthy individuals. After including this component, the top 1% income share increase from 21.7% to 26.9%, a 5.2 p.p. rise, and the top 0.1% share increases from 8.6% to 12.3%, a 3.7 p.p rise. A higher share of income at the top of the distribution mechanically implies lower income shares for the rest: in particular, the bottom 50% share falls from 10.1% to 7.0% (a 3.1 p.p. drop).

[36] See Table A.3 for the rescaling factors applied to the main income components.
[37] According to POF 2017/18, 72.6% of Brazilian households are homeowners.

Figure 9: Income Shares



(a) Fiscal, Economic and Pretax National Income Shares



(b) Pretax National Income Shares: Comparison

Notes: The figure displays income shares by income group. Panel (a) reports the shares of fiscal income, economic income, and pretax national income. Fiscal income is the adjusted income reported in PIT returns for tax data observations and in the survey for survey observations. Economic income adds undistributed profits allocated to firm owners via our shareholder tree. Both concepts are defined prior to rescaling to national accounts aggregates. Pretax national income is obtained by rescaling the economic income components to their respective macro aggregates, and adding the remaining components needed to reach national income–such as interest paid, government income, and employee SSC–before any other taxes and transfers. Panel (b) compares our pretax national income shares with those of De Rosa, Flores, and Morgan (2024). Our estimates are derived from linked micro-administrative data that integrate personal income tax, withholding income tax, and business income tax returns, whereas their study relies mainly on tax tabulations and ad hoc assumptions to impute distributed and undistributed capital income.

Moving to pretax national income–the income concept that reconciles micro and macro data–we observe that inequality in Brazil is even higher than previous estimates. The top 1% concentrates 27.4% of national income. As shown in Figure 1, this is among the highest levels of inequality recorded worldwide, well above the shares in France (11.3%), the Netherlands (14.1%), and the United States (19.0%) (Bozio et al., 2024; Bruil et al., 2025; Piketty, Saez, and Zucman, 2018).[38]

Figure 9b plots our estimates of top income shares alongside those of De Rosa, Flores, and Morgan (2024), the most recent DINA study for Brazil, and those of other Latin American countries, whose results are published in the World Inequality Database (WID). For the middle 40% of the distribution, income shares are relatively close across studies, with our estimate 1.5 p.p. lower. However, differences are sharp at both the top and the bottom. Our estimate for the top 1% is 7.1 p.p. higher, while the bottom 50% share is 2.7 p.p. lower than in their study. This reflects greater concentration of economic income among very rich individuals in our data: the top 0.01% (15,000 individuals) receives 6.1% of national income, compared with just 0.8% in De Rosa, Flores, and Morgan (2024).

Several factors explain the divergence between our estimates and those of De Rosa, Flores, and Morgan (2024). First, we directly observe both distributed and undistributed business income at the top by linking firms to their owner, whereas they impute these components from survey data and then rescale to national accounts totals, requiring large and distorting adjustments. Second, while we use micro-administrative tax data, these authors employed tax tabulations, limiting their ability to study top incomes. Finally, we link PIT and withholding income tax (WHT) returns to measure income and taxes withheld; abandoned several ad hoc assumptions–such as couple composition at the top–since these features are directly observed in our data; and draw on richer auxiliary data, such as wealth declarations reported in PIT returns and Central Bank debt tabulations.

5.2 Taxation Along the Full Income Distribution

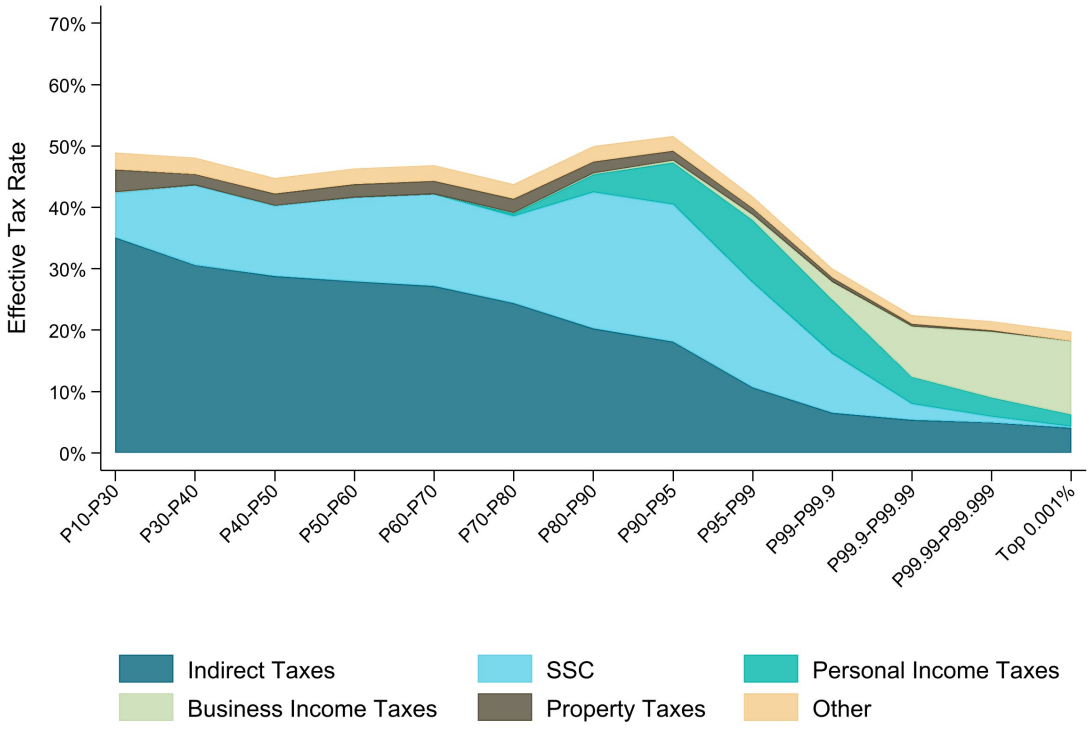
Figure 10 presents the most detailed analysis of distributional analysis of taxation for Brazil conducted so far. It plots effective tax rates by income groups, broken down by tax type. The effective tax burden averages 42.5% of pretax national income. Indirect taxation is the main source of revenue, contributing 39.7% of total collection.[39] Indirect taxes fall primarily on consumption and disproportionately burden lower-income individuals, for whom consumption accounts for a larger share of income, even after adjusting for informal consumption patterns (Bachas, Gadenne, and Jensen, 2023). The effective indirect

[38] The Netherlands estimate in Bruil et al. (2025) refers to 2016; the United States and France estimates are for 2019–the year of our study–and were retrieved from the World Inequality Database (WID).

[39] This share already accounts for the cash transfer adjustment described in Section 3.3.

tax rate ranges from 35.1% for the bottom group (P10–P30) to just 5.8% for the top 1%.

Figure 10: Effective Tax Rate by Income Groups, All Taxes



Notes: This figure shows effective tax rates (ETRs) on pretax national income by income group. Indirect taxes comprise ICMS (value-added tax), IPI (tax on industrialized products), import taxes, and other taxes on products. Individual ETRs for indirect taxes are adjusted for cash transfers received and for informal consumption, following Bachas, Gadenne, and Jensen (2023). Property taxes include the urban property tax (IPTU), the rural property tax (ITR), and the vehicle tax (IPVA). The personal income tax combines IRPF (personal income tax) and IRRF (withholding income tax). Business income taxes comprise the household share of IRPJ (business income tax) and CSLL (the social contribution levy on net profit), allocated to firm owners via the shareholder tree. To measure ETRs for Brazilian residents, we exclude taxes paid by non-residents in Brazil and include taxes paid abroad by Brazilian residents. The "Other" category includes payroll and workforce taxes, other production taxes, the Inheritance and Gift Tax (ITCMD), and the government share of business income taxes. See the Online Appendix E.4 for details.

Social security contributions (SSC) are the second largest component, accounting for 34.5% of total tax revenue. SSC are mildly progressive at first but eventually become regressive. SSC rates rise from 7.3% for the bottom group (P10–P30) to 22.3% for P90–P95, and then fall thereafter. For the top 1 %, the rate drops to 6.0%. This pattern is due to three factors. First, SSC are only paid by formal workers (Saez and Zucman, 2023). Second, contributions are capped. Third, the share of labor income sharply drops at the top.

The personal income tax is the third most important tax, collecting 12.3% of revenue, far less than indirect taxes and SSC. The PIT has a narrow base, covering roughly the top 20% richest adults. As detailed in Section 4.2, it becomes regressive at the very top of

the distribution, since dividends and undistributed profits are not subject to PIT.[40] The PIT's effective tax rate peaks at 10.2% of pre-fiscal economic income for P95–P99, and then steadily declines to 2.0% for the top 0.001%. Together, these features explain why the PIT contributes only about a small share of total tax revenue.

In contrast, the business income tax is mildly progressive, but only accounts for 5.7% of total tax revenue:[41] its effective tax rate as a share of individual economic income, rises from 2.9% at P99–P99.9, to 8.2% at P99.9–P99.91, to 10.7% at P99.99–P99.991, and to 11.9% for the top 0.001%. As discussed previously effective corporate tax rates remain well below the statutory rate of 34%, as companies reduce liabilities via tax benefits (see Section 4.2). This helps explain why effective taxation at the very top remains low, despite the fact that most of the income of the very rich derives from businesses.

Overall, Brazil's tax system is regressive. Most adults pay effectively taxes in the 45–50% range, whereas the richest 1%–who concentrate nearly one-third of national income–pay a tax rate of just 26.2%. The burden declines further at the very top of the distribution, with the top 0.001% only paying 19.7% of their income in taxes. Three factors explain this pattern. First, the system's reliance on indirect taxes. Second, the exemption of dividends that makes the personal income tax regressive within the top 1%. Third, the generous tax benefits that reduce the burden on business income well below the statutory tax rate of 34%. Naturally, taxes are only one side of government intervention in the economy; for poor individuals cash transfers can lift consumption possibilities. We leave the analysis of the progressivity of government spending for future work.

6 Conclusion

This article uses population-wide administrative micro-data from the Brazilian Tax Authority (*Receita Federal do Brasil*) to provide new estimates of income inequality and effective tax rates across income groups for Brazil. A key challenge in measuring inequality is capturing business income–both distributed (mainly dividends) and undistributed profits (retained earnings)–the main income component at the very top of the distribution. Using individual income tax returns, business tax returns, and data linking firms to their owners, we allocate all business income–distributed and retained–and business income taxes to their owners. We then reconcile all income components and taxes with national

[40] The ETR level in this section differs from estimates in Section 4.2 because the reference income here is pretax national income, whereas Section 4.2 uses the adjusted income reported in the PIT returns plus the undistributed profits assigned to companies' owners using our shareholder tree. In addition, all components are rescaled to national-accounts totals here (see Section 3.3), further affecting levels.

[41] Note that this share does not include business income taxes paid by non-residents in Brazil.

accounts aggregates to ensure macroeconomic consistency.

We uncover two main results. First, we revise upwards Brazil's inequality estimates. The resulting top 1% income share is 27.4%, one of the highest recorded in the world and 7.1 percentage points higher than the most recent estimate. Our estimate is larger because retained earnings are more concentrated than directly observed capital income sources–capital income in surveys and dividends in micro-tax data. Income inequality in developing countries may be systematically underestimated, as even in Brazil–where dividends are untaxed and incentives to retain income within firms are limited–distributing business income to firms' owners leads to substantially higher inequality estimates. Second, Brazil's tax system is regressive: while the average tax rate of the economy is 42.5%, the effective tax rate falls to 20.6% for million-dollar earners (roughly the top 0.01% of the distribution). This pattern reflects the heavy reliance on indirect taxes, and the limited progressivity of income taxation, stemming principally from the non-taxation of dividends and the generous corporate tax provisions that reduce firms' effective tax rates.

This paper is the product of an ongoing collaboration between the Brazilian Tax Authority (*Receita Federal do Brasil*) and the EU Tax Observatory. We plan to extend our analysis in several directions. First to cover inequality estimates for close to a decade (from 2014 to 2022, when detailed corporate tax data are available). Second, to incorporate transfers, including in-kind, and other income components to construct post-tax national income and, therefore, capture the full redistribution of the tax and transfer system. Third, we aim to use detailed wealth declarations in income tax returns to study wealth inequality and its interaction with income inequality.

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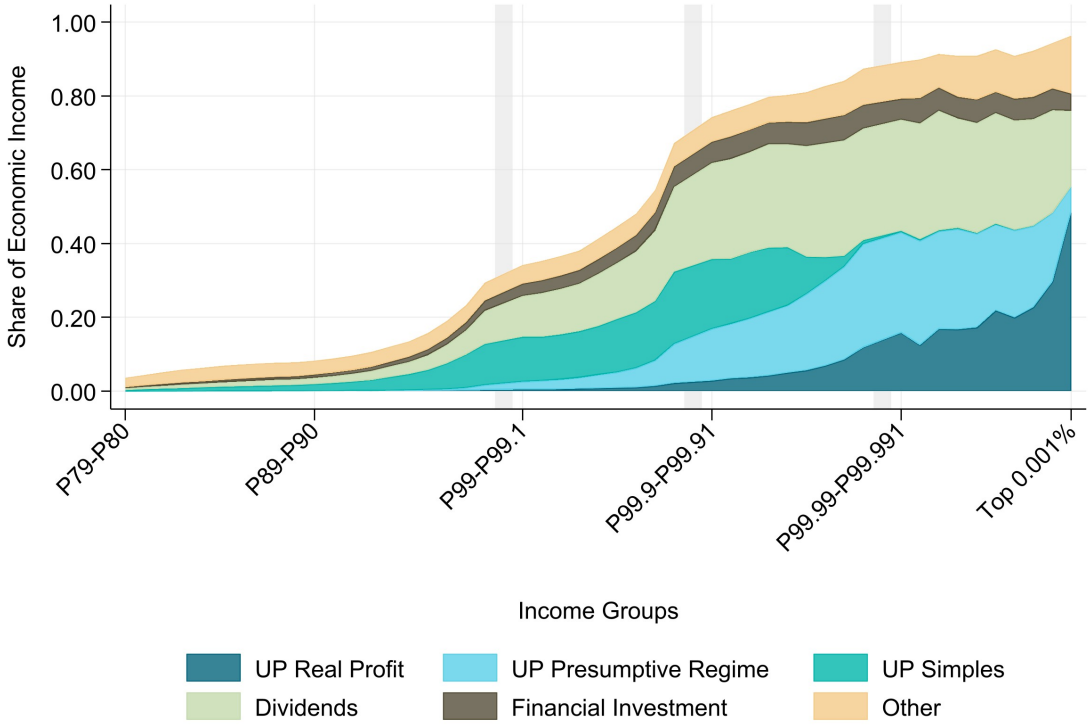
A Appendix A: Figures and Tables

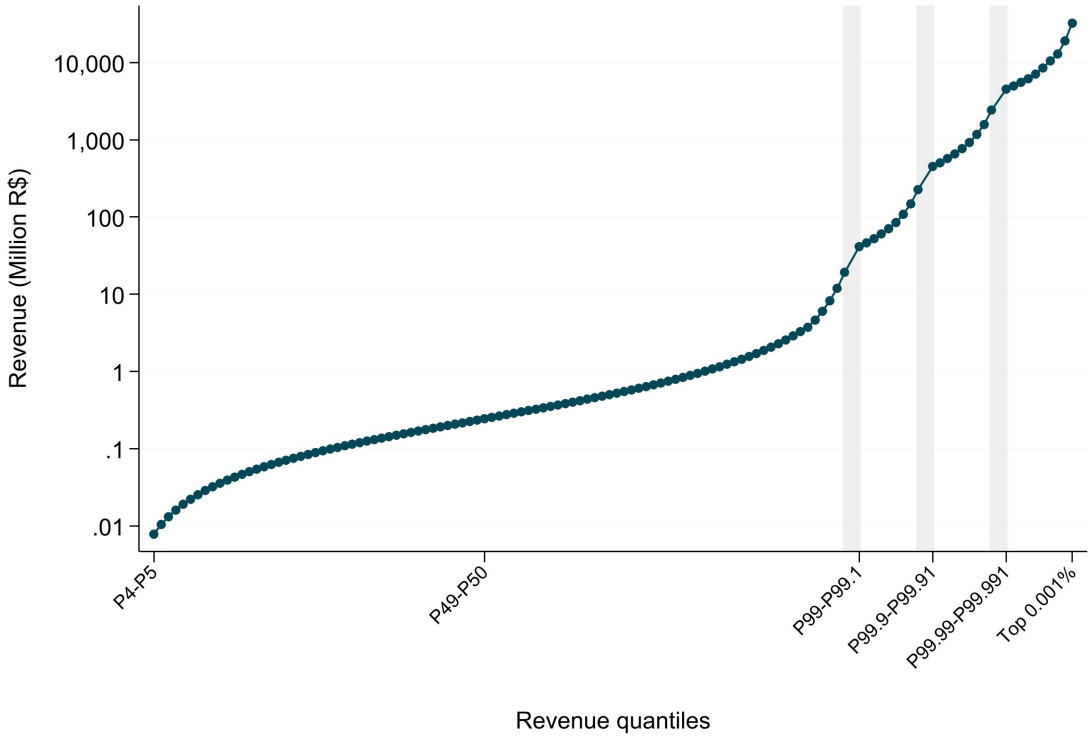
A.1 Figures

Figure A.1: Capital Income Composition by Income Groups



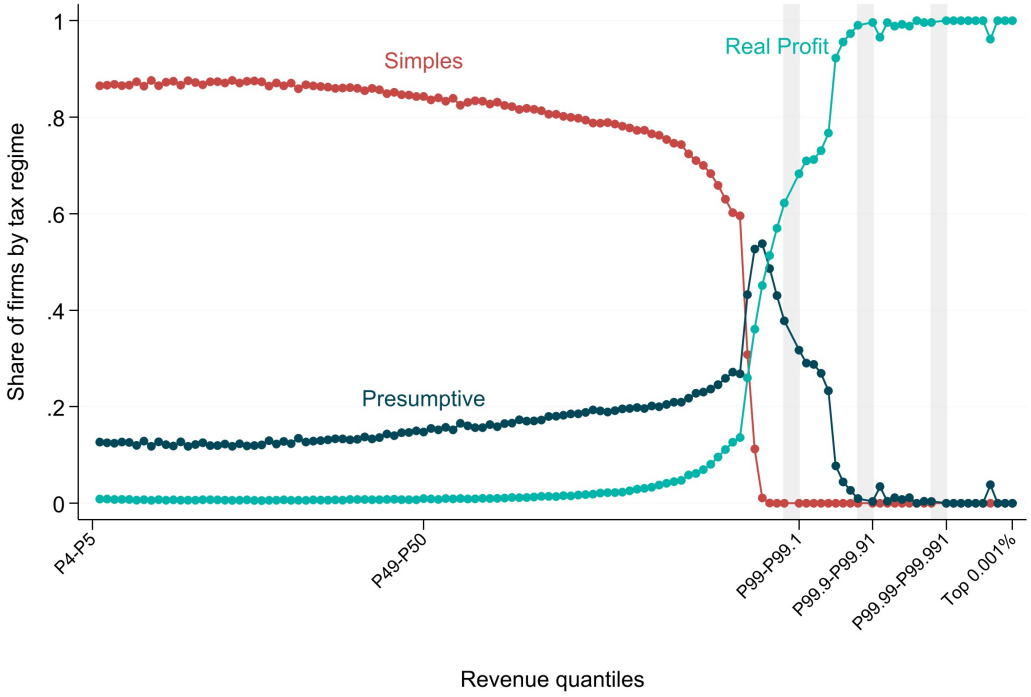
Notes: The figure decomposes the capital income from economic income by income group. We display results for the top 20% of adults–roughly the share whose income exceeded the PIT filing-exemption threshold, corresponding to about 25.5 million individuals in 2019. Economic income is the sum of adjusted income reported in PIT returns and undistributed profits allocated to firm owners via our shareholder tree. The capital income is divided into dividends; financial investment income; undistributed profits (UP) originating from firms in the *Simples*, Presumptive Profit, and Real Profit regimes; and Other, which includes returns on corporate equity (*Juros sobre Capital Próprio*), rental income, income from savings accounts and other exempt fixed income assets, and other exempt capital incomes.

Figure A.2: Turnover Levels Across The Firm-Size Distribution

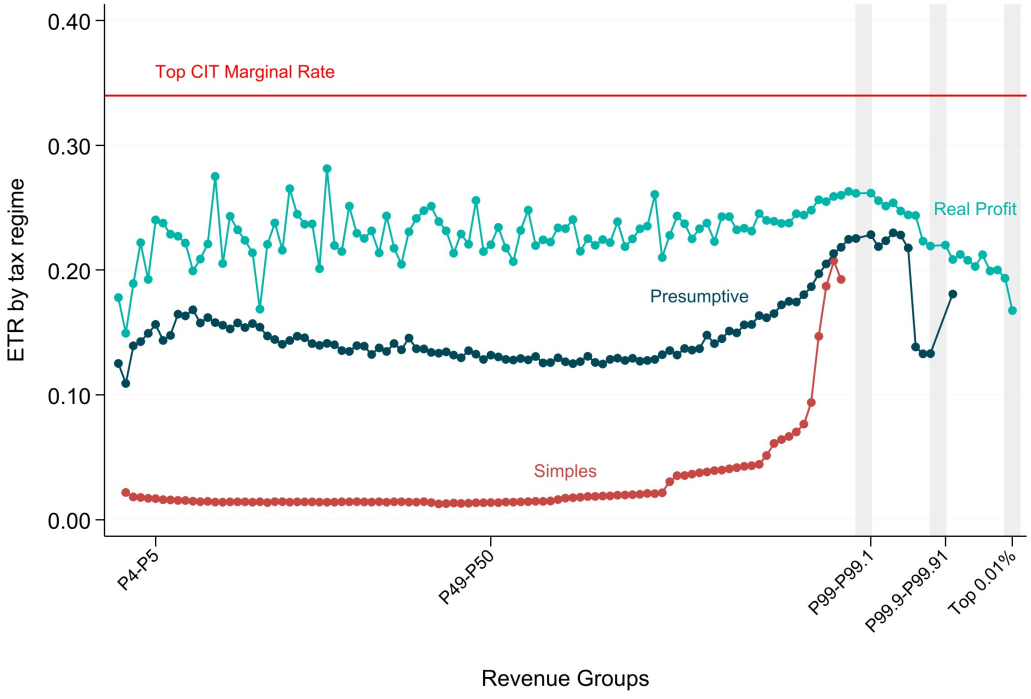


Notes: This figure presents the minimum level of yearly turnover for each fractile of the firm size distribution in 2019. Numbers in y-axis are in R$ million.

Figure A.3: Corporate Tax Regimes Across the Firm Size Distribution



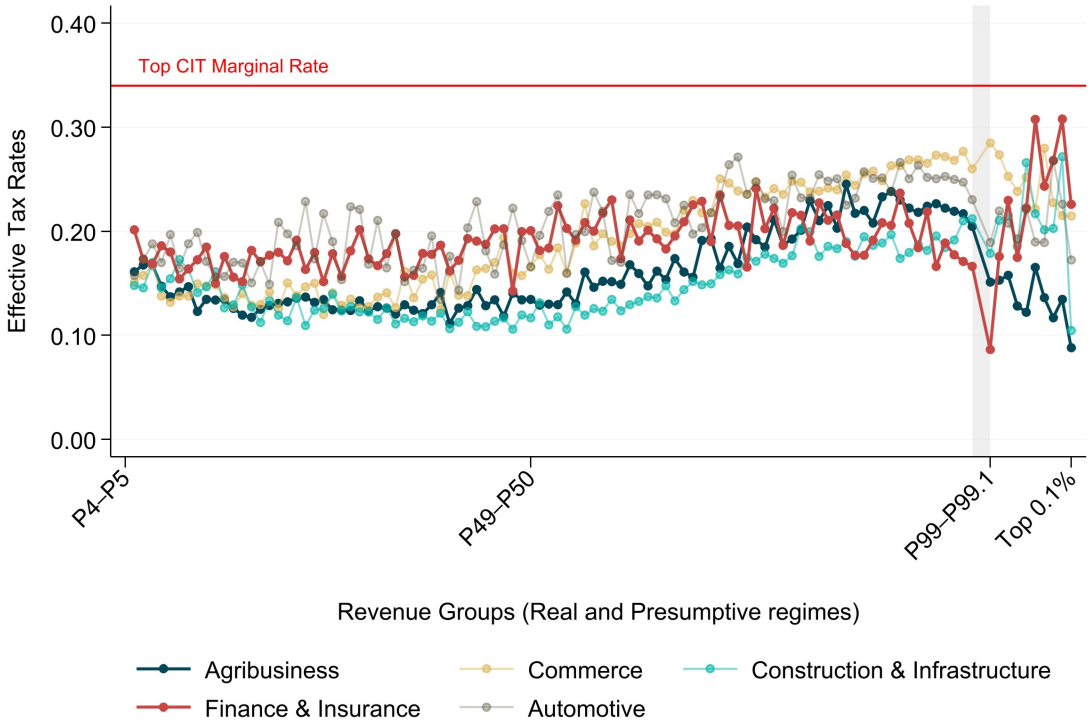
(a) Composition of tax regimes across firm size distribution



(b) Effective tax rates by CIT regime

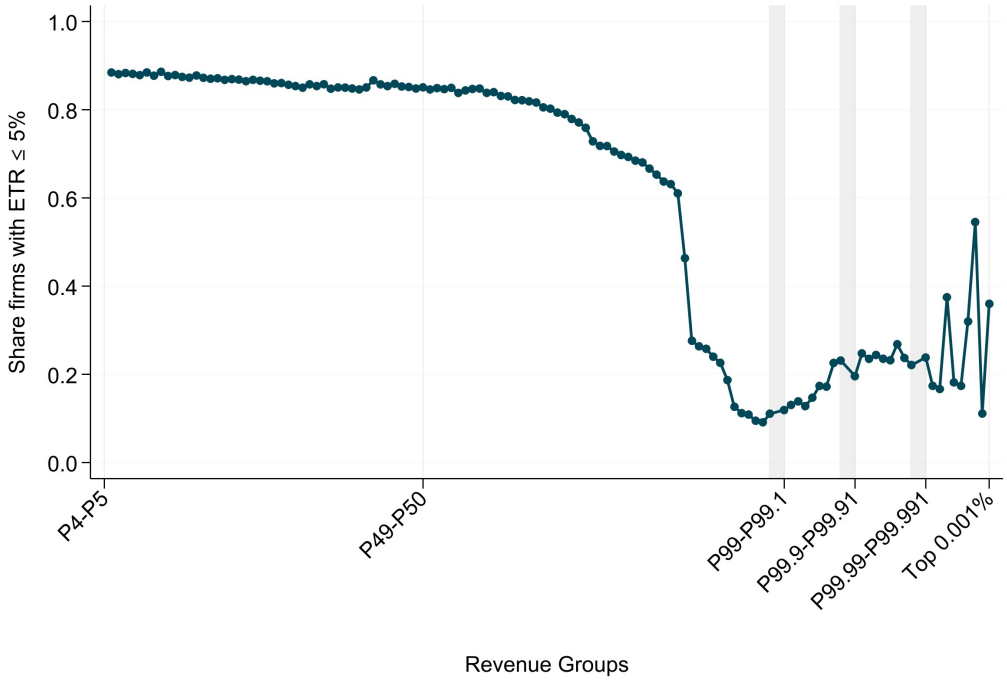
Notes: Panel(a) presents the composition of firms by corporate tax regime, in each of the fractiles of firm size distribution. Panel (b) presents average effective tax rates (ETR) in each of the three corporate tax regimes in Brazil, across the distribution of corporations by turnover. Effective Tax Rates are defined as the ratio between income taxes and economic profits. ETRs are winsorized two-sided at the 1st and 99th percentiles and average ETRs are simple averages across all firms in the regime-fractile.

Figure A.4: Effective Tax Rates Across Sectors (Real and Presumptive regimes only)

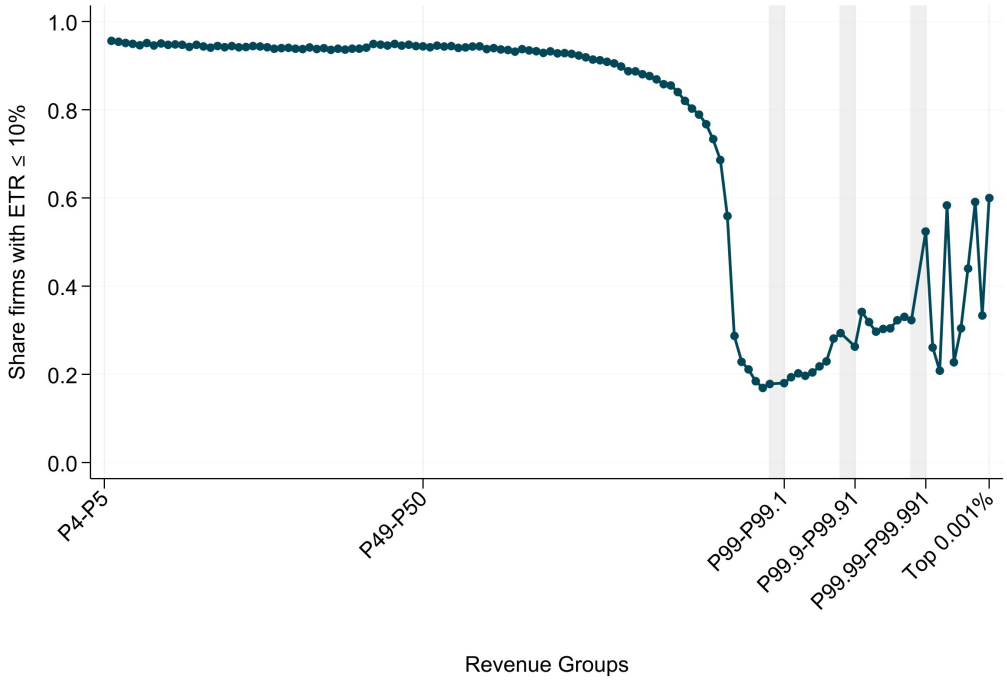


Notes: This figure presents average effective tax rates (ETRs) for firms in different economic sectors, across the distribution of corporations by turnover. The sample for this figure only includes firms in the Presumptive and Real Profit Regimes, for which we have better information on economic sectors. The fractiles of revenue in this figure are computed within firms of these regimes, i.e., they do not include *Simples* firms. ETRs are winsorized two-sided at the 1st and 99th percentiles. We use internal sectoral definitions from the Brazilian Tax Authority.

Figure A.5: Firms with Low Effective Tax Rates



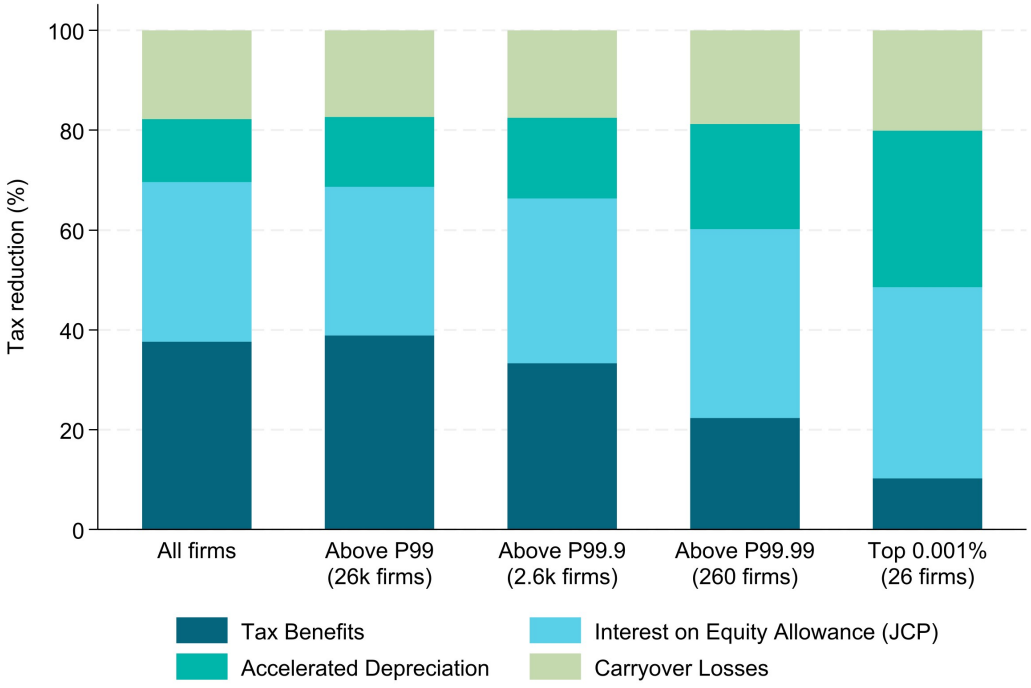
(a) Share of Firms with Effective Tax Rate Below 5% of Their Profits



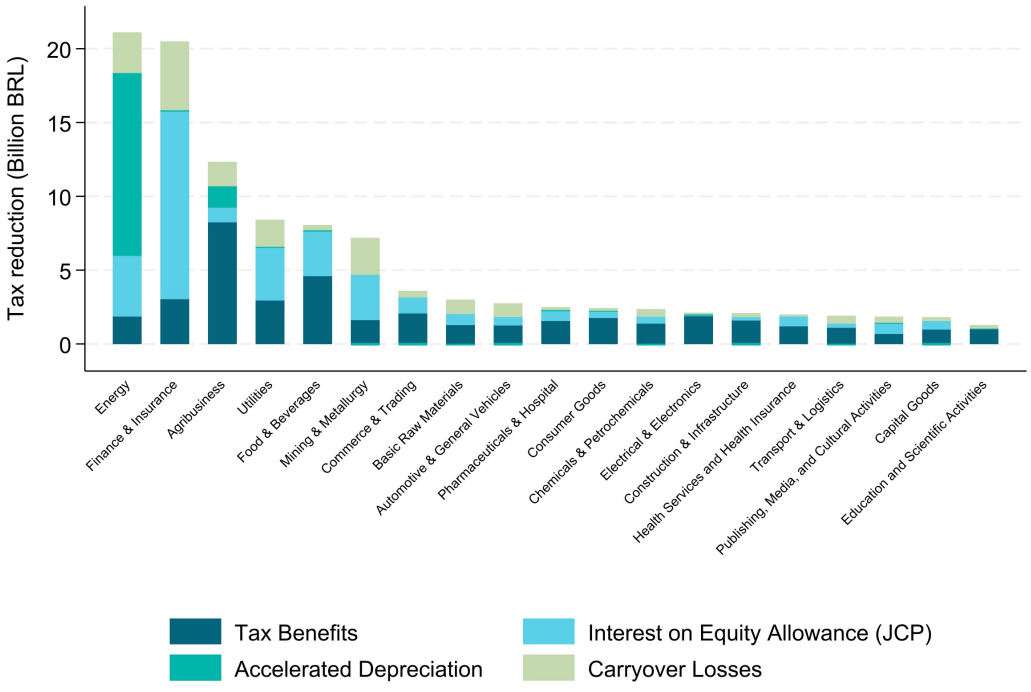
(b) Share of Firms with Effective Tax Rate Below 10% of Their Profits

Notes: These figures present the share of firms in each fractile that report ETRs below 5% (panel a) and below 10% (panel b), conditional on firms reporting positive economic profits. Effective Tax Rates are defined as the ratio between CIT and economic profits. ETRs are winsorized two-sided at the 1st and 99th percentiles

Figure A.6: Provisions Reducing CIT: Types and Sectoral Allocation



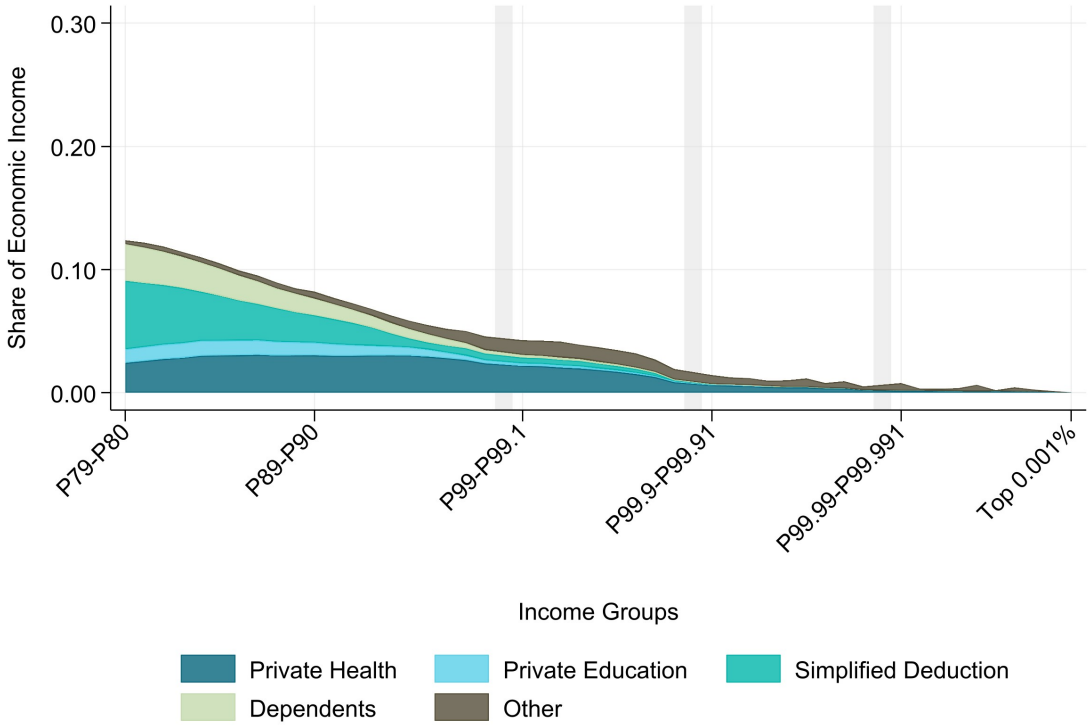
(a) Relative Composition by Firm-Size



(b) Absolute Composition: by Economic Sectors

Notes: These figures present the composition of tax reduction provisions for 2019. Panel (a) presents the relative composition for all firms and for selected groups of top firms by revenue. Panel (b) presents absolute levels across economic sectors, as classified by the Brazilian Tax Authority (*Receita Federal do Brasil*). Tax reduction provisions are classified in four groups: Tax benefits (industry or program-related provisions); Interest on Equity Allowance (JCP); Carryover losses; and Accelerated depreciation provisions. To express all values of benefits in terms of tax reductions, we multiply values by 0.34 when these provisions are additions or exclusions of the levels of taxable profit

Figure A.7: Deductions of the Personal Income Tax



Notes: This figure plots PIT deductions by economic income group. Results cover the top 20% of adults–roughly the 25.5 million whose 2019 income exceeded the PIT filing-exemption threshold. Economic income is the sum of adjusted income reported in PIT returns and undistributed profits allocated to firm owners via our shareholder tree. The graph shows the share of economic income related to deductions on PIT returns–private health and education expenditures, dependents, the simplified deduction (net of the SSC part), and "other" (including professional expenses and private pension contributions).

A.2 Tables

Table A.1: Descriptive Statistics of Fiscal and Economic Income

	Fiscal income			Economic income		
Fractile	N	Threshold	Mean > thr.	N	Threshold	Mean > thr.
P50	75,960,599	14,305	60,579	75,875,159	14,305	68,523
P80	29,837,280	36,156	120,996	29,837,281	36,178	141,121
P90	14,918,645	72,044	190,968	14,918,640	73,213	230,814
P95	7,459,322	123,013	288,602	7,459,319	129,125	365,465
P99	1,491,873	322,496	696,343	1,491,870	374,526	1,004,838
P99.9	149,191	941,998	2,645,164	149,187	1,422,293	4,586,560
P99.99	14,922	4,096,386	11,745,946	14,922	7,003,875	22,950,356
P99.999	1,492	18,746,922	50,763,272	1,492	36,343,312	111,879,448
P99.9999	152	88,030,552	202,595,312	152	199,694,816	491,618,912

Notes: This table reports, for Brazil in 2019, the number of observations (N) above each fractile threshold, the corresponding threshold (Threshold), and the mean income above that threshold (Mean > thr.) for both fiscal and economic income. Fiscal income is the adjusted income reported in PIT returns for tax data observations and in the survey for survey observations. Economic income adds undistributed profits allocated to firm owners via our shareholder tree. Both concepts are defined prior to rescaling to national accounts aggregates. Differences in the number of individuals across fiscal- and economic-income groups reflect re-ranking of observations with different weights.

Table A.2: Descriptive Statistics of Business Income Tax Declarations

Regime	N firms	Agg. Revenue (billion)	Agg. Profits (excl. losses) (billion)	Agg. Profits (billion)	Agg Taxes (billion)	Average ETR (positive profits)	Aggregate ETR (positive profits)	Share with losses (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
All firms	3,608,780	13,634	1,816	1,510	249	5	14	8.73
Simples Nacional	2,592,346	947	389	388	12	2	3	2.54
Presumptive	850,100	1,321	446	390	67	15	15	19.50
Lucro Real	165,555	11,366	980	732	170	25	17	50.58
Below BRL 78MM threshold	152,079	1,517	135	8	31	25	23	53.04
Above BRL 78MM threshold	13,476	9,849	845	724	139	23	16	22.80

Notes: This table presents statistics for corporate tax filings in 2019. The first line present statistics for all firms, while the following three lines present results for samples restricted to each of the regimes: *Simples Nacional*, Presumptive and *Real Profit*. In the last two lines, we present results for two samples within the Real Profit regime: firms below the R$ 78 million threshold, the maximum revenue size for firms to be in the Presumptive regime (i.e. these are firms that opt for Real Profit but would be allowed to be in Presumptive instead); and firms with revenue above that threshold. Column (1) presents the number of firms per sample; Column (2) presents the aggregate gross revenue for each sample; column (3) presents aggregate economic profits excluding loss making firms; column (4) presents aggregate economic profits, inclusive of losses; column (5) presents aggregate income taxes. Columns (6) and (7) presents two measures of effective tax rates (ETR): the unweighted, average ETRs for firms with positive economic profits (7); and the aggregate ETR, defined as the ratio between total income taxes and total profits (excluding losses) (7). Finally, column (8) present the share of firms registering economic losses in each sample.

Table A.3: Rescaling Factors

Component	Observed (mn)	National Accounts (mn)	Rescaling factor
Distributed Capital income	798,414	912,049	87.5
Mixed income	453,812	617,592	73.5
Labor income & Pensions	3,964,875	3,911,659	101.4
Imputed Rent	578,882	482,425	120.0
Employee SSC	207,437	249,060	83.3
Personal Income Taxes	234,173	330,572	70.8
Business Income Taxes (hhlds)	109,982	127,822	86.0
Employer SSC	656,814	677,987	96.9
Vehicle Taxes	44,443	46,134	96.3
Indirect taxes	481,963	1,079,369	44.7
Non-contributory pensions	28,737	55,525	51.8
Bolsa Familia and Other	23,427	41,863	56.0

Notes: This table presents the components of pretax national income that we rescale to their respective national accounts aggregates for Brazil in 2019. *Observed* reports totals from micro-administrative tax data and survey data (see Appendix B for the estimation of components such as imputed rents, vehicle taxes, and indirect taxes). *National Accounts* corresponds to the respective national accounts aggregate. The *Rescaling factor* is the ratio of the observed value to the national accounts value.

Online Appendix For

"Tax Progressivity and Inequality in Brazil: Evidence from Integrated Administrative Data"

B Details on survey data

B.1 Survey Data

Pesquisa Nacional por Amostra de Domicílios Contínua (PNADC). The reference survey data used in this study are drawn from the *Pesquisa Nacional por Amostra de Domicílios Contínua* (PNADC), conducted by the *Instituto Brasileiro de Geografia e Estatística* (IBGE) on a monthly basis since January 2012, with results published quarterly. PNADC employs a stratified two-stage cluster design to yield estimates representative at the national level and for each of the five macro-regions, as well as for urban and rural domains.

Approximately 211,000 households are interviewed each quarter (around 70,000 per monthly wave), using a rotating-panel scheme in which dwellings remain in the sample for five consecutive quarters, thus enabling both cross-sectional snapshots and short-term longitudinal analyses. Standardized questionnaires collect detailed information on demographic characteristics, education, labor-market status, occupational characteristics and household income. Importantly, PNADC is the principal source of information on labor-market informality in Brazil.

Pesquisa de Orçamentos Familiares (POF). Although PNADC is our reference survey for labor-market variables, it does not capture household consumption expenditures. To address this, we also employ IBGE's Consumer Expenditure Survey (Pesquisa de Orçamentos Familiares, POF), conducted on a less frequent basis[1].

Focusing on its most recent cycle (July 2017 – July 2018), POF uses a stratified two-stage cluster design to produce national and regional estimates for urban and rural areas. In that cycle, approximately 57,920 households provided complete expenditure data. Data were collected through seven-day expenditure diaries for food and beverage acquisitions and through standardized questionnaires with 30-day (nondurable goods), 90-day (semidurable goods) and 12-month (durable goods and services) recall periods for other consumption categories. POF microdata thus constitute the principal source for analysing household consumption patterns and for determining the products and weights that compose the market baskets for Brazil's consumer price indices.

B.2 Consumption Taxes Imputation

To estimate the consumption taxes remitted by households, we use the very detailed consumption data coming from POF 2017-2018. Following Bachas, Gadenne, and Jensen (2023), we adjust indirect taxes to account for informal consumption. For this purpose, we exclude consumption goods purchased in the informal economy from the consumption

[1] POF editions in the early twenty-first century were carried out in 2002–2003, 2008–2009 and 2017–2018

tax computation, using the type of store where the purchases occurred as an approximation.

After this adjustment, we group the thousands of consumption items present in POF into the 127 product categories of the input-output matrix, adhering to the classification of Silveira et al. (2022). Subsequently, we apply the author's effective indirect tax rates for each of the categories to the POF consumption values.[2] These effective rates are estimated using the output-input matrix and encompass all the indirect taxes presented in National Accounts.[3]

To link the consumption taxes estimated in POF to our reference survey, PNADC, we employ a machine-learning approach–specifically, a stacked ensemble of XGBoost, Generalized Additive Model (GAM), Random Forest (RF), Lasso regression and Ridge regression trained with 10-fold cross-validation–trained on POF data to predict household consumption taxes in PNADC.[4] We then distribute the taxes paid by household to its members in proportion of their share on the total household income. For the observations in the tax data, we simply apply the effective consumption tax by income groups.

B.3 Imputed Rents Estimation

We employed a mixed strategy to estimate the imputed rents for owner-occupied households. For the survey observations, we use a machine-learning approach as described in section B.2, where we train our model using the rented dwellings to predict the imputed rents for the owner-occupied ones.[5] PNADC has very detailed characteristics of the households sampled, which allow us to train our model using both these very detailed household information together with geographical and socioeconomic variables.[6]

On the other hand, the observations in the tax data are required to report the value of their houses in their personal income tax returns. To make use of this detailed wealth information, our strategy was to apply a rent-to-declared-price multiplier, which incorpo-

[2]In this estimation, we focus solely on the cash portion of household consumption, thus including only transactions made with cash and credit cards.

[3]This includes ICMS (value-added tax), IPI (industrialized product tax), import tax, and other taxes on products.

[4]To train the model, we use variables common to both PNADC and POF: household income decile, region, indicators for state capital and other metropolitan areas, urban versus rural status, household size, number of children (<14 years), and head-of-household characteristics (sex, race, age decile).

[5]For the years 2014, 2015, 2020, and 2021, we do not observe information regarding household characteristics. Therefore, we train our model using the nearest year containing this information and using solely geographical and socioeconomic variables.

[6]To train the model, we employed variables related to households characteristics–type of dwelling; number of bedrooms and bathrooms; walls, roof, and floor type; information regarding the types and accessibility of sewage, water and energy; households appliances and electronics, etc.–, geographical variables–geographical area, strata, and urban/rural–, and socioeconomic information–education, race, labor status and age of the head of household; household income; household size.

rates both the rent-to-price ratio observed in market surveys and an adjustment for real estate values that are reported below market value in the tax data.

B.4 Debt and Interests Paid Estimation

To estimate interest payments, we begin by constructing a measure of individual debt that combining detailed debt tabulations from the Central Bank withand administrative tax data. The first data source are the tax returns. Individuals are required to report non-collateralized debt (such as credit card or personal loans) if it exceeds BRL 5,000. Collateralized debts, such as mortgages and auto loans, are not reported, as assets are declared net of debt.

The second data source consists ofis tabulations from the Sistema de Informações de Créditos (SCR), provided by the Central Bank of Brazil.[7] The Central Bank collects comprehensive data on all loans issued to individuals by banks and other regulated financial institutions. These data are made available in tabulated form, with outstanding loan balances disaggregated by loan type, income group, occupation, state, and type of financial institution. For the purposes of this analysis, we aggregate the data at the level of loan-type and income- group levels, which aligns with the structure of the survey data. The income groups are: no income; up to 1 minimum wage; more than 1 to 2 minimum wages; more than 2 to 3 minimum wages; more than 3 to 5 minimum wages; more than 5 to 10 minimum wages; more than 10 to 20 minimum wages; and more than 20 minimum wages. The non-collateralized loan types are: Credit card; Payroll-deducted loan; Non-payroll personal loan; Other credits; and Rural and agro-industrial credit. The collateralized loan types are: Vehicle loan; and Mortgage.

We match the Central Bank's data on outstanding loans to individuals in the survey by income group as defined in the Central Bank data. This gives us the total outstanding debt by loan type for the income group to which each individual belongs. To distribute this total within each group, we allocate debt based on individuals' relative income shares. For example, within the income group earning between 1 and 2 minimum wages, an individual earning 2 minimum wages is assigned twice the debt of someone earning 1 minimum wage. Note that this does not imply distributing total debt proportionally to income across all individuals, as each income group has its a different total debt level. For individuals in the tax data, we retain their reported non-collateralized debt reported in the tax data and supplement it with collateralized debt information obtained from the Central Bank data, identified byusing the information on loan type. Finally, we distribute interest payments proportionally to debt outstanding for each individual.

[7] The data can be downloaded at https://dadosabertos.bcb.gov.br/dataset/scr_data.

C Administrative Tax records

C.1 Sources of income details - DIRPF

Our main source of individual income and income taxes are the yearly filings of Personal Income Taxes (PIT), known as DIRPF (*Declaração de Imposto de Renda de Pessoa Física*). In recent years, approximately 40 million individuals or 30% of working-age adults filed a declaration each year.

Obligation to file a declaration is not only based on taxable income levels, but also encompasses levels of wealth and exempt income. Between 2015 and 2022, filing was mainly mandated for individuals who:

- Received taxable income above R$ 28,559.70
- Received exempt, non-taxable or exclusively taxable income above R$40,000.
- Received gross revenue from rural activities above R$ 142,798;
- Had gross wealth above R$ 300,000 as of December, 31, 2022.

Since 2014, the PIT declaration for many filers is pre-filled: information from third-parties such as withholding of wages and capital income, as well as some types of allowable deductions, are automatically included in a pre-filled declaration by the tax authority. Taxpayers might amend the declaration, correcting or adding information.

Joint filing. Married couples, those in long-lasting recognized relationships and co-parent can file jointly. Less than 10% of total declarations in 2019 were joint filings; in those cases, we assign an equal-split of income between the two adults filing.

Income sources. The DIRPF declaration is comprised of three main income sources, discussed in detail below. **Taxable income** is mostly labor income from wages and other sources, taxed at a progressive schedule of increasing marginal rates. **Exclusively taxed income** are those that face final withholding at source, meaning they are not subject to adjustments (using the tax schedule) when taxpayers file their PIT declarations. Finally, **exempt income** is income from sources that are exempt from Personal Income Tax, but must be declared to the Tax Authority.

Tax schedule.[8] All taxable income, net of deductions, are pooled and taxed at increasing marginal rates varying between 7.5% and 27.5%. In 2019-2022, incomes below R$ 22,847 were taxed at zero (this is the equivalent to gross income of R$ 28,559.70, the exempt level to file, minus the standard 20% deduction) and the highest marginal tax rate income bracket of 27.5% started at incomes of R$ 55,976. At 27.5%, the highest marginal

[8] Tax tables for Personal Income Taxes are available here

income tax rate is similar to the average of 30% across Latin American countries, while the exemption threshold is quite low–it is equivalent to 50% of gross national per capita income, compared to approximately 140% average in Latin America (Bergolo, Londoño-Vélez, and Tortarolo, 2023). In the period, the exemption threshold was also equivalent to approximately twice the annualized minimum wage.

Exclusively taxed income face different rates depending on the specific source:

1. 13th salary: taxed at progressive rates of 7.5 - 27.5%, based on monthly tax table (7.5% starts from R$1,903/month)

2. Profit sharing or performance bonuses for workers (*Participação em Lucros e resultados*: exempt from INSS & FGTS (social security and social protection), exempt up to R$ 6,670, then pays standard progressive rate schedule (7.5% - 27.5% applies above R$ 16,380).

3. Income from financial investments (fixed income) (*aplicações financeiras*): taxed at a tax schedule between 15% and 22.5%, depending on length of investment holding (15% above 720 days). Same with investment funds on fixed income, depends on holding period.

4. Income from financial investment in stocks (*renda variável*): For stock market, 20% if day trade, 15% otherwise. Withdraws from investment funds on stocks are taxed at 15%.

5. Returns on corporate equity (*Juros sobre capital próprio*): taxed at source at 15% flat rate.

6. Capital gains: taxed between 15% and 22.5%, progressive schedule. Up to R$ 5 million taxed at 15%, and above R$ 30 million taxed at highest marginal rate of 22.5%.

Deductions. Taxpayers can choose between a *simplified deduction system*, where total deductions are equivalent to 20% of taxable income up to R$ 16,754; or use itemized deductions. The largest itemized deductions are for social security contributions, which prevent double taxation, and for medical expenses, both of which are uncapped (i.e. there is no maximum allowable deduction). Other important itemized deduction items are a fixed allowance for each dependent and a capped deduction for education expenses. In 2019, approximately 50% of PIT declarations used the simplified deduction.

Exempt income sources are not taxed but must be informed to the tax authority in the Personal Income Tax filing.[9] The main sources of exempt income in terms of aggre-

[9]Precisely because they are not taxed, empirically we observe some issues with data quality, such as extreme values (often used repeated digits such as 9999999999). For that reason, we exclude a small number observations that are clear incorrectly reported.

gate amounts are dividends, exempt income from small businesses, and exempt pension income.

C.2 Identification of Pension Income

Pensions are reported in two parts in income tax statements. The portion of pension income below the pension exemption threshold is declared as exempt income, for which there is a dedicated variable. The portion exceeding the exemption threshold is reported as taxable income and appears in the general taxable income variable.

To distinguish pension income from other sources of taxable income, we use an occupational declaration variable in which individuals are required to indicate if they are retired. Based on this information, we identify 6.2 million individuals as pensioners.

To further account for individuals who may receive pensions but do not report themselves as retired, we also identify cases where taxable income is paid by the main public pension institution.[10] If an individual receives income from this source, we classify it as pension income regardless of the occupation declared. This approach yields 6.3 million pensioners, almost entirely in overlap with those that declare that they are retired.

C.3 Assigning Undistributed Corporate Profits to Individual Taxpayers

C.3.1 Main Corporate Tax Regimes in Brazil

Individual Microentrepreneur Program (MEI)

The Individual Microentrepreneur Program (MEI) was established as a tax regime aimed at integrating informal small businesses and individual entrepreneurs into the formal economy. To be eligible for the MEI, individuals must satisfy a set of criteria: their business should generate no more than R$81,000 in annual gross revenue, they cannot have ownership stakes in other companies, they are limited to employing no more than one worker, and their enterprise must operate within the range of industries that are eligible for the program. In addition to the primary advantage of transitioning into a formal tax regime – which implies legal recognition, access to credit markets, and the ability to issue invoices and receipts – enrollees in the MEI also gain access to social security benefits, such as pensions and maternity leave.

Compared to other tax regimes, the MEI offers distinct advantages, including no registration costs and reduced tax rates. The primary tax for MEI participants is a fixed monthly rate, set at 5% of the minimum wage (MW), which translates to R$65.10 in 2023,

[10] We use payments from the FRGPS - Fundo do Regime Geral da Previdência Social, CNPJ 16.727.230/0001-97

for the payment of Social Security Contributions (SSC). In addition, businesses in the commerce and industry sectors are required to pay a monthly tax of R$1 towards ICMS (a value-added tax levied by states), while those in the service sector are obliged to pay R$5 for the ISS (a service tax imposed by municipalities). Enterprises operating in both commerce and service sectors must pay both ICMS and ISS.

Within the economic literature assessing the MEI, Rocha, Ulyssea, and Rachter (2018) shows that the program's reduction in tax burden led to an increased rate of formalization for firms. The authors clarify that this surge primarily stemmed from the formalization of existing informal firms, rather than the creation of new businesses or heightened survival rates of already formal firms. Aligning with these findings, Rocha de Farias and Hsu Rocha (2025) also observed a rise in formality rates following the MEI's introduction, though they noted no significant impact on economic indicators such as firm growth rates.

Simples Nacional

The *Simples Nacional* is a special tax regime designed to simplify and reduce the tax collection costs for small businesses. This regime is available to Microenterprises (ME) and Small Businesses (EPP), defined based on their annual gross revenue: up to R$360,000 for MEs and between R$360,000 and R$4.8 million for EPPs.

Under the *Simples Nacional*, firms pay a single turnover taxes that replaces an array of other federal, state and municipality taxes: IRPJ (corporate income tax), CSLL (social contribution on net profit), PIS/Pasep (contribution to employee savings programs), COFINS (contribution for social security financing), IPI (industrialized product tax), ICMS (value-added tax), ISS (service tax), and CPP (employer's social security contribution). Businesses under this regime are divided into five main categories, each with distinct tax brackets and progressive marginal tax rates. For instance, retail businesses (general stores) fall under Annex I, facing tax rates that range from 4% of monthly revenue for those with annual revenue up to R$ 180,000, to 19% for revenues between R$3,600,000 and R$4,800,000.

In the literature, the *Simples* regime has been studied primarily for its effects on informality. Piza (2018) critically revisited the contrasting conclusions of Fajnzylber, Maloney, and Montes-Rojas (2011) and Monteiro and Assunção (2012), focusing on the 1996 reform of the *Simples*. The study concluded that the *Simples* regime had no significant impact on informality rates among both micro and small firms. Furthermore, the economic costs associated with the program are substantial; according to the data from the Brazilian Tax Authority (*Receita Federal do Brasil*), the foregone tax revenues due to the *Simples* program were around 1.1% of the GDP in 2020.

Presumed Profit Regime

The Presumed Profit regime offers a simplified approach to paying the IRPJ (corporate income tax) and the CSLL (social contribution on net profit). Firms with annual gross revenue of less than R$78 million are eligible to participate in this regime, provided they are not engaged in certain specified business activities, such as financial institutions and publicly traded companies, which are mandated to participate in the Real Profit regime.

Taxes within this regime are calculated over the presumed profits, rather than the actual net income of the company. This approach is designed to simplify tax computations for firms lacking complex accounting structures. For instance, the presumed profit margin applied to gross revenue is set at 8% for sales of goods, industry, and transportation sectors; 16% for most services; and 32% for service providers in higher profitability areas, such as professional services.

Unlike the previously mentioned regimes, tax payments under the Presumed Profit regime are made quarterly. The rates are the same as for the Real Profit regime discussed below: 15% for IRPJ and 9% for CSLL, applied to the presumed profits. An additional IRPJ rate of 10% is levied on any profit exceeding R$20,000 estimated per month. Additionally, companies are required to pay COFINS and PIS monthly, with rates of 3% and 0.65%, respectively, based on the company's gross revenues. Depending on the nature of the business activity, ISS and ICMS taxes may also be applicable; however, these are calculated separately as they are not included in the Presumed Profit regime. Furthermore, unlike the Simples Nacional, the employer's social security contribution (CPP) – typically around 20% of the payroll amount – is also excluded from this regime. Therefore, for firms with significant payroll expenses, this implies a significant disadvantage compared to the *Simples Nacional* regime.

Orair and Gobetti (2019) highlight how these special tax regimes, in conjunction with the exemption of distributed dividends in the Personal Income Tax and high payroll taxes, contribute to a phenomenon in Brazil known as *pejotização*. This term refers to individuals transforming into companies for the purpose of tax evasion. To illustrate this point, while wage workers are subject to marginal rates up to 27.5% in the Personal Income Tax, those who registered in the companies' special regimes face, in the service sector case for example, total tax rates ranging from 4.5% to 16.85% under the Simples Nacional regime and from 16.33% to 19.53% under the Presumed Profit regime. Additionally, note that the 1.1% of GDP estimate of revenue loss due to Simples Nacional does not take into account behavior response from the taxpayers, leading to a possible downward bias to this estimate by not considering the additional losses related to the *pejotização*.

Real Profit Regime

The Real Profit regime is the standard corporate taxation system in Brazil. In contrast to the Presumed Profit regime, taxes are levied on companies' profits. This requires detailed accounting and financial tracking, as all revenues and allowable expenses must be thoroughly documented and justified. While any company can opt for taxation under the Real Profit regime, it is mandatory for companies with annual gross revenues exceeding R$78 million, as well as for businesses in specific sectors such as financial institutions, firms involved in foreign currency exchange, and those benefiting from certain tax incentives or fiscal advantages.

Companies under the Real Profit regime face a corporate income tax (IRPJ) of 15%, with an additional rate of 10% on any portion of real profits exceeding R$ 20,000 per month. The Social Contribution on Net Profit (CSLL) is levied at a rate of 9% for most companies, 20% for banks, and 15% for other financial institutions. These taxes are calculated based on the actual profits computed quarterly by the companies. Another point of divergence from the Presumed Profit regime is the rates for PIS and COFINS, which are 1.65% and 7.6% respectively, compared to 0.65% and 3% in the Presumptive Profit regime. However, under the Real Profit regime, PIS and COFINS are calculated on a non-cumulative basis, allowing for credits from certain taxes paid on inputs, effectively reducing these tax rates.

C.3.2 Constructing Firm-Level Measure of Undistributed Profits

In this section we provide a detailed explanation on the construction of the undistributed corporate profit measure we use. We discuss separately how we build the measure for firms in each of the regimes, given the information provided by corporations varies in each of them.

In summary, whenever firms file a detailed profit and loss statement (PLS)[11] we first create a measure of "economic profit" starting from their declared earnings before income taxes, and making adjustments so it more closely resembles corporate profits as measured in national accounts. For firms that do not file PLS and are taxed on their gross revenue, we use the median profit rate for firms of similar size and sector that have filed PLS and impute their profits. Finally, we deduct the total amount of dividends and interest on equity allowance (JCP) paid by the firm during the year and add the total amount of dividends and interest on equity allowance (JCP) received by the firm in the same year from the profit of all firms that file PLS to arrive at our measure of undistributed corporate profits. For those that do not file PLS, we take different approaches as discussed below.

Real Profit Regime: all corporations in the Real Profit (*Lucro real*) regime must file a Tax Accounting Bookkeeping (ECF) declaration, which includes detailed profit and loss

[11] The official name of these statements in the Brazilian CIT regime is *Escrituração Contábil Fiscal - ECF*, or Tax Accounting Bookkeeping.

statements. Our profit measure starts from corporate Earnings Before Taxes (EBT or LAIR in Portuguese, *Lucro Antes de Imposto de Renda*)–turnover (gross sales plus other revenue) minus total costs (including cost of goods sold, labor costs, other operational costs, financial costs and depreciation). This is the "top line" on the Corporate Income Tax (CIT) form, which then faces adjustments to compute taxable income. Starting from the EBT, we perform a series of adjustments items to make this measure more closely resemble corporate economic profits. These mainly include i) IFRS valuation adjustments, such as fair value and impairment assessments; ii) adjustments for temporary foreign exchange gains or losses; iii) adjustments for provisions; and iv) adjustments for the share of profit or loss in investments accounted for using the equity method to avoid double counting of profits. After these adjustments, we obtain our measure of **adjusted economic profit** for each corporation in a given period. To obtain the **undistributed adjusted economic profits**, we then subtract the total amount of dividends and interest on equity allowance (JCP) paid by the firm during the year (as reported in the ECF Registers Y600 and X450) and add the total amount of dividends and interest on equity allowance (JCP) received by the firm in the same year (as reported in the ECF Register X430). This information is provided in the Y600 form, which includes the total distribution for each shareholder in the period.

Finally, we also attribute to individual shareholders the income taxes paid by their corporations. In the Real Profit and Presumptive regimes, we compute the total amount of corporate income tax–IRPJ and Social Contribution on Net Profit (CSLL)–declared by firms in their Tax Accounting Bookkeeping declarations. Importantly, we do not attribute to shareholders turnover-based, federal contributions such as PIS and COFINS. In doing that, we follow the standard classification of taxes by the Brazilian Tax Authority (Tesouro Nacional do Brasil, 2019) that classifies these contributions as indirect taxes on consumption. Similarly, employers' social security contributions (CPP), equivalent to 20% of wage bill, are not attributed to shareholders but to workers.

Presumptive regime: While firms in the presumptive regime are not mandated to file detailed bookkeeping information, 86% of them do so in 2019. These are often the largest firms in the regime, representing approximately 95% of total revenue.[12] For firms that do file accounting information, we apply the same methodology as for firms in the Real Profit Regime, computing an economic profit measure and then netting out distributed dividends. For the remaining 14% that do not, we only observe their turnover, the tax base of the Presumptive regime. So we use an imputation procedure, based on the **median profit rate** of similar firms that do file accounting information. We implement that

[12] Although filing the income statement has no impact on tax liability, many of these firms already maintain bookkeeping for internal management purposes and for their relationships with creditors.

by first classifying all firms in the regime into 60 cells, defined by the combination of economic sector (12 groups) and five turnover levels (below R$ 1 Million; R$ 1 - 5 million; R$ 5 - 20 million; R$ 20 - 50 million; above R$ 50 million). We then calculate the **median profit rate** in each cell for firms filing accounting information, and apply that profit rate to firms in the same cell not declaring accounting profits. As discussed above, this imputation affects 14% of firms in the presumptive regime but they respond for only 5% of total turnover.

Simples Nacional: Firms under the *Simples Nacional* tax regime are not required to report income statements. They are only obligated to declare their revenues, as their tax liabilities are calculated as a fixed percentage of reported revenues. To estimate net profits for these firms, we apply sector-specific median net profit margins to their reported revenues. These margins are derived from firms in 12 economic sectors operating under the *Lucro Presumido* regime, which do report income statements.[13]

Since very few firms in the *Simples* regime file income statements, we do not observe dividend distribution at the firm level and therefore take a different approach to compute undistributed profits. We proceed as follows. We first distribute total profits of these firms to their shareholder, without adjusting for any distribution. At the shareholder level, we observe the dividends received from *Simples* firms. We then net out from the profit of *Simples* firms attributable to this shareholder any income declared at the PIT filing as income from *Simples*; this is our measure of undistributed profits at the shareholder level.

In the *Simples* regime, firms pay a unique flat tax that replaces several other taxes at the federal, state and municipal level. However, the total tax is broke down in individual taxes it replaces, so we are similarly able to compute only the amount of their single taxes that are supposed to pay for the Corporate Income Tax (IRPJ) and Social Contribution on Net Profits (CSLL), whereas most of the other taxes are consumption based. It should be noted that these two components are in general a small share of the taxes paid by *Simples* firms: for most firms in the regime, these two taxes represent less than 10% of the total amount of *Simples*' taxes, while the share of VAT (ICMS) is close to one-third and employers' SSC more than 40%.

C.3.3 Descriptive statistics and key findings at corporate level

We summarize key features of the CIT database, at the firm level, in Table A.2. We observe approximately 3.6 million firms filing declarations in 2019–2.6 million from the Simplified

[13] Less than 10% of all *Simples* firms voluntarily file an income statement. We find these statements to be often unreliable, with many inconsistencies, and for that reason we opt to impute profits to all firms in the regime, including those filing an income statement.

Regime, 850,000 from the Presumptive Regime, and 165,000 from the Real Profit Regime. Despite representing three-quarters of all filings, *Simples* firms represent less than 7% of all declared turnover, while Real Profit regimes declare close to 85% of total revenue despite representing only 5% of firms. This is illustrated in Figure A.3a, where we plot the share of firms in each regime across 118 fractiles of firm revenue (99 bottom percentiles; 9 fractiles for the top 1%; 9 fractiles for the top 0.1%; and 10 fractiles for the top 0.001%). *Simples* firms represent close to 90% of firms in the bottom half of the distribution and those in presumptive regime the remaining 10%. *Simples* participation slowly declines to approximately 60% at the 92th percentile, where the highest marginal rate for Simples starts (R$ 3.6 million) (see Figure A.2 for the level of revenue of firms in each fractile),[14] and then quickly decreases to zero as firms hit the *Simples* ceiling (R$ 4.8 million) and the participation of firms from the Presumptive regime increases. Above that level, the participation of firms in the Real Profit Regime grows quickly and approaches 100% within the top 1%, as Presumptive firms also reach their revenue cap (R$ 78 million).

D Combining Survey and Administrative Tax Data

We begin by constructing a variable for reportable income in the survey, defined as income that would be declared to tax authorities. For employees, we consider income from formal employment. For self-employed individuals and employers, we include income from these activities only if the individual reports paying social security contributions or indicates that their business is formally registered. All pension income is included, as well as an *other* income variable, which primarily consists of financial income. This measure of reportable income excludes income from informal activities, which is not subject to tax reporting.

In the tax data, we keep individuals whose reported income exceeds the mandatory filing threshold. From 2016 to 2022, this threshold was BRL 28,559.70 annually. Some individuals may also file tax returns despite earning below this threshold, typically because they exceed the wealth declaration threshold, receive specific types of income that require mandatory reporting (e.g., capital gains or foreign income), or seek to recover taxes withheld.

Additionally, we retain individuals in the tax data who have negative economic income. These cases arise when individuals own firms that incur large losses. To avoid including individuals with very small negative income due to minor shares in firms with losses, we keep only those whose negative economic income exceeds the filing thresh-

[14] Declaring revenue above R$ 3.6 million not only places firms in the highest marginal rate but also entails several additional obligations for firms, such as separately paying the Brazilian state VAT (*ICMS*).

old in absolute value. For 2019, this corresponds to individuals with negative economic income of less than R$–28,559.70. Such individuals are not captured in the survey, as it does not account for business profits and losses. As a result, the tax dataset used for the combination excludes individuals with economic income between minus the reporting threshold (R$–28,559.70) and plus the reporting threshold (R$28,559.70).

To combine the survey and tax data, we proceed as follows:

1. Individuals in the survey are ranked by their reportable income.

2. We then sequentially replace observations in the survey, starting from those with the highest reportable income, with observations from the tax data, using sampling weights to preserve population totals, until all tax filers are incorporated into the combined dataset.

Table D.4 shows that the number of individuals in the survey with reportable income above the tax filing threshold closely matches the number of individuals in the tax data. This correspondence supports the validity of our survey-based measure of reportable income as a proxy for the population covered in administrative tax records.

Table D.4: Comparison of IRPF Declarations in Survey and Tax Data (2014–2022)

Year	**Tax filers (total)**	**Tax filers above threshold**	**Estimated tax filers in survey**	**Estimated survey filers / tax filers above threshold**
2014	28,020,284	19,894,401	17,964,677	0.903
2015	28,284,635	20,082,090	18,145,905	0.904
2016	28,916,466	21,109,020	21,185,002	1.004
2017	29,603,192	21,906,362	22,082,763	1.008
2018	30,452,434	22,839,325	24,157,564	1.058
2019	30,498,516	23,178,872	25,719,620	1.110
2020	31,634,843	23,726,132	25,178,346	1.061
2021	35,993,061	27,714,656	26,508,596	0.956
2022	40,569,727	32,455,781	35,788,514	1.103

Notes: This table reports the number of personal income tax (PIT) filers per year. Column 1 reports the total number of PIT filers. Column 2 reports the number of PIT filers with taxable income above the mandatory PIT filing threshold. Column 3 reports the estimated number of PIT filers in the survey, using the procedure described in Section D. Column 4 reports the ratio of Column 3 to Column 2.

E Matching Micro Data to National Accounts Aggregates

E.1 Conceptual Framework

Unit of Observation. In order to facilitate international comparisons, we adhere to the equal-split adults' benchmark of the DINA guidelines (Blanchet et al., 2021), distributing Brazil's income to the individual level. Specifically, our unit of analysis is the population aged 20 or more, where the income of married couples is split equally.

As argued by Piketty, Saez, and Zucman (2018), this analysis assumes that all the income earned by married couples is equally shared within the couple. This assumption establishes a conservative estimate of income concentration by ensuring that the sharing of resources between spouses is not underestimated, thereby avoiding an overestimation of income inequality.

Income Concepts. Our benchmark for income is the national income, defined as the GDP minus capital depreciation plus net foreign income (Piketty, Saez, and Zucman, 2018). Our analysis relies on three income concepts: (i) *Fiscal Income*; (ii) *Economic Income*; and (iii) *Pretax National Income*. Fiscal income refers to the reported income in our combined tax and survey dataset; withheld income in PIT returns is grossed up using WHT returns, and we exclude asset transfers and capital gains–the latter to avoid double counting with undistributed profits. Economic income is reached by adding the retained earnings allocated to firms' owner using our 10-level shareholder tree. Finally, pretax national income accounts for all the gross income (inclusive of pensions benefits, net of social security contributions), before taxes and transfers.

E.2 From Household Income to Economic Income

The income declared by individuals in PNADC is grouped into four main categories: labor income, capital income, self-employed (mixed) income, and public pensions–both from workers of the private sector (*Regime Geral de Previdência Social*, or RGPS) and public servants (*Regime Próprio de Previdência Social*, or RPPS). On the other hand, as detailed in the previous section, the income in the tax data is divided into three main categories: (i) Taxable Income, constituted mainly by salaries; (ii) Income Subject to the Withholding Income Tax (WHT), encompassing the 13th salary, income from financial investments, profit sharing or performance bonuses, and capital gains; (iii) Exempt Income, predominantly comprising profits and dividends, earnings from micro and small enterprises, and asset transfers.

First, we classify the income components inside the three categories of the tax returns into labor income, distributed capital income, mixed income, pensions income, capital

gains, or property income. Remember that as the Income Subject to the WHT is declared is presented net of taxes within the PIT returns, we associated this data with the WHT returns to have the gross income. For further details about the classification of each component of the tax data, check section C.

The last step to reach the harmonized income is to exclude the asset transfers and the capital gains declared in the tax data to be consistent with National Accounts. Therefore, after applying these steps, we have a harmonized income concept between our survey and administrative tax data, named **fiscal income**, composed by labor income, distributed capital income, mixed income, and pensions.

Following the income harmonization steps for both survey and tax data outlined above, we combine the two datasets to address the survey's underestimation of top incomes. The methodology for this step is detailed in Section D. Finally, to move from **fiscal income** to **economic income**, we allocate retained earnings to firms' owners using our 10-level shareholder tree.

E.3 From Economic Income to Pretax National Income

Table E.5: Fiscal Income in National Accounts

Fiscal Income Classification	**National Accounts Aggregates**
Labor Income	(+) Salaries (D11 resources, S14)
	(+) Other current transfers (D7 resources, S14)
Distributed Capital Income	(+) Gross operating surplus (B2 resources, S14)
	(+) Gross interests (D41 resources, S14)
	(+) Distributed income of corporations (D42 resources, S14)
	(–) Imputed rent for owner-occupied housing
Mixed Income	(+) Gross mixed income (B3 resources, S14)
Pensions Income	(+) Social security benefits in cash (D621 + D622 resources, S14)

From Economic Income to Personal Income. Transitioning from economic income to personal income requires rescaling the components of economic income to their respective national accounts aggregates and adding components not present in economic income that are attributed to households, as well as considering items allocated to corporations and non-profit institutions serving households (NPISH). Table E.5 first describes how we construct national accounts aggregates comparable to the fiscal income components; Table

E.6 then lists the remaining components of pretax national income and explains how we rescale them to national-accounts totals.[15]

Unlike most DINA studies, we directly observe corporate undistributed profits because we allocate them to firms' owners using our 10-level shareholder tree.[16] We also exclude the non-resident share of undistributed profits to remain consistent with our pretax national income definition, and include undistributed profits of the government sector in government pretax income.

To compare the share of profits attributed to households, we estimate the share of total profits potentially attributable to households using the profit shares of direct ownership observed in the data. The direct ownership profit share is 48% for households, 11% for foreign entities, and 3.5% for the government. Immediate indirect ownership through other firms corresponds to 28.5%, and information is unavailable for 9%. Indirect ownership profits potentially attributable to households, the government, and foreign shareholders are estimated in proportion to their direct ownership profit shares among Real Profit firms, as indirect ownership is concentrated in this regime. We obtain a share of 62% of profits potentially distributable to households when considering both direct and indirect ownership. This procedure is used solely to estimate the share potentially attributable to households and does not affect the allocation of profits.

Importantly, we distribute the main income components using rich administrative microdata–such as corporate income tax returns and our shareholder tree (to allocate undistributed profits to shareholders), wealth declarations in PIT returns, and debt microdata from the Central Bank of Brazil (to recover imputed rent and interest paid). This allows us to be more precise than other inequality studies. Including all components in Table E.6–except government pretax income–gives the personal national income.

From Personal to Pretax National Income. Lastly, to reach the Pretax National Income, one of our benchmark income concepts, we need to add to the personal income some components attributed to the government. More precisely, we need to take into account the prettax factor income of the government, and the social insurance surplus/deficit. To not distort the income distribution when imputing these non-observable components, we distribute the pretax income of the government neutrally to the personal national income.

[15]For more details on the construction of macroeconomic aggregates for the DINA methodology for Brazil, see Palomo and Souza (2025).

[16]Our measure of undistributed profits is already net of accounting depreciation reported by firms in their financial statements. For *Simples* and some Presumptive Profit firms that do not report such accounting information, we use profit-to-revenue multipliers by sector and size, as described in Appendix C. To estimate undistributed profits in national accounts–because Brazilian national accounts do not report corporate consumption of fixed capital–we rely on estimates from the World Inequality Dataset (WID). However, these estimates are imputations based on other countries, which introduces substantial uncertainty. Given this, we rely on our detailed firm-level data and reported accounting depreciation; we then distribute any remaining gap to the national accounts aggregate neutrally to personal income.

Table E.6: Pretax National Income Components and Rescaling Methodology

National Accounts Aggregate	**Rescaling to**
(+) Fiscal Income	
(+) Investment income disbursements (D43 + D44 resources, S14)	Distributed Capital Income
(+) Adjustment for the change in pension entitlements (D8 resources, S14)	Pension Income
(+) Imputed rent for owner-occupied housing	Imputed rent estimated (see section B.3)
(–) Interest paid (D4 uses, S14)	Interest paid estimated (see section B.4)
(–) Households' actual social contributions and its supplements (D613/D614 uses, S14)	Employee SSC estimated (see section E.4)
(–) Other Current Transfers (D7 resources, S14)	Fiscal Labor Income
(–) CFC attributable to Mixed Income	Fiscal Mixed Income
(–) CFC attributable to Operating Surplus	Fiscal Capital Income
(+) Pretax Income Non-Profit Institutions Serving Households (NPSH)	Fiscal Income
(+) Pretax Income Corporations	Undistributed Profits (see section C)
(+) Pretax Income Government	Personal Income

Figure E.8: Composition of Households' Fiscal Income

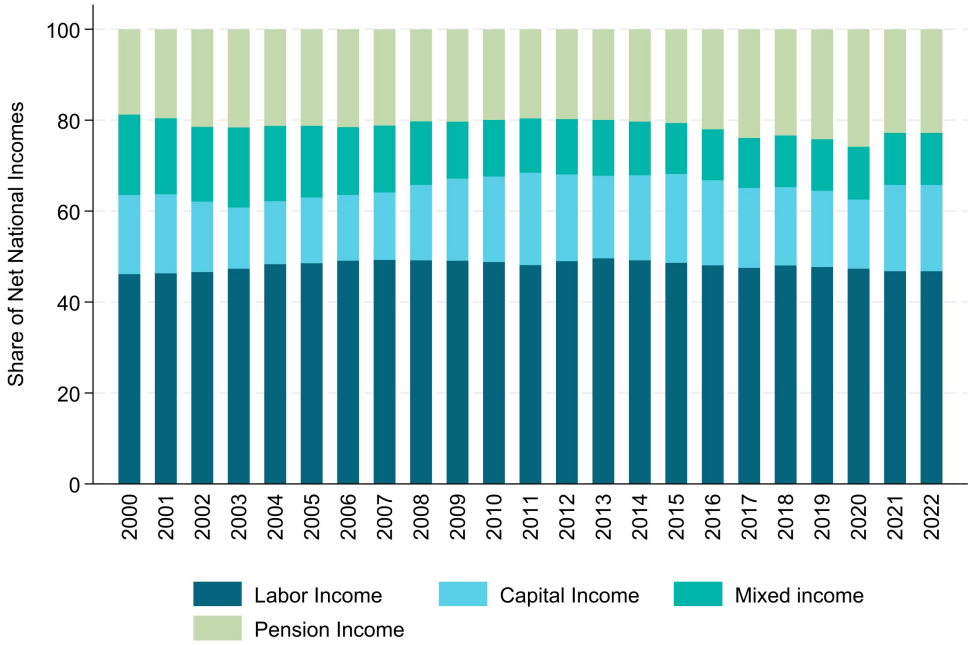


Figure E.9: Composition of Household Pretax income

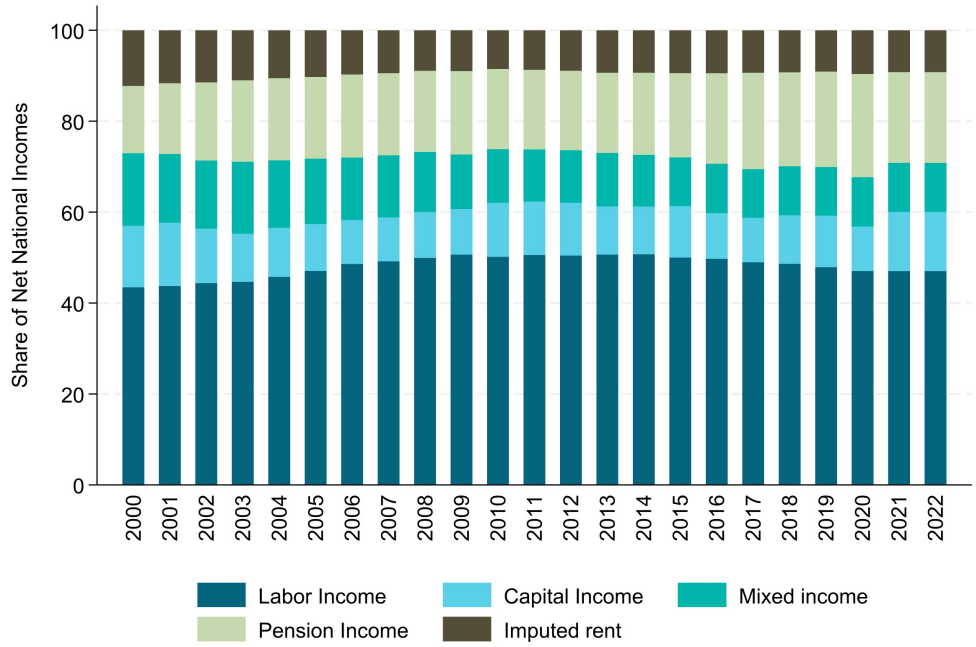
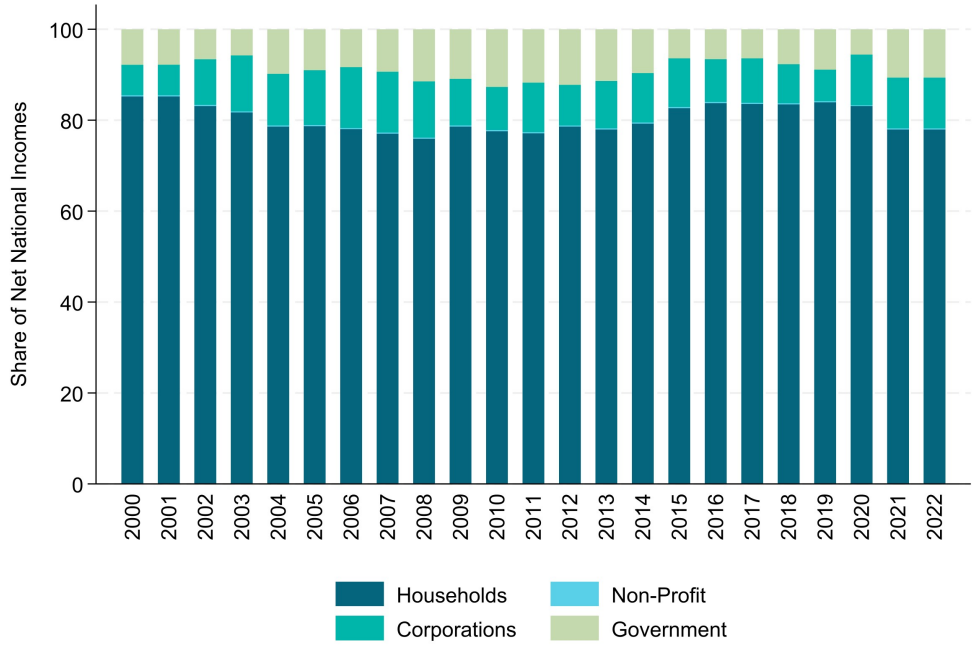


Figure E.10: Composition of Net National Income - sectors



E.4 Taxes

For the analysis of taxes, we follow the distributional current-tax analysis developed by Saez and Zucman (2023). Within this framework, labor income taxes are assigned to workers, capital income taxes are allocated to the corresponding asset owners, and indirect taxes are attributed to consumers.

Personal Income Tax (PIT) and Withholding Income Tax (WHT). Thanks to high-quality administrative records, we directly observe PIT in the *Declaração de Imposto de Renda de Pessoa Física* (DIRPF) and WHT in the *Declaração de Imposto de Renda Retido na Fonte* (DIRF).

Business Income Tax. We observe business income taxes paid by firms using corporate tax returns, which primarily include forms from the *Escrituração Contábil Fiscal* (ECF) and the *Declaração de Informações Socioeconômicas e Fiscais* (DEFIS). We then allocate these taxes to firms' owners via our shareholder tree. Importantly, we remove the taxes paid by non-residents in Brazil, and include the taxes paid by residents abroad. Additionally, the taxes paid by the government are distributed neutrally to the pretax national income.

Consumption taxes. Our methodology for capturing consumption taxes is described in detail in Section B.2. After imputing consumption taxes for observations in our combined survey–tax dataset, we rescale indirect tax values to their corresponding national accounts totals. We then apply an adjustment based on the amount of cash transfer each individual receives, reducing the indirect taxes in proportion to the increase in Pretax

National Income following the addition of the cash transfers.[17] Consequently, after this adjustment, we measure the taxes paid before the impact of the cash transfers to avoid an underestimation of the ETR paid by the consumers.

Social Security Contributions (SSC). Because employee SSC can be fully deducted from taxable income in PIT returns, we directly observe employee contributions for tax data observations. To estimate employer SSC, we apply a 20% rate for the *Instituto Nacional do Seguro Social* (INSS) plus an 8% rate for the *Fundo de Garantia do Tempo de Serviço* (FGTS) to employee salaries. We allocate employer SSC to workers (Saez and Zucman, 2023). For survey data observations, we estimate both employee and employer SSC according to the legislation in effect each year,[18] assuming that civil servants and military personnel pay SSC at RPPS rates, that public pensioners contribute to the RPPS, and that employer SSC on wages follows the rates presented above.

Property and Vehicle taxes. The property taxes, encompassing both the urban property tax (*Imposto sobre a Propriedade Predial e Territorial Urbana*, or IPTU) and the rural property tax (*Imposto sobre a Propriedade Territorial Rural*, or ITR) are distributed in proportion to the real state value declared in the wealth returns for the tax data observations, and proportionally to the estimated value of the house estimated for the survey data using the imputed rents. For the vehicle tax (*Imposto sobre a Propriedade de Veículos Automotores*, or IPVA), as they are directly observed in the POF 2017/18, we also use a machine-learning approach in the lines of the one described in Section B.2 to estimate theses taxes in PNADC.

Other. The remaining taxes include (i) other payroll and workforce taxes, distributed in proportion to employer SSC; (ii) other production taxes, distributed in proportion to indirect taxes; and (iii) the Inheritance and Gift Tax (ITCMD), distributed in proportion to other business income taxes.

[17] In practice, this is equivalent to multiplying the indirect taxes paid by each adult i by a factor equal to the ratio of the Pretax National Income of i to the sum of the Pretax National Income and the cash transfers of i.

[18] For the estimation of SSC on survey observations, we are immensely indebted to Pedro H. G. Ferreira de Souza for sharing his detailed work on SSC estimation based on Brazilian legislative changes.

Figure E.11: Composition of Tax Revenues