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## A history of inequality: Top incomes in Brazil, 1926-2015

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## **A history of inequality:** top incomes in Brazil, 1926–2015

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# A HISTORY OF INEQUALITY: TOP INCOMES IN BRAZIL, 1926–2015

Pedro H. G. Ferreira de Souza<sup>1</sup>

## ABSTRACT

This paper uses income tax tabulations to estimate top income shares in Brazil over the long term. Between 1926 and 2015, the concentration of income at the top remained very high, following a sine wave trend: top shares ebbed and flowed over time, frequently in tandem with political and institutional disruptions. There is some evidence in favour of Williamson's 'missed levelling' hypothesis regarding the origins of Latin America's exceptionally high levels of inequality, but the recent decline in inequality is cast in a more dubious light, since top income shares have remained quite stable since 2000 and the 'tax-adjusted' Gini coefficients show a smaller and shorter, though still sizeable, decrease. The nature of the political regime matters, but democracy is not a sufficient condition for redistribution. Brazil's tumultuous political history suggests top income shares change substantially mostly during political-institutional crises, when the typical quid pro quo of more liberal regimes in normal times collapses. The analysis is complemented by international comparisons and a discussion of the role of institutions in shaping inequality.

**Keywords:** income inequality; top incomes; social stratification; Brazil.

## 1 INTRODUCTION

Research into top incomes flourished following Piketty and Saez's (2003) long-term estimates for the USA. After a long hiatus, the same approach, and even some of the methods espoused by many late-19<sup>th</sup> and early-20<sup>th</sup> century social scientists, were 'rediscovered', most notably the use of income tax data to measure the concentration of income among the rich.

Top income shares and related estimates are now available for over two dozen countries: the earliest studies were collected in the two volumes edited by Atkinson and Piketty (2007; 2010), and the latest figures can be found in the World Wealth and Inequality

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Database (WID.world 2017). However, due to data limitations, most of the works have focused on developed countries, as can be gleaned from recent reviews (Alvaredo, Atkinson, Piketty, and Saez 2013; Atkinson, Piketty, and Saez 2011; Keister 2014).

This paper uses income tax data to calculate top total income shares for Brazil from 1926 to 2015. I present estimates for 71 out of those 90 years and ‘adjusted’ Gini coefficients since 1976. Souza (2014) estimated the first historical series for Brazil, computing top taxable income shares for 57 years between 1933 and 2012 and top total income shares from the mid-1970s onwards. Souza and Medeiros (2015) extended the series for taxable incomes to 66 years, between 1928 and 2012. Morgan (2015) calculated top taxable shares for 61 years between 1933 and 2013 and top total income shares since the mid-1970s. Finally, Souza (2016) published total income figures for 69 years between 1926 and 2013. This paper builds on and refines these recent works.

The long-term dynamics of the concentration of income at the top of the income distribution in Brazil offers a unique opportunity to assess claims regarding the influence of politics and institutions on income inequality. Brazil underwent major structural and institutional changes over the course of the 20<sup>th</sup> century. Whereas the former progressed at a relatively steady pace until the 1980s, the latter were plentiful and abrupt: since the 1920s the country alternated between democracy and two periods of dictatorial rule (1937–1945 and 1964–1985), and had five different Constitutions.

In fact, most of the glowing appraisements of Brazil’s social and economic performance over the last decade have celebrated institutional changes brought by redemocratisation. Empirical studies pointed out the redistributive consequences of increased access to public schooling (Barros, Franco, and Mendonça 2007; Ferreira, Leite, Litchfield, and Ulyseia 2006; Menezes-Filho, Fernandes, and Picchetti 2007), the rise in the minimum wage (Firpo and Reis 2007; Saboia 2007) and the expansion of welfare transfers, most notably the *Bolsa Família* programme, the country’s flagship poverty relief programme (Hoffmann 2013; Soares, Osorio, Soares, Medeiros, and Zepeda 2009). Many praised the emergence of a ‘new middle class’ (Neri 2008), the combination of a wide range of policies since redemocratisation to reduce long-standing inequalities (Arretche 2016), and the ‘new social contract’ anchored by ‘fiscally sound inclusion’, spawned by the 1988 Constitution and the stabilisation of the 1990s (Alston, Melo, Mueller, and Pereira 2013). Similar trends and assessments have also happened elsewhere in Latin America (López-Calva and Lustig 2010).

The top incomes series for Brazil also sheds light on the ongoing dispute about the origins of the exceptionally high levels of inequality in Latin America. The conventional wisdom—repackaged in neoinstitutionalist fashion by Engerman and Sokoloff (1997; 2002; Sokoloff & Engerman 2000)—posits that the roots of such high inequality lie in ‘extractive institutions’ (Acemoglu, Johnson, and Robinson 2001) set up during the colonial era. More recently, Williamson’s (2010; 2015) revisionist hypothesis claimed that inequality was comparable in Latin America and in the developed world until roughly the early 20<sup>th</sup> century, but that paths forked as the former missed out on the ‘great levelling’ that reshaped the income distribution of the latter after the First World War.

The empirical evidence so far is still mixed (Arroyo Abad and Astorga Junquera 2017; Bértola, Castelnuovo, Rodriguez, and Willebald 2009; 2010; Frankema 2009; Prados de la Escosura 2007; Williamson 2015). Hence, a new, comparable series of top incomes may help dispel the controversy to some extent.

This paper is organised as follows: Section 2 briefly reviews the rise of institutional explanations of inequality and top shares; Section 3 provides an overview of the data and methods; Section 4 presents the estimates for top income shares and ‘tax-adjusted’ Gini coefficients; and Section 5 examines how the empirical results for Brazil contribute to more general substantive issues.

The findings show that top income shares in Brazil follow a sine wave pattern, frequently coinciding with political and institutional changes. There is some evidence in favour of Williamson’s ‘missed levelling’ hypothesis. Top income shares have remained quite stable since 2000, and the ‘tax-adjusted’ Gini coefficients suggest a smaller and shorter, though still sizeable, decrease in inequality.

## 2 INSTITUTIONS AND INCOME INEQUALITY

The search for the ‘Kuznets curve’ became a staple of cross-national research following Kuznets’s (1955) conjecture that inequality would typically follow an inverse U-shaped pattern—rising in the early stages of development before plateauing and eventually falling—due mostly to structural pressures.

Nevertheless, the rise in inequality in the USA and other rich countries in the 1980s did not fit Kuznets’s framework. Economists then quickly converged to the ‘skill-biased technological change’ (SBTC) hypothesis, which essentially ascribed the increase in inequality to mismatches in the “race between education and technology”, as Goldin and Katz (2008) put it, following Tinbergen (see also Bound and Johnson 1992; Katz and Murphy 1992; Levy and Murnane 1992). Its empirical shortcomings subsequently led to the reconceptualisation of the effects of technological change in terms of polarisation in a task-based framework (Acemoglu and Autor 2012; Autor, Katz, and Kearney 2008; Autor, Levy, and Murnane 2003).

The top incomes research programme jumpstarted by Piketty and associates explicitly squared off with such approaches. Developed countries, they argued, did not follow at all a Kuznets-like inverted-U pattern. There were steep drop-offs in top shares in the period between the two World Wars; then, in the early 1980s, after decades of relative stability, several Anglophone countries diverged from the rest, with top shares surging, especially in the USA. Such divergence meant strictly technological or market-based explanations could not account for the bulk of recent changes (Alvaredo et al. 2013; Atkinson et al. 2011; Piketty and Saez 2003; 2006).

Their proposed interpretation had a far more historical and institutional character. Great emphasis was given to the disruptive effects of both World Wars and the Great Depression, due not only to the effective destruction of capital, but also to inflation and often radical policies put in place to ensure cooperation of the citizenry in the war effort. Likewise, they associated the surge in top shares in some countries with lower marginal income tax rates (Alvaredo et al. 2013; Atkinson et al. 2011; Moriguchi and Saez 2008; Piketty and Saez 2003). Even Piketty’s *Capital* (2014), which controversially defined ‘laws of capitalism’, went to great lengths to stress the role of social and political processes and avoid economic determinism (Piketty 2015).

This renewed awareness of institutions and politics is in line with similar approaches in other subfields of economics and in other disciplines. Not long ago many sociologists lamented that the profession was conspicuously absent from the public debate on the rise in inequality (DiPrete 2007; Kenworthy 2007; Morris and Western 1999; Myles 2003).

This is no longer strictly the case, as both sociologists and political scientists have joined the fray, focusing precisely on the role of institutions and their interplay with market forces; see, for instance, Bartels (2008) and Hacker and Pierson (2010) on the influence of politics and partisanship, and Weeden and Grusky (2014) on rents generated by institutional barriers as a growing source of inequality in many rich countries.

In fact, the latest attempts to rework Kuznets complement it with a much stronger emphasis on the interplay of politics and market forces: for example, Milanovic's (2016) 'Kuznets waves' hypothesis is an explicit attempt to reconcile the theories of Kuznets, Tinbergen and Piketty.

### 3 DATA AND METHODS

The basic data consist of tabulations from personal income tax returns detailing the total amount of income reported, broken down by income brackets. Only a fraction of the population files tax returns, so one cannot use it to measure inequality across the full distribution of income. Top income shares can be computed, but to do so one needs to interpolate the appropriate fractiles, making use of an exogenous control for total population, and then divide the resulting income by an exogenous control for total income.

Income tax tabulations have well-known advantages over household surveys, especially when it comes to measuring the incomes of rich people. Surveys normally suffer from differential unit and item non-response rates, frequent underreporting of high incomes as well as property and self-employment incomes, sampling error, top coding, and so on (Atkinson et al. 2011; Canberra Group 2011; Kennickell 2017). Besides, income tax tabulations are available for much longer periods. Tax data also have some shortcomings, such as the lack of microdata, limited population coverage, and potential problems caused by tax evasion, tax avoidance and changes in tax laws and enforcement.

Brazilian personal income tax was introduced by law in 1924. Currently, the personal and corporate income taxes amount to about 5 per cent of gross domestic product (GDP), roughly 15 per cent of the total tax burden. Nóbrega (2014) offers a comprehensive account of the evolution of personal income tax. In short, the biggest change came in 1989, when regulations and tax forms were completely overhauled and simplified. Appendix A recounts the evolution of income taxation in Brazil in more detail. For the purposes of this paper, none of the reforms seriously compromise the homogeneity of the long-term series.

The full list of sources can be found in Appendix B. I tracked down data for 71 years between 1926 and 2015. The tabulations are generally fine-grained, consistent, and comparable by international standards.

Several adjustments had to be made to the raw data. The most important were: a) the scale-up to national coverage in years when the original data were representative only of the richest states (1926–1943 and 1966); b) the imputation of tax allowances (1933–1949) and deductions (1926–1963) to convert reported net taxable incomes into gross taxable incomes; and c) the imputation of 'non-taxable' incomes—that is, incomes either exempt from personal income tax or taxed exclusively at the source—whenever the original tabulations did not report them (1926–1973 and 1995–2002). Appendix C documents all adjustments, and Appendix E presents robustness checks.

Most adjustments are uncontroversial, except perhaps for the imputation of non-taxable incomes. Unfortunately, such data were not collected before the early 1970s. Thus, early estimates such as Souza (2014) and Morgan (2015) underestimated inequality, as they reported top shares only for gross taxable incomes until 1973. The imputation makes it possible to deal with the more interesting issue of top total income shares.

The definition of income—gross total income—is slightly broader than the most widespread approach, encompassing all taxable and non-taxable, earned and unearned, gross monetary income flows: wages and salaries; rents, interest, profits, dividends and property incomes; pensions and other social security and welfare benefits; inheritances, gifts and capital gains; and so on. Incomes are assessed net of corporate income taxes, employers' share of payroll contributions and fixed capital consumption of unincorporated businesses, but before employees' payroll contributions and personal income taxes, except for some capital incomes taxed exclusively at the source.

The control for total income from the national accounts uses the same formula as Londoño Vélez (2012, 63): the balance of households' primary incomes *plus* social benefits (other than social transfers in kind) *minus* employers actual social contributions *minus* imputed social contributions *minus* attributed property income of insurance policy holders *minus* imputed rentals for owner-occupied housing *minus* fixed capital consumption of unincorporated businesses (see Appendix D).

This formula could not be precisely calculated for the entire period because detailed national accounts are available only from 1995 onwards. A common approach is to anchor this estimate to GDP by averaging it over the years with available information and then use this constant fraction over the entire period. This would imply an income control of roughly 67 per cent of GDP, which is in line with other countries.

However, this approach is inappropriate for Brazil due to a secular decrease in household consumption as a share of GDP. Consequently, this paper makes use of information on macroeconomic aggregates available since 1947 to improve the accuracy of the income denominator. Instead of pegging it strictly to GDP, I break down the control for total income in parts anchored to different macroeconomic aggregates, allowing for changes in the composition of national income. I used a constant fraction of GDP only for the period 1926–1946, when data are scarcer. The estimated control ranges from 61 per cent to 78 per cent of GDP.

I define the total population as individuals 20 years old or older. The data come from the decennial censuses. Figures for intercensal years were computed via cubic spline interpolation.

Brazilian tax law never defined the tax unit very clearly. For the most part, married couples always had the option to file separate tax returns at least in some cases; since 1994 they can choose freely how to file. The decision to consider tax units as individuals follows previous research (Medeiros et al. 2015a; 2015b; Souza 2014; 2016). The assumption, backed by the available data, is that hardly any married women had independent earnings in the early decades, so tax units were effectively individuals. More recently, there have been strong financial incentives for dual-earner couples to file separately. Appendix E assesses the effects of different population and income controls.

Population fractiles and corresponding incomes were obtained via Pareto interpolation, following Feenberg and Poterba (1993), Piketty (2001) and Piketty and Saez (2003). I assumed that top incomes follow a Pareto Type I distribution with CDF  $F(x)$ , and estimated the Pareto coefficient  $\alpha$  considering that  $\mu$  is the function that returns the average income about the cut-off.



The ‘tax-adjusted’ Gini coefficient relies on the property of additive decomposability by non-overlapping income groups, as shown by Kakwani (1980), Yitzhaki (2002) and Alvaredo (2011), among others. The adjusted Gini assumes a non-infinitesimal top income group and can be written as the sum of within- and between-group inequality:

$\beta$  is the inverted Pareto coefficient, that is,  $\beta = \frac{1}{\alpha}$ ;  $p$  and  $y_p$  denote the population and income shares of the desired top income fractile, respectively; and  $G$  is the Gini coefficient for the rest of the income distribution. For a fixed  $p$ , the adjusted Gini takes as inputs  $\beta$  and  $y_p$  from tax data and  $G$  from survey data.

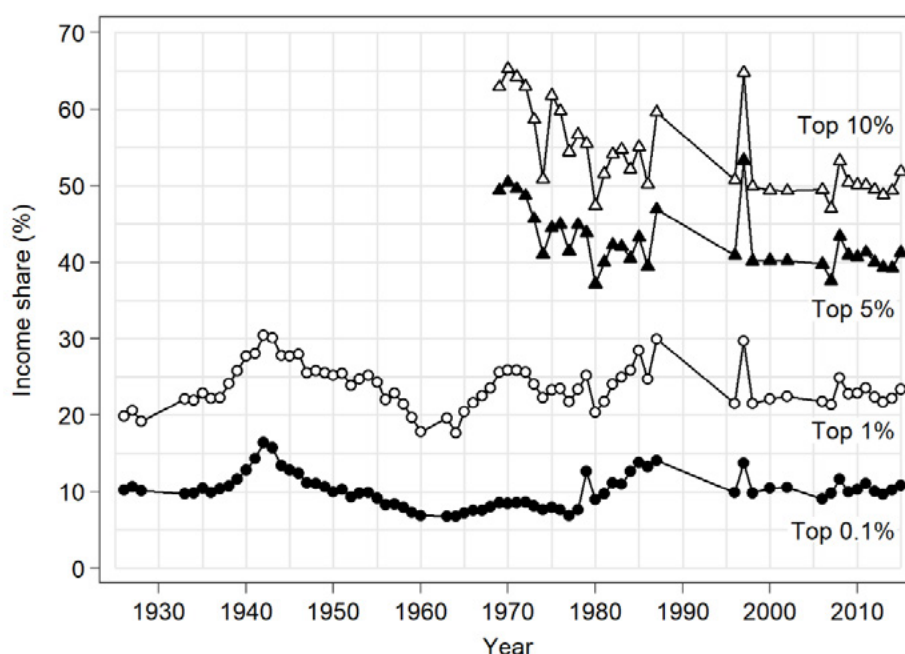
Survey estimates are based on microdata from two sources: the public use sample of the decennial census, provided by IPUMS-International (Minnesota Population Center 2017) and the *Pesquisa Nacional por Amostra de Domicílios* (PNAD), a large, multipurpose household survey carried out by the country’s central statistics agency. The unit of analysis and the definition of population were the same as in the tax data.

#### 4 TOP INCOMES SHARE AND INEQUALITY IN BRAZIL IN THE LONG TERM

Back in 1920, Brazil was predominantly rural, with a population of about 30.5 million people and GDP per capita under USD1,300 purchasing power parity (PPP). Almost a century later, in 2015, the country boasted more than 200 million inhabitants, and GDP per capita had increased twelvefold, corresponding to an average annual growth rate of 2.7 per cent.

FIGURE 1

**Income shares of the top 0.1 per cent, 1 per cent, 5 per cent and 10 per cent—Brazil, 1926–2015**



Source: Author’s calculations based on tax returns and national accounts data; see Section 3 and Appendix B for more information.

Note: All series include capital gains, inheritances and gifts.

Figure 1 presents estimated income shares over this period for several top income groups, from the top 0.1 per cent to the top 10 per cent. Clearly, top income shares were neither stable nor did they follow secular trends towards increasing or decreasing inequality. On the contrary, the very top income groups display a sine wave pattern like the one conjectured by Frankema (2009) for Latin America. On average, the share of total income received by the top 1 per cent was about 24 per cent. Most of the time it fluctuated between 20 per cent and 25 per cent. Nonetheless, inequality rose and declined, sometimes quite abruptly, and often in tandem with major political and institutional changes.

Inequality first soared during Getúlio Vargas's quasi-fascist dictatorship, the *Estado Novo* (1937–1945): the share of the top 0.1 per cent rose 6 percentage points (p.p.) before peaking in 1942. Vargas had been in charge since 1930. In the 1920s, Brazil was a liberal democracy, albeit one with very limited voting rights and voter participation, and rampant fraud (Nicolau 2012). Large landowners and coffee producers held a tight grip on the State until the onset of the Great Depression, when the combination of intra-elite quarrels, mounting domestic opposition and the collapse of coffee exports amid abundant crops led to the 1930 Revolution and the ascent of Getúlio Vargas.

Vargas's coalition was highly heterogeneous and unstable, and he sought to accommodate the displaced oligarchs. In the face of increased polarisation and political militancy, anti-communism became the regime's rallying cry, and state violence against left-wing organisations was commonplace. Escalating political repression and uncertainty about the 1938 presidential election spurred a self-coup in 1937, widely backed by economic elites and the military. Congress was shut down, political parties were dissolved, strikes strictly prohibited, and an authoritarian and nationalistic Constitution was promulgated. At the same time, the scope of government was enlarged, and modernisation was set afoot (Bethell 2008; Carvalho 2001; Fausto 1988; Gomes 2005).

Under such conditions, the onset of the Second World War led to rising inequality. The war brought a surge in exports and a severe contraction of imports, thus promoting a short-term industrial boom (Abreu 1990; Baer 2009; Bethell 2008). The regime heavily favoured business interests by curtailing the scope of labour laws, freezing wages and imposing rigid discipline in broadly defined 'war industries' (Gomes 2005; Paoli 1989). Such policies were relaxed, and Vargas undertook a more overtly populist turn only after 1943, as he sought popular support to retain power once the war was over (Gomes 2005; Vianna 1999).

Still, Vargas was forced to step down, and democracy was reinstated in 1945. Top income shares fell back to their pre-war levels in the second half of the 1940s, as the exceptional war conditions dissipated. In fact, rising industrial wages bolstered industrialists' anti-union stance (Colistete 2007), leading to another crackdown during the Dutra administration (1946–1951).

The brief democratic interregnum of 1945–1964 was the golden age of 'import substitution industrialisation' (ISI) in Brazil, insofar as substantial economic growth was accompanied by increased political participation. Even though many scholars regard ISI as inherently inegalitarian (Franco 2005; Maranhão 1981), the existing empirical evidence is mixed (Alvaredo 2010; Arroyo Abad and Astorga Junquera 2017; Colistete 2007; 2009; Ferreira 1996; Frankema 2009; Prados de la Escosura 2007). Top income shares tell a more benign story. Overall, the concentration of income at the top decreased by some 10 p.p. in this period: not only was there a post-war drop-off, but top shares also declined quickly in the late 1950s, particularly during the Juscelino Kubitschek administration (1956–1961).

Under Juscelino Kubitschek, Brazil embarked on an ambitious industrialisation plan that completely disregarded budget constraints. Income redistribution might have been an unintended side effect, as state activism, rapid urbanisation and rampant inflation spurred substantial growth in unionisation rates and increased militancy (Fausto 1994; Rodrigues 1968). The minimum wage reached its historical peak in the late 1950s and early 1960s. Meanwhile, high inflation and legal caps on interest rates wiped out almost all (domestic) public debt, and coffee exports declined sharply (Bacha 1978; Sochaczewski 2006; Villela 2005), which hurt the affluent.

In the early 1960s a slowdown in growth, rising inflation and increased labour militancy entailed political and economic turmoil, which culminated in the 1964 military coup—a turning point that marked the reversal of the decline in inequality. This time, however, most of the relative gains accrued to the P99–P99.9 group, rather than the top 0.1 per cent. By the early 1970s the share of the top 1 per cent had already risen from 18 per cent back to 26 per cent. Survey-based measures also show an increase in inequality in the 1960s (Fishlow 1972; Hoffmann 1973; Hoffmann and Duarte 1972; Langoni 1973).

The historically most influential interpretation ascribed this rise to Kuznets-type structural changes and the short-term inelasticity of the supply of skilled workers during the post-1968 ‘Brazilian miracle’ (Langoni 1973). Top income shares do not support this view. On the contrary, the combination of labour repression and business-friendly policies enacted by the military dictatorship, particularly in its early years of structural adjustment, seems to have played a more decisive role, as pointed out decades ago (Fishlow 1972; Hoffmann 1973; Hoffmann and Duarte 1972; Malan and Wells 1973).<sup>1</sup> In the 1960s the military “radically remodeled and severely undermined (...) democratic institutions” (Bethell and Castro 2008, 165) and regularly persecuted, imprisoned and suspended the political rights of its perceived opponents. The crackdown on the left and on the labour movement was severe, strikes were again rigidly controlled, and many were tortured and/or murdered (Bethell and Castro 2008; Carvalho 2001; Fausto 1994). In terms of policy, the adjustment plan carried out by the regime during the reform period of 1964–1968 froze and even lowered real wages, increased indirect taxes, slashed income tax and granted tax incentives to the very rich, and revamped capital markets and the financial system, bypassing interest rate caps (Baer 2009; Carvalho 1982; Fishlow 1972; Hermann 2005b; Hoffmann 1973; Lago and Abreu 1990; Oliveira 1986; Resende 1982; Vianna 1999).

As a result, most of the increase in top shares happened before growth resumed in 1968. In effect, in 1974, at the end of the ‘Brazilian miracle’, both the political and the economic situation had changed completely. The Geisel administration (1974–1979) had to fend off the hardliners in the military and boost the investment rate while dealing with mounting foreign debt, oil shocks and renewed civil society militancy. The solution was to double down on the ISI strategy, but now also publicly recognising that living conditions and inequality had to be addressed (e.g. Brazil 1974, 52–54). Wage policy became more favourable to workers, and access to some basic services expanded somewhat in the 1970s (Carneiro 1990; Carvalho 1982; Colistete 2009; Marques 2016; Oliveira 1986).

The modest decline in top shares in this period was short-lived. By the 1980s, the military dictatorship crumbled as macroeconomic imbalances became unmanageable and persistently high inflation rates ran out of control (Carneiro and Modiano 1990; Hermann 2005a). Redemocratisation in 1985 entailed explosive demands for better living conditions and recognition of new social rights, but the transition itself was a result of a compromise between

military and political elites. Consequently, ever-increasing inflation was the only way to placate heterogeneous demands, and for years the government sought to address it with a string of unsuccessful, unorthodox stabilisation plans (Franco 2005).

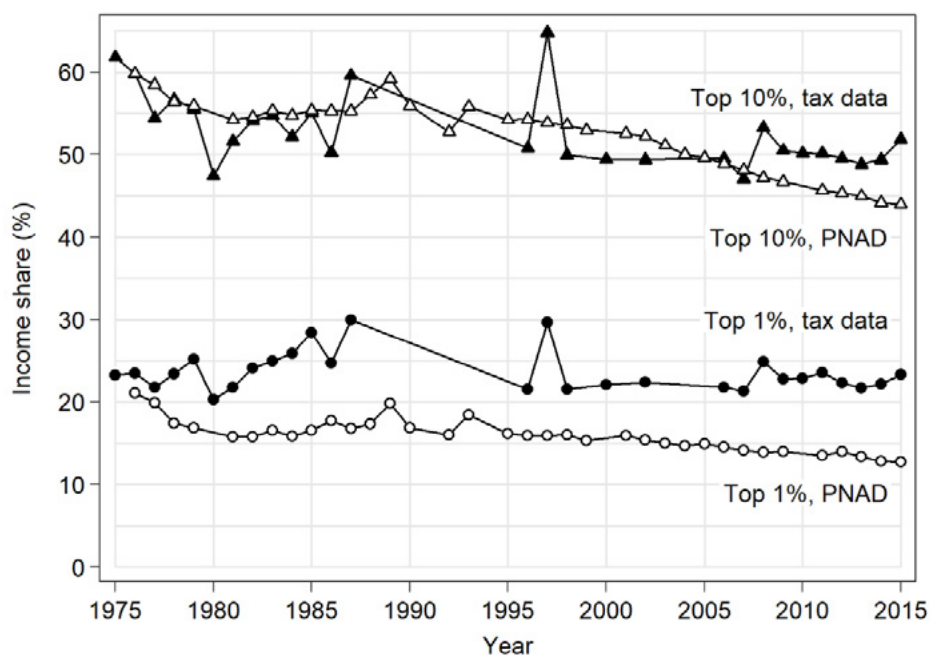
The increase in top income shares in the latter half of the 1980s also appears in survey-based measures (Bonelli and Ramos 1993), and can probably be explained by the steep rise in inflation rates. Given all the indexation mechanisms created during the military dictatorship, the rich were better equipped to protect their standing than the poor in a decade of low growth (Ferreira and Litchfield 2001; Neri 1995). The magnitude of this increase, however, is more debatable: it is possible that the 9 p.p. rise in the share of the top 1 per cent is partly spurious, resulting from the noise introduced by very high inflation.

There are no estimates for 1988–1995. The top incomes series resumes in 1996 at a much lower level than in the 1980s, which suggests that the successful stabilisation achieved by the *Plano Real* in 1994 played a part in lowering inequality. The spike in 1997 was very likely a one-off response to changes in income tax and can be disregarded.

Since the late 1990s there has been very little change in top income shares, which contrasts sharply with the prolonged drop of the Gini coefficient in surveys. Redistribution might have happened among the ‘bottom 90 per cent’, but the concentration of income at the top has not budged. Thus, top income shares and the recent economic slump cast doubt on the hypothesis that redemocratisation and macroeconomic stabilisation promoted a new social contract based on ‘fiscally sound inclusion’ (Alston et al. 2013).

FIGURE 2

**Top 1 per cent and top 10 per cent income shares based on tax and PNAD data—Brazil, 1976–2015**



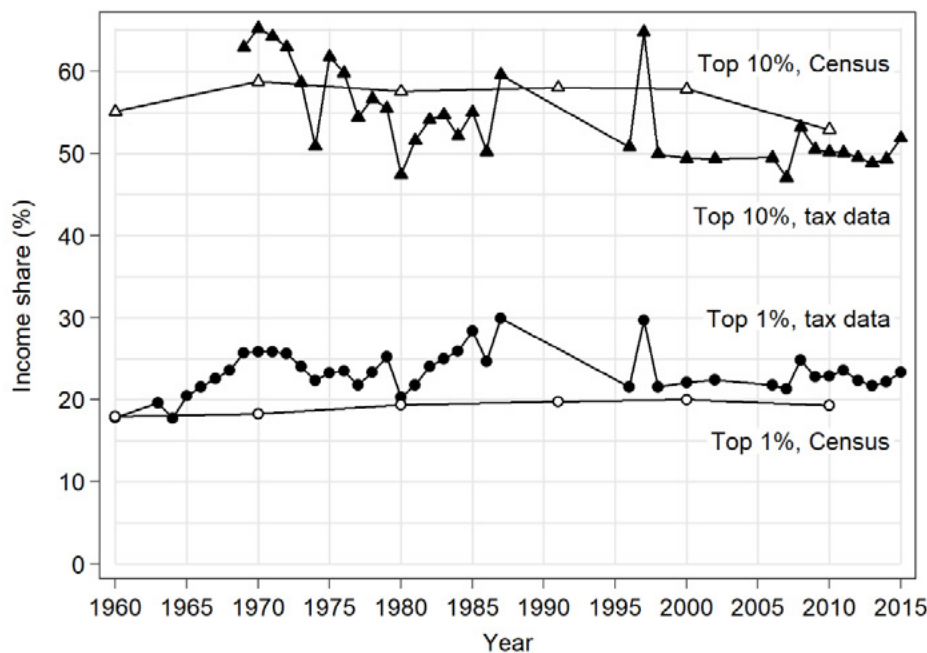
Sources: Author's calculations based on tax returns and national accounts and on PNAD microdata; see Section 3 and Appendix B.

Such results clash with the mainstream consensus that improved policymaking and democratic pressures are finally reshaping the distribution of income in Brazil. Although many institutional changes have indeed benefited poor people, the 1988 Constitution was hardly a clean break with the past. Brazil's persistent fiscal woes and high tax burden show there was more accommodation than outright redistribution from the top. Corporatism remains embedded in the Brazilian State, and many affluent groups still receive preferential treatment: civil servants earn a considerable wage premium and benefit from generous pension rules (Medeiros and Souza 2014; 2015a); big business still enjoys a plethora of tax breaks and access to subsidised credit (Mendes 2015); regulatory capture and cronyism are frequent (Lazzarini 2011; Mendes 2015); land reform efforts remain stillborn (Hoffmann and Ney 2010); welfare transfers are not as redistributive as one might expect (Medeiros and Souza 2013; 2015a); and the expansion of the welfare State itself was financed via indirect taxation, which corresponds to the bulk of the tax revenue, as opposed to what happens in most rich countries (Abreu and Werneck 2008; Silveira 2008). The income tax system itself is riddled with exemptions and loopholes that benefit the rich (Castro 2014; Gobetti and Orair 2016) and falls far short of its redistributive potential (Carvalho Jr 2010; Gobetti and Orair 2016; Silveira 2008; Soares, Silveira, Santos, Vaz, and Souza 2010).

In fact, tax data and surveys differ in levels and in trends in Brazil, at least at the very top. Figure 2 compares tax estimates and PNAD results and shows a growing divergence over time. The discrepancy is much more marked for the top 1 per cent than for the top 10 per cent. Figure 3 presents the comparison with census estimates, which are closer to levels of the historical tax series but also fail to replicate the precise trends. Still, the greater similarity suggests that massive samples may successfully mitigate the underestimation of top incomes in surveys to some extent.<sup>2</sup>

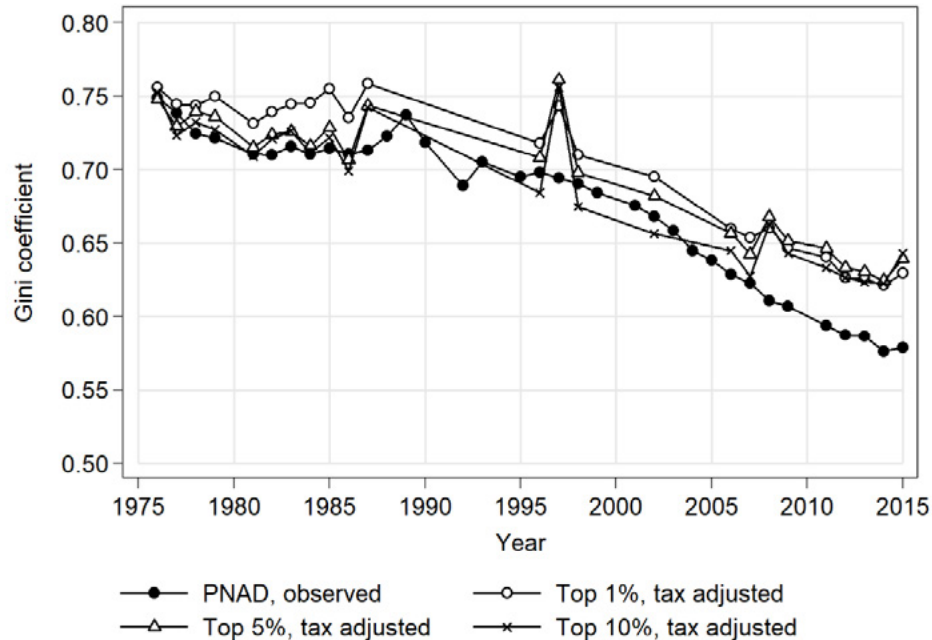
FIGURE 3

**Top 1 per cent and top 10 per cent income shares based on tax and census data—Brazil, 1960–2015**



Sources: Author's calculations based on tax returns and national accounts and on census microdata from IPUMS-International (Minnesota Population Center 2017); see Section 3 and Appendix B.

FIGURE 4

**Observed and tax-adjusted Gini coefficients for individual incomes among adults using PNAD data—Brazil, 1976–2015**

Sources: Author's calculations based on tax returns and national accounts and on PNAD microdata; see Section 3 and Appendix B.

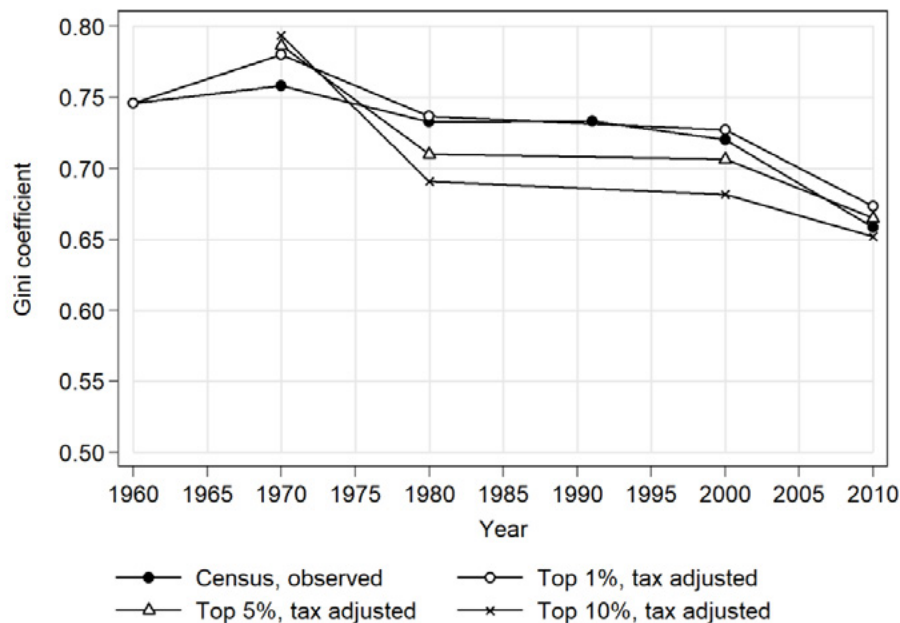
Top incomes shares estimated from tax data can be used to 'adjust' the Gini coefficient originally computed from survey data. Figures 4 and 5 present the observed and adjusted Ginis for three reasonable thresholds or merging points: the top 1 per cent, 5 per cent and 10 per cent, for PNAD and census data, respectively. The Ginis pertain to individual incomes among adults because the income tax tabulations are not detailed enough to calculate household income per capita, as is the custom in Brazil. In any case, the observed Gini for individual incomes matches the trend for household income per capita.

In Figure 4 the observed and adjusted Ginis display the same overall pattern of stable and then declining inequality. One of the drivers behind this drop was the unparalleled rise in the labour market participation of women and the corresponding sharp reduction in the percentage of adults with zero income. Evidently, more recent policy changes—such as the expansion of welfare and social security transfers—also played a role.

Nevertheless, the fall in income inequality in the tax-adjusted Ginis is less pronounced: between 2006 and 2013—that is, the heyday of pro-poor growth in Brazil and Latin America—the observed Gini drops 7 per cent, while the decrease in the adjusted Ginis range from 3 per cent (top 10 per cent adjusted) to 5 per cent (top 1 per cent). The long-term decline in the Gini coefficient among adults slowed down considerably over the past decade. Alternative techniques to merge tax and survey data yield similar results (Medeiros et al. 2015b). In other words, recent changes in the distribution of income become less impressive once the underestimation of top incomes in the PNAD data is accounted for.

FIGURE 5

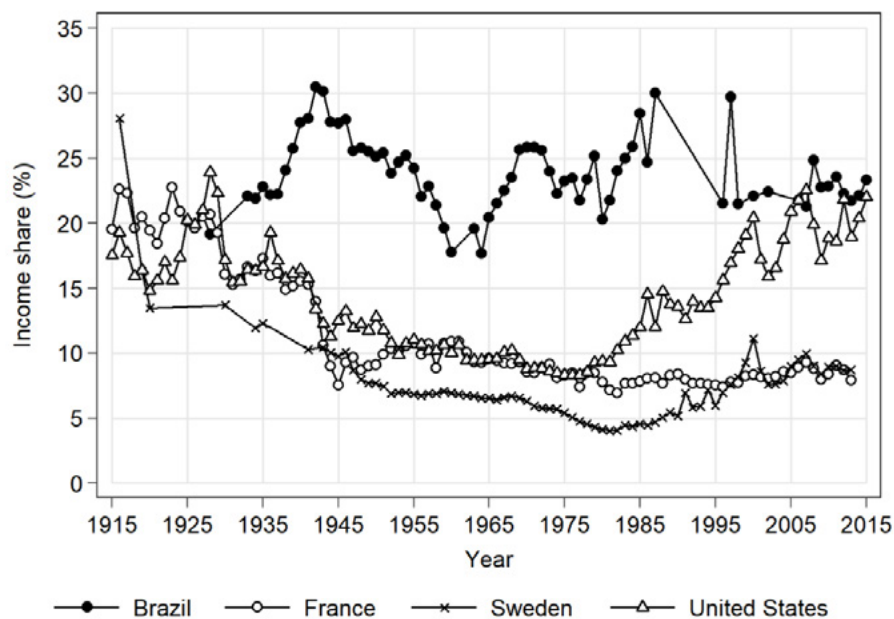
**Observed and tax-adjusted Gini coefficients for individual incomes among adults using census data—Brazil, 1960–2015**



Sources: Author's calculations based on tax returns and national accounts and on census microdata from IPUMS-International (Minnesota Population Center 2017); see Section 3 and Appendix B.

FIGURE 6

**Top 1 per cent income shares in Brazil and selected rich countries, 1915–2015**



Sources: Brazil: Author's calculations; see Section 3 and Appendix B. France, Sweden and USA: World Wealth and Income Database.

Note: Capital gains are included in the Brazilian, Swedish and US series, but not in the French.

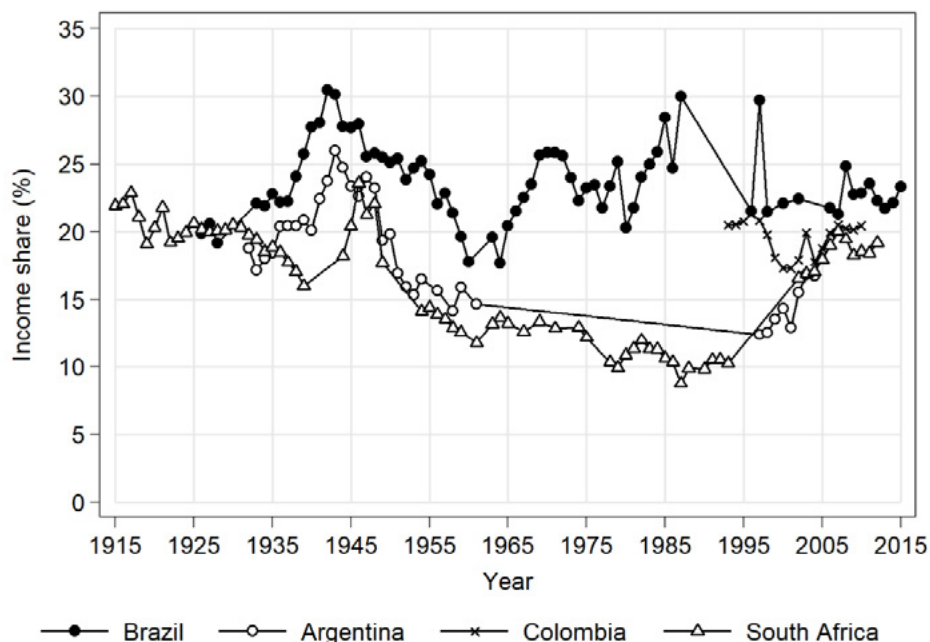
In Figure 5 the adjustments magnify the increase in inequality during the 1960s<sup>3</sup> and the decline in the following decade. More recently, the trends broadly coincide, though it must be noted that there are few data points and no tax estimates for 1991. Also, once again, the drop in inequality during the 2000s becomes less impressive: while the observed Ginis fall by 9 per cent, the adjusted Ginis shrink by between 4 per cent and 7 per cent.

Top shares are much higher in Brazil than in most rich countries. Figure 6 contrasts the top 1 per cent income share in Brazil with those in France, Sweden and the USA. These three countries are typical of different ‘varieties of capitalism’ and illustrate well the most important patterns in levels and trends in top shares in rich countries.

Inequality was high across the board in the early 20<sup>th</sup> century, but Brazil followed neither the U-shaped pattern shown by the USA nor France’s L-shaped curve. (Sweden is somewhere in-between.) The Second World War provoked abrupt declines in the concentration of income at the top in most rich countries, due to both policy and sheer destruction and disruption (Atkinson et al. 2011; Moriguchi and Saez 2008; Piketty and Saez 2003; 2006). In Brazil it had the opposite effect, and the country became relatively much more unequal than the other three for most of the past century. More recently, the steep rise in inequality in the USA—and, to a lesser extent, in other Anglophone countries—made it the only rich country to rival Brazilian levels of inequality, according to top income shares.

FIGURE 7

#### Top 1 per cent income shares in Brazil and selected developing countries, 1915–2015



Sources: Brazil: Author’s calculations; see Section 3 and Appendix B. Argentina, Colombia and South Africa: World Wealth and Income Database.

Note: Only the Brazilian series includes capital gains.

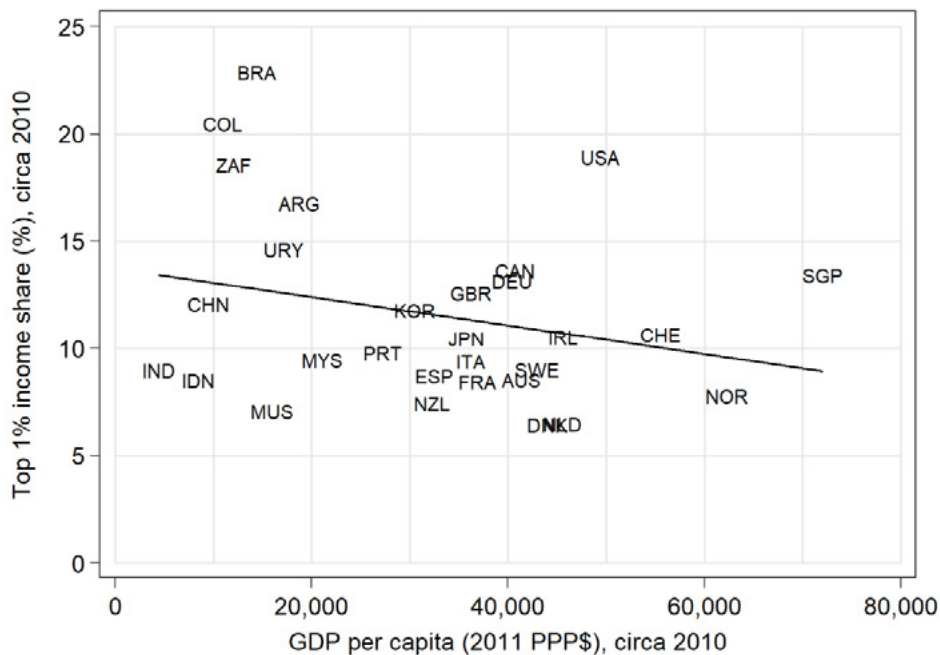


Figure 7 compares the top 1 per cent income share in Brazil and in the three most unequal countries in the World Wealth and Inequality Database (as of April 2017): Argentina, Colombia and South Africa. Overall, Brazil seems to be the most unequal, though this might stem from differences in the tax systems and in the quality of the tax data. Still, at the very least Brazil is as unequal as any of the three.

The countries in Figure 7 show neither a U- nor an L-shaped pattern. However, until 1960, Argentina, Brazil and South Africa had similar trajectories. The last is difficult to analyse because of apartheid, when white supremacy coexisted with decreasing top shares from 1945 onwards (see Alvaredo and Atkinson 2010). Argentina, on the other hand, parallels the Brazilian trajectory more closely in the early decades, precisely when both countries' political and institutional histories were quite similar—see, for instance, Alvaredo's (2010) account of the period. The two countries diverge from the 1960s onwards. Finally, the Colombian series, though much shorter, is useful to highlight another case where survey estimates clash with tax-based top shares. Again, traditional measures show falling inequality in surveys, while top shares remain mostly stable (Londoño Vélez 2012).

FIGURE 8

**Comparison of GDP per capita and the top 1 per cent income share in a cross-section of countries, circa 2010**



Sources: Brazil: author's calculations; see Section 3 and Appendix B. Others: World Wealth and Income Database. GDP per capita: World Bank's World Development Indicators.

Note: Top shares in Australia, Brazil, Sweden and the USA include capital gains.

Finally, Figure 8 depicts Latin America's stark levels of concentration of income at the top *vis-à-vis* the rest of the world. The scatterplot of GDP per capita and the top 1 per cent income share is not meant to be interpreted causally; rather, it is useful to show that in most countries

with available data—rich and poor alike—the top 1 per cent receives between 5 per cent and 15 per cent of total income. Three Latin American countries—Argentina, Brazil and Colombia—are among the five exceptions, and Uruguay barely falls below the 15 per cent threshold. Moreover, the slightly negative correlation between income and inequality vanishes when the four Latin American countries are excluded.

## 5 DISCUSSION

Social scientists have yet to develop any widely accepted general theory of the dynamics of inequality. Still, structural and institutional changes underpin most existing explanations: the controversy usually revolves around their relative importance. As noted, recent scholarship has generally been more favourable to institutional explanations.

Top income shares in Brazil do not bolster the case for rigid structural explanations. Urbanisation and industrialisation progressed apace for most of the past century, yet changes in top shares were always abrupt. Kuznets's inverted U-shaped curve was nowhere to be seen, as opposed to what some scholars expected. Insofar as neither Brazil nor any of the countries in the World Wealth and Income Database fit Kuznets's conjecture, it is perhaps time to discard it entirely.

The sine wave pattern of the concentration of income at the top in Brazil is much more akin to recent reworkings of the structural change view which infuse it with strong institutional elements, such as Frankema's (2009) conjecture for Latin America and Milanovic's (2016) 'Kuznets waves'. However, Frankema's emphasis on globalisation, de-globalisation and skills-based technological change does not really match the timing of the changes in top shares in Brazil. Milanovic fares better by identifying endogenous benign and malign forces that could explain the shape of Kuznets waves, but, again, the timing and frequency of the changes in Brazil cast doubt on the full applicability of this hypothesis to the country.

Rather, top shares seem to follow institutional reforms more closely than either approach allows for. All major rises and falls coincide with sharp turns in the institutional framework. Great political upheavals inevitably brought reform and change, as in other countries that were subject to great shocks (e.g. many rich countries during the Second World War).

'Institutions' in this case should be defined broadly. The nature of the political regime and the general 'rules of the game' clearly matter, in both the political and the economic arena, but so do the actual micro-level policies implemented by the government. Since any modern government enacts a range of often contradictory policies, what is at stake is their aggregate or net effect on the distribution of income.

The need for an encompassing definition of institutions is easy to illustrate. For instance, democracy itself was a necessary, but insufficient, precondition for lower inequality. The results for Brazil do little to rehabilitate theories which mechanically link the *de jure* nature of the regime with more egalitarian outcomes. Even the military dictatorship could only pursue an aggressively regressive agenda in its early years; later, the regime was forced to compromise to a certain extent. Likewise, redemocratisation in 1985 *per se* did not entail a prolonged and significant fall in top shares—though the Gini coefficient tells a more favourable story.

Top shares changed mostly in short bursts amid crises that prompted institutional makeovers. This is in accordance with hypotheses that stress the importance of more or less exogenous or at least unexpected shocks in reshaping inequality (e.g. Jencks 1972, 209–210). Even Piketty (2015, 743–746) underscores the political response to major crises as a key driver of top incomes. No country seems to have achieved a peaceful and gradual transition from high- to low-inequality status.

Why are top shares relatively stable in normal conditions, and why do they tend to change quickly during institutional breakdown and reconstruction? Although a fully-fledged answer is beyond the scope of this paper, the Brazilian case offers some hints. Political bargaining in more liberal regimes usually favours a *quid pro quo* that leaves the concentration at the top mostly unchanged. Rich populations can usually mobilise political, economic and cultural capital to advance their interests or offset losses when it comes to drafting or vetoing new legislation or simply by letting existing policies ‘drift’ (Hacker and Pierson 2010). The patchwork of policies found in most modern States and the logic of concentrated benefits and diffuse costs facilitate a zero-sum game.

Great political-institutional crises are pivotal because their solution often grants some groups the temporary power to enact comprehensive reforms. For instance, the need for mass mobilisation in the USA to fight the Second World War reshaped the institutional framework, leading to the so-called ‘Treaty of Detroit’ (Levy and Temlin 2007).

The most significant changes in top shares in Brazil happened under similar conditions. The *Estado Novo* and the Second World War led to encompassing changes and higher inequality, while opposition was stifled. Similarly, in the wake of the 1964 military coup, the new regime imposed wide-ranging pro-business reforms which explicitly sought to maximise future growth at the expense of current welfare.

Yet such efforts cannot persist indefinitely. Even authoritarian regimes need some level of legitimacy, and the reforming impetus usually triggers endogenous reactions. As seen, even the military dictatorship had to accommodate popular demands for better living conditions. Ultimately, the results were runaway inflation and political turmoil in the 1980s. The macroeconomic stabilisation in the 1990s put an end to that, and seemingly marked a new era of stable top shares. It is still unclear whether the current political and economic crisis will cause significant changes.

Finally, the Brazilian estimates and the preceding discussion also contribute to the ongoing dispute regarding the starting point of Latin America’s high levels of inequality. Whereas conventional wisdom blames extractive institutions set up during the colonial era, Williamson’s (2015) revisionist hypothesis claims that Europe and most of the rich countries only became relatively more egalitarian during the ‘great levelling’ of the 20<sup>th</sup> century.

The Brazilian top incomes do not cover colonial or imperial times, but the data partially support Williamson’s hypothesis. Brazil was not much more unequal than France, Sweden or the USA in the early 1930s; afterwards, the divergence is clear, notwithstanding the late 1970s surge in the USA.

Still, three caveats are necessary. First, Brazil was already somewhat more unequal than many rich countries, so this is not exclusively a mid-20<sup>th</sup> century phenomenon. Second, top income shares may not reflect changes elsewhere in the distribution of income. In fact, this likely explains the difference between the results discussed in this paper and those computed

with occupation-based pseudo Ginis. Third, Brazil did not entirely miss out on the 'great levelling': both the post-war and the late-1950s drops in top shares can be viewed as a 'mild' levelling. One can only speculate whether it would have continued in the absence of the 1964 coup. As it were, this trend was entirely reversed in the first decade of the military dictatorship.

## 6 CONCLUSION

This paper has drawn on income tax tabulations and national accounts data to estimate the concentration of income at the top of the income distribution in Brazil from 1926 to 2015. The new, homogeneous top incomes series approximates a sine wave pattern in the long term for the top 0.1 per cent and the top 1 per cent.

Top income shares started at a high level in the 1920s and rose substantially during the late 1930s and early 1940s, peaking in 1942–1943. They declined sharply in the early post-war years, but the concentration of income once again escalated in the mid-1960s. The 1980s saw another wave of increasing inequality, which reversed in the early 1990s. From then on, top income shares remained mostly stable.

Brazil underwent massive structural change over the 20<sup>th</sup> century. Yet neither the Kuznets curve nor its more nuanced heirs account properly for this trajectory. On the contrary, the ebb and flow of top shares track political and institutional changes very closely. Top shares increased during the dictatorship of Getúlio Vargas (*Estado Novo*, 1937–1945) and faded when war conditions dissipated. Similarly, the turnaround in the 1960s happened during the early years of the right-wing military dictatorship (1964–1985), when the new regime enacted a wide range of pro-business reforms and cracked down on the left. The concentration at the top declined as the regime sought legitimacy, but it surged in the 1980s as the political compromise that resulted in redemocratisation led to spiralling inflation in the face of new demands that had to be accommodated, old privileges that could not be revoked, and massive debt accumulated during the ISI period. Macroeconomic stabilisation in 1994 seems to have been equalising, but top shares have not budged since, owing to the reigning political status quo. Most recent policy changes have either been small in terms of budget (e.g. the vaunted *Bolsa Família* programme accounts for less than 2 per cent of total tax revenue) or not very redistributive at all, and, in any case, they have certainly not been paid for by steeply progressive taxes on the rich population.

Tax-based top shares differ from survey estimates in both levels and trends: the former are generally higher and show no recent decline. Differences are more pronounced at the very top, and they are likely to be related to increases in capital gains, which are not measured by surveys. The share of the top 1 per cent is on average 3 to 9 p.p. higher in the tax data, and the divergence grew somewhat since the late 1990s, so stable tax estimates coexist with modestly falling top shares in surveys. Due to this discrepancy, I also computed 'adjusted' Gini coefficients of individual incomes, taking into account the underestimation of top incomes in surveys. The adjusted Ginis confirm the prolonged fall in inequality since the 1980s. The adjustments suggest that this equalising process was milder than implied by the observed Ginis and slowed down considerably in the mid-2000s.

The concentration of income at the top is much higher in Brazil than in most other countries for which somewhat reliable estimates exist. The difference *vis-à-vis* most rich

countries was smaller at first, but the gap increased after the Great Depression and even more so during the Second World War. The sine wave trajectory of top shares in Brazil bears no resemblance to the typical patterns found in developed nations, being closer to some developing countries, most notably Argentina's until the 1960s.

From a broader point of view, the Brazilian estimates strengthen the argument for more institutionalist explanations of inequality, at least when it is defined more narrowly as the concentration of income at the top. The nature of the political regime matters, but democracy is not a sufficient condition for redistribution. Actual policymaking is crucial, and the inevitable patchwork of policies and the piecemeal aspect of most reforms call for an aggregate or net assessment of their impacts. Giving with one hand and taking with the other is commonplace in modern States.

Consequently, both in Brazil and elsewhere, top income shares tend to change substantially mostly during political-institutional crises, when the typical *quid pro quo* of more liberal regimes in normal times collapses, and some groups obtain temporary power to enact sweeping reforms. The need for mass mobilisation and adverse war conditions yielded a paradigmatic example of egalitarian reforms and outcomes in many countries during the Second World War. The 1964 military coup in Brazil provides an example of the opposite trend: frantic policymaking amid authoritarian rule led to deeper inequality. In turn, recent stability in top shares in Brazil highlights how difficult it is to gradually redistribute income in liberal democracies, even in a country where inequality is rampant and most, if not all, major political forces pay lip service to the need to tackle the problem.

Finally, the Brazilian top shares also shed some light on the ongoing controversy regarding the historical origins of Latin American inequality. Going against conventional wisdom, Williamson (2015) has argued that Latin America was comparable to Europe prior to the 'great levelling' that reshaped the income distribution in the latter part of the 20<sup>th</sup> century. Thus, the colonial legacy was no 'original sin' that set the region apart. The evidence discussed in this paper partly supports this hypothesis. On the one hand, it is true indeed that top income shares in the USA, France and elsewhere were much more similar to Brazil's 100 years ago. Even if early Brazilian top shares are somehow biased downwards, the difference was hardly as stark as in the post-war decades. On the other hand, my estimates are evidently silent on earlier Brazilian history, and even in the inter-war decades the concentration at the top in Brazil was already slightly higher. Also, Brazil (and Argentina) did not miss out entirely on the 'great levelling': in both countries, the post-war years saw not only growing macroeconomic imbalances and the heyday of ISI, but also a 'mild levelling' that was halted or reversed by military coups.

The results discussed in this paper are robust, and the underlying data are of comparable quality to most countries. Still, as usual, some caveats need to be mentioned. First, a series of adjustments, imputations and extrapolations had to be made to the raw data to make them usable. Second, runaway inflation in the 1980s probably biased upwards the rise in top shares in this period. Third, survey and tax data clash partly because the definition of income is more encompassing in the tax data. Fourth, international comparisons should always be interpreted *cum grano salis*. Brazil differs from most countries because the tax data include capital gains, gifts and inheritances. Data for recent years suggest that the income share of the top 1 per cent is 1–2 p.p. lower when they are excluded.

## APPENDIX A. INCOME TAX IN BRAZIL

The modern federal income tax was created in 1922. Roughly speaking, by the end of the 1920s it settled into a long-lasting system that was completely overhauled only in the late 1980s (see Nóbrega 2014).

During this early period, it featured a schedular system of taxation. Gross personal incomes (total income) were separated into gross taxable and non-taxable incomes. The latter comprised both tax-exempt incomes and incomes taxed 'exclusively at the source', usually at preferential rates. Gross taxable incomes were assigned to different income schedules, according to their nature. Each schedule had its own list of admissible deductions, corresponding to expenses incurred.

The sum of schedular net taxable incomes was the *renda bruta*. Taxpayers could subtract personal allowances (*abatimentos*) from the *renda bruta* to obtain their net taxable income (*renda líquida*), which was then subject to progressive tax rates. Marginal tax rates closely mimicked international trends.

Capital gains, inheritances and some government transfers were almost always non-taxable, but the scope of non-taxable incomes increased somewhat over time. In the early years, several professional groups were granted tax exemptions for their earnings, which were all revoked in 1964. By then the military dictatorship decided to grant exemptions or preferential treatment to several types of capital and business incomes in a bid to foster savings and investment. The values adjusted for inflation by the newly created indexation mechanism known as 'monetary correction' (*correção monetária*) were also tax exempt.

The income schedules were discarded, and forms and regulations were simplified in the late 1980s. Gross total incomes are still separated into gross taxable and non-taxable; net taxable incomes are gross taxable incomes minus deductions (standard or itemised).

Business profits and dividends were exempted from personal income tax in 1996. Previously, either they had been considered fully taxable incomes (until 1974) or taxpayers could choose whether to report them as gross taxable incomes or incomes taxed exclusively at source (1975–1995) (Nóbrega 2014).

Today, non-taxable incomes account for about 40 per cent of total income reported on tax returns; in the mid-1990s, this figure was about 10 p.p. lower (Souza 2016, 177–178). Profits and dividends account for roughly 10 per cent of total income, whereas investment incomes and capital gains (taxed exclusively at source) account for 5 per cent.

## APPENDIX B. LIST OF SOURCES

Table B1 lists the data sources used in this paper. Overall, I tracked down tabulations for 71 years from 1926 to 2015. As of April 2017, only 11 out of 32 countries in the World Wealth & Income Database had more available data.

TABLE B1

**List of sources for the income tax tabulations—Brazil, 1926–2015**

Year <sup>a</sup>	Source	Coverage <sup>b</sup>	Brackets ranked by <sup>c</sup>	Incomes reported by brackets <sup>c</sup>
1926	Souza Reis (1930)	DF	Net	Net, gross
1927	Souza Reis (1930)	DF	Net	Net, gross
1928	Souza Reis (1930)	DF	Net	Net, gross
1929	n/a	n/a	n/a	n/a
1930	n/a	n/a	n/a	n/a
1931	n/a	n/a	n/a	n/a
1932	n/a	n/a	n/a	n/a
1933	AEB 1941–1945, p. 496–497 (IBGE 2016a)	DF	Net	Net
1934	AEB 1946, p. 488–489 (IBGE 2016a)	DF	Net	Net
1935	AEB 1946, p. 488–489 (IBGE 2016a)	DF	Net	Net
1936	AEB 1946, p. 488–489 (IBGE 2016a)	DF	Net	Net
1937	AEB 1946, p. 488–489 (IBGE 2016a)	DF	Net	Net
1938	AEB 1946, p. 488–489 (IBGE 2016a)	DF	Net	Net
1939	AEB 1946, p. 488–489 (IBGE 2016a)	DF	Net	Net
1940	AEB 1946, p. 488–489 (IBGE 2016a)	DF	Net	Net
1941	AEB 1946, p. 488–489 (IBGE 2016a)	DF	Net	Net
1942	AEB 1946, p. 488–489 (IBGE 2016a)	DF	Net	Net
1943	AEB 1946, p. 488–489 (IBGE 2016a)	4 states	Net	Net
1944	Mortara (1949, 14)	Brazil	Net	Net
1945	AEB 1948, p. 489 (IBGE 2016a)	Brazil	Net	Net
1946	AEB 1949, p. 570–572 (IBGE 2016a)	Brazil	Net	Net
1947	AEB 1949, p. 570–574 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1948	AEB 1950, p. 496–499 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1949	AEB 1951, p. 506–509 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1950	AEB 1952, p. 514–518 (IBGE 2016a)	Brazil	Net	Net
1951	AEB 1953, p. 441–445 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1952	AEB 1954, p. 480–483 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1953	AEB 1955, p. 529–532 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1954	AEB 1956, p. 404–405 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1955	AEB 1957, p. 452–453 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1956	AEB 1958, p. 450–451 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1957	AEB 1959, p. 436–437 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1958	AEB 1960, p. 377–378 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1959	AEB 1961, p. 423–424 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1960	AEB 1962, p. 341 (IBGE 2016a)	Brazil	Net	Net, <i>renda bruta</i>
1961	n/a	n/a	n/a	n/a
1962	n/a	n/a	n/a	n/a
1963	Relatório 1964 (Ministério da Fazenda 1965: 56)	Brazil	Net	Net, <i>renda bruta</i>
1964	Bol. Estat. n. 23 (Ministério da Fazenda 1966)	Brazil	Net	Net, gross, <i>renda bruta</i>



Year <sup>a</sup>	Source	Coverage <sup>b</sup>	Brackets ranked by <sup>c</sup>	Incomes reported by brackets <sup>c</sup>
1965	Bol. Estat. n. 28 (Ministério da Fazenda 1968a)	Brazil	Net	Net, gross, <i>renda bruta</i>
1966	Bol. Estat. n. 32 (Ministério da Fazenda 1968b)	SP, GB	Net	Net, gross, <i>renda bruta</i>
1967	Imposto sobre a renda e proventos de qualquer natureza 1968 (Ministério da Fazenda 1968c)	Brazil	Net	Net, gross, <i>renda bruta</i>
1968	AEF 1970 (Ministério da Fazenda 1980)	Brazil	Net	Net, gross, <i>renda bruta</i>
1969	AEF 1971 (Ministério da Fazenda 1980)	Brazil	Net, gross	Net, gross, <i>renda bruta</i>
1970	AEF 1972 (Ministério da Fazenda 1980)	Brazil	Net, gross	Net, gross, <i>renda bruta</i>
1971	AEF 1973 (Ministério da Fazenda 1980)	Brazil	Net, gross	Net, gross, <i>renda bruta</i>
1972	AEF 1974 (Ministério da Fazenda 1980)	Brazil	Net, gross	Net, gross, <i>renda bruta</i>
1973	AEF 1975 (Ministério da Fazenda 1980)	Brazil	Gross	Net, gross, <i>renda bruta</i>
1974	AEF 1976 (Ministério da Fazenda 1980)	Brazil	Net, gross	Net, gross, <i>renda bruta</i> , non-taxable, total
1975	AEF 1977 (Ministério da Fazenda 1980)	Brazil	Net, gross	Net, gross, <i>renda bruta</i> , non-taxable, total
1976	AEF 1978 (Ministério da Fazenda 1980)	Brazil	Net, gross	Net, gross, <i>renda bruta</i> , non-taxable, total
1977	AEF 1979 (Ministério da Fazenda 1980)	Brazil	Net, gross	Net, gross, <i>renda bruta</i> , non-taxable, total
1978	AEF 1980 (Ministério da Fazenda 1980)	Brazil	Net, gross	Net, gross, <i>renda bruta</i> , non-taxable, total
1979	IRPF 1980 (Ministério da Fazenda 1989)	Brazil	Net, gross, non-taxable	Net, gross, <i>renda bruta</i> , non-taxable, total
1980	IRPF 1981 (Ministério da Fazenda 1989)	Brazil	Net, gross, non-taxable	Net, gross, <i>renda bruta</i> , non-taxable, total
1981	IRPF 1982 (Ministério da Fazenda 1989)	Brazil	Net, gross, non-taxable	Net, gross, <i>renda bruta</i> , non-taxable, total
1982	IRPF 1983 (Ministério da Fazenda 1989)	Brazil	Net, gross, non-taxable	Net, gross, <i>renda bruta</i> , non-taxable, total
1983	IRPF 1984 (Ministério da Fazenda 1989)	Brazil	Net, gross, non-taxable	Net, gross, <i>renda bruta</i> , non-taxable, total
1984	IRPF 1985 (Ministério da Fazenda 1989)	Brazil	Net, gross, non-taxable	Net, gross, <i>renda bruta</i> , non-taxable, total
1985	IRPF 1986 (Ministério da Fazenda 1989)	Brazil	Net, gross, non-taxable	Net, gross, <i>renda bruta</i> , non-taxable, total
1986	IRPF 1987 (Ministério da Fazenda 1989)	Brazil	Net, gross, non-taxable	Net, gross, <i>renda bruta</i> , non-taxable, total
1987	IRPF 1988 (Ministério da Fazenda 1989)	Brazil	Net, gross, non-taxable	Net, gross, <i>renda bruta</i> , non-taxable, total
1988	IRPF 1989 (Ministério da Fazenda 1989)	Brazil	Net, gross, non-taxable	Net, gross, <i>renda bruta</i> , non-taxable, total
1989	n/a	n/a	n/a	n/a
1990	n/a	n/a	n/a	n/a
1991	n/a	n/a	n/a	n/a
1992	n/a	n/a	n/a	n/a
1993	n/a	n/a	n/a	n/a





Year <sup>a</sup>	Source	Coverage <sup>b</sup>	Brackets ranked by <sup>c</sup>	Incomes reported by brackets <sup>c</sup>
1994	n/a	n/a	n/a	n/a
1995	n/a	n/a	n/a	n/a
1996	Tributação da Renda no Brasil Pós-Real, appendix 3–4 (Secretaria da Receita Federal 2001)	Brazil	Gross	Gross
1997	Tributação da Renda no Brasil Pós-Real, appendix 3–4 (Secretaria da Receita Federal 2001)	Brazil	Gross	Gross
1998	Análise Econômica da DIRPF 1999 (Secretaria da Receita Federal 2000)	Brazil	Gross	Net, gross
1999	n/a	n/a	n/a	n/a
2000	Torres (2003: 103)	Brazil	Gross	Gross
2001	n/a	n/a	n/a	n/a
2002	O IR das pessoas físicas no Brasil (Secretaria da Receita Federal 2004)	Brazil	Gross	Gross
2003	n/a	n/a	n/a	n/a
2004	n/a	n/a	n/a	n/a
2005	n/a	n/a	n/a	n/a
2006	Medeiros, Souza, and Castro (2015a)	Brazil	Total	Gross, non-taxable, total
2007	GNIRPF ano-calendário 2007 (Secretaria da Receita Federal 2016b)	Brazil	Net, gross, non-taxable, total	Net, gross, non-taxable, total
2008	GN IRPF ano-calendário 2008 (Secretaria da Receita Federal 2016b)	Brazil	Net, gross, non-taxable, total	Net, gross, non-taxable, total
2009	GN IRPF ano-calendário 2009 (Secretaria da Receita Federal 2016b)	Brazil	Net, gross, non-taxable, total	Net, gross, non-taxable, total
2010	GN IRPF ano-calendário 2010 (Secretaria da Receita Federal 2016b)	Brazil	Net, gross, non-taxable, total	Net, gross, non-taxable, total
2011	GN IRPF ano-calendário 2011 (Secretaria da Receita Federal 2016b)	Brazil	Net, gross, non-taxable, total	Net, gross, non-taxable, total
2012	GN IRPF ano-calendário 2012 (Secretaria da Receita Federal 2016b)	Brazil	Net, gross, non-taxable, total	Net, gross, non-taxable, total
2013	GN IRPF ano-calendário 2013 (Secretaria da Receita Federal 2016b)	Brazil	Net, gross, non-taxable, total	Net, gross, non-taxable, total
2014	GN IRPF ano-calendário 2014 (Secretaria da Receita Federal 2016b)	Brazil	Net, gross, non-taxable, total	Net, gross, non-taxable, total
2015	GN IRPF ano-calendário 2015 (Secretaria da Receita Federal 2016b)	Brazil	Net, gross, non-taxable, total	Net, gross, non-taxable, total

Notes: 'n/a' means not available.

<sup>a</sup>'Year' refers to the tax year (*ano-calendário* in Portuguese). Tax returns are filed the following year (*exercício*).

<sup>b</sup>'DF' stands for Federal District and corresponds to the city of Rio de Janeiro. After the capital was moved to Brasília in 1960, the city of Rio de Janeiro became the state of Guanabara (GB) until 1975, when it merged with the state of Rio de Janeiro. The four states in 1943 are São Paulo, the Federal District, Rio Grande do Sul and Minas Gerais.

<sup>c</sup>'Net' and 'gross' refer to taxable incomes only; 'non-taxable' refers to incomes exempt from personal income taxation or taxed exclusively at source; 'total' is gross taxable plus non-taxable incomes. *Renda bruta* equals gross taxable incomes minus deductions. The table omits cases in which income brackets are ranked by *renda bruta*.

## APPENDIX C. ADJUSTMENTS AND IMPUTATIONS

### 1 POPULATION COVERAGE IN 1927–1943 AND IN 1966

Until 1942 the tabulations report tax returns only for the city of Rio de Janeiro (then the Federal District). The figures for 1943 refer to the Federal District plus the states of São Paulo, Minas Gerais and Rio Grande do Sul. The data for 1966 cover only the states of São Paulo and Guanabara (also the city of Rio de Janeiro).

For 1926–1942 I multiplied the raw data by the inverse of the share of the Federal District in the total income tax revenue in each year (); for 1943 the multiplier was the inverse of the share of the Federal District and the three states (). For 1966 the multiplier was the inverse of the share of taxpayers living in São Paulo and Guanabara ().

This approach yields accurate results when applied to years with both regional and national tabulations (e.g. 1945–1947): ‘inflated’ regional figures usually differ from observed national numbers by less than 5 per cent.

### 2 NUMBER OF TAX RETURNS BY INCOME BRACKET IN 1963 AND 1964

The official tabulations for 1963 and 1964 do not report the number of tax returns by income bracket. Kingston and Kingston (1972) provide additional tabulations for 1964, but average incomes fall outside the valid range for two intermediate income brackets.

For both years I imputed average incomes as the midpoint of each income bracket; for the top brackets I assumed an inverted Pareto coefficient of 1.8 and imputed average incomes accordingly. The imputed figures are very close to the numbers reported by Kingston and Kingston (1972) for 1964, except for the two anomalous brackets.

### 3 GROSS TAXABLE INCOMES IN 1927–1963

The published tabulations do not report gross taxable incomes before 1964. The extrapolation was done in two steps. First, for 1933–1946, only net taxable incomes were reported by income bracket, so I multiplied net taxable incomes by 1.25, which implies that allowances were 20 per cent of the *renda bruta*, as was roughly the case in neighbouring years. Multipliers were slightly different for 1947–1949 (between 1.2 and 1.4) due to better data availability. Second, I had to impute schedular deductions to convert the *renda bruta* into gross taxable incomes. The procedure was slightly different for 1926–1928, 1933–1946 and 1947–1963, but, again, I used average values in the closest neighbouring years. For example, for 1947–1960 I multiplied all schedule C incomes by 1.14, since deductions accounted for 12 per cent of gross schedule C incomes in 1964–1967. This approach is better than Souza’s (2014) and Morgan’s (2015) because it effectively takes into account all available information, including changes in the composition of schedular incomes.

### 4 FIXED CAPITAL CONSUMPTION

Profits and dividends paid out by incorporated businesses are already net of fixed capital consumption, but that is not the case with unincorporated and family businesses. For the years

before 1988, whenever there was detailed information I simply considered 50 per cent of the reported deductions on schedules C and D as fixed capital consumption. For the years with no income breakdown by schedules, I set fixed capital consumption as 6 per cent of the gross taxable income for each income bracket. For the years after 1988, I took the *deduções com livro-caixa* at face value as fixed capital consumption; whenever this information was not available I used bracket-specific percentages (from 0.05 per cent to 4 per cent of gross taxable incomes).

## 5 DATA FOR 1926 AND 1988

The tabulations for 1927 provided by Souza Reis (1930) conflate incomes earned in 1926 and 1927. I disentangled both years by following Souza (2016), who multiplied the reported figures by 0.75 and then assumed the distribution of net taxable income was identical in 1926 and 1927.

Conversely, the tabulations for 1988 yielded unreasonable results and were discarded; for instance, the top 1 per cent income share almost doubled from 30 per cent in 1987 to an absurd 58 per cent in 1988. Spiralling inflation is the most likely cause for this anomalous behaviour: the standard Brazilian consumer price index leapt from 363 per cent in 1987 to 980 per cent in 1988.

## 6 NON-TAXABLE INCOMES IN 1926–1973, 1996–1998, 2000 AND 2002

Brazil's tax authority did not collect information on non-taxable incomes before 1974, and many published tabulations omit them afterwards. For the period 1926–1973 I first calculated top income shares using only gross taxable incomes (after adjustments and imputations) and then added the average difference between the total and gross taxable income series computed in 1974–1979: the income shares of the top 0.1 per cent and the top 1 per cent increased by 4.5 and 10.3 percentage points (p.p.), respectively.

This approach is both straightforward and accurate, insofar as the difference between total and gross taxable income shares in 1974–1979 is very stable. It would not make any difference to extend the reference period to 1987.

For the years 1996–1998, 2000 and 2002 I ran the following OLS regression for 2007–2015:

Where  $\hat{y}_t$  is the total top income share of the top  $\alpha$  in year  $t$  estimated using tabulations of total incomes by total income brackets;  $\hat{y}_t^g$  is the income share of the top  $\alpha$  in year  $t$  estimated using only tabulations of gross taxable incomes by gross taxable income brackets; and  $\hat{z}_t$  is the aggregate share of non-taxable incomes in total income among all tax filers.

Then I just applied the estimated coefficients to the relevant variables in 1996–1998, 2000 and 2002. The residuals for 2007–2015 are usually smaller than 0.5 p.p..

# APPENDIX D. ESTIMATING TOP INCOME SHARES

## 1 CONTROL FOR TOTAL POPULATION

An exogenous control is needed to define the number of tax filers in each fractile. There are two aspects to this choice: one must define a proper unit of analysis and an age cut-off. I defined the

tax unit as individuals, as did Souza (2014; 2016) and Medeiros, Souza, and Castro (2015a; 2015b). There are three reasons for this. First, restrictions on couples filing separately were somewhat immaterial because married women were not participating in the labour force: for example, according to the 1960 census, only 5 per cent of married women reported positive earnings. Second, married couples could almost always file separately under some circumstances. Third, since the early 1990s dual-earner couples have had strong incentives to file separately.

The age cut-off was set at 20 years old. This is in line with most country studies, which normally set the cut-off somewhere between 15 and 21 years (Atkinson et al. 2011).

Population data come from the decennial census carried out by the Instituto Brasileiro de Geografia e Estatística (IBGE), Brazil's statistics office. Intercensal estimates were computed via cubic spline interpolation. The population denominator grows from 14.9 million to 143.4 million people from 1926 to 2015 (an average of 2.6 per cent per year).

## 2 CONTROL FOR TOTAL INCOME

Top income shares also require a control for total income. The most common approach is what Atkinson (2007) called 'top-down': starting from national accounts, researchers construct income totals comparable to what is reported on income tax returns, effectively treating the incomes of non-filers as a residual.

Detailed national accounts might not be available for the entire period of interest. In this case, the standard solution is to compute the proper income denominator for all possible years and then anchor it to GDP—that is, average it out and use a constant percentage of GDP for all remaining years. Most previous work on Brazil followed this approach: Souza (2014) and Medeiros, Souza, and Castro (2015a) set the control at 67 per cent of GDP, whereas Morgan (2015) defined it as 60 per cent.

As noted by Atkinson (2007), it is very unlikely that a constant percentage is the optimal choice. Thus, I start from the same formula computed by Londoño Vélez (2012) and Souza (2016):

Control for total income =

- Balance of households' primary incomes
- + Social benefits (except social transfers in kind)
- Employers' (actual) social contributions
- Imputed social contributions
- Imputed property income of insurance policyholders
- Imputed rentals for owner-occupied housing
- Fixed capital consumption (i.e. 5 per cent of gross savings)

This income control can be calculated for 1995–2014; it is, on average, 67 per cent of GDP, with a slight upward trend over time. This figure is certainly too low for the earlier years (Souza 2016, 205); therefore, instead of conditioning only on GDP, I relied also on other macroeconomic aggregates. First, I rewrote the formula for the income denominator as:

Control for total income =

- Household final consumption and gross savings
- Income and wealth taxes paid by households
- Imputed rentals for owner-occupied housing
- Fixed capital consumption (i.e. 5 per cent of gross savings)
- Residual

Then I computed for 1995–2014 the average ratio between each term and a similar macroeconomic aggregate available since 1947, namely: household final consumption expenditures, total revenue from direct taxes, value added by the real estate sector and gross savings. The residual was anchored to GDP. These average ratios were used to calculate the control for total income between 1947 and 1994. For the earlier years (1926–1946) I used the same percentage of GDP as estimated for 1947.

This ‘variable’ control for total income ranges from 61 per cent to 78 per cent of GDP; on average, it is about 72 per cent. It is much more fine-tuned than a constant percentage of GDP, as it accounts for the changing composition of the Brazilian economy.

The data needed to compute the precise income denominator for 1995–2014 come from IBGE (2000; 2011; 2016b) and the Secretaria da Receita Federal (2016a). The historical data are available from IBGE (2006), the IBGE *Séries Históricas* (historical series)<sup>4</sup> and Ipeadata.<sup>5</sup>

### 3 PREFERRED ESTIMATES

My preferred estimates always rely on tabulations ranked by the most comprehensive income concept available whenever there are multiple tabulations for the same year: ‘total income’ brackets were preferred to ‘gross taxable income’ brackets, which were in turn chosen over ‘net taxable income’ brackets. The one exception is the period 1979–1987. Since non-taxable incomes are concentrated at the very top, I relied on the ‘gross taxable’ tabulations for the top 5 per cent and 10 per cent and on the ‘non-taxable’ tabulations for the top 0.1 per cent and 1 per cent.

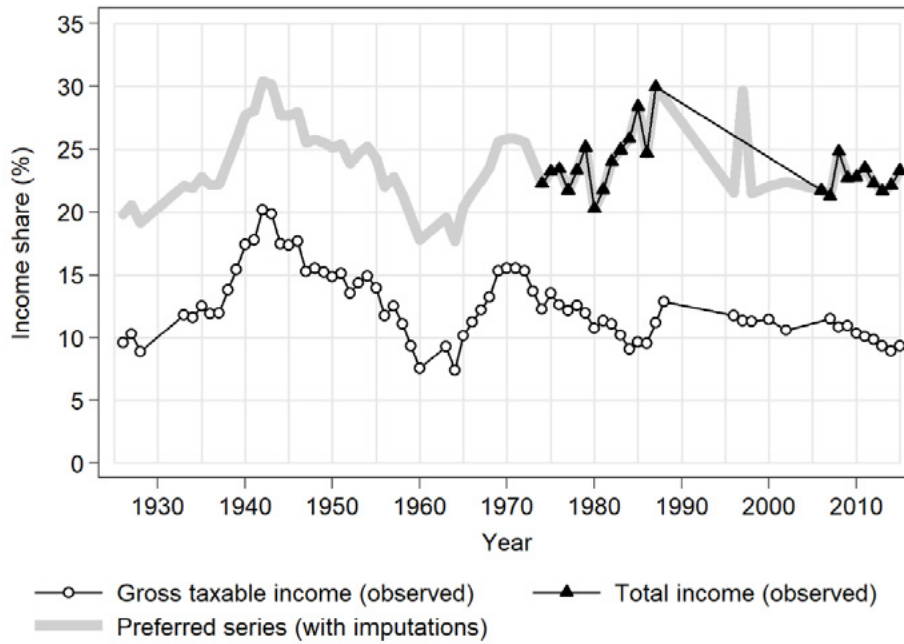
## APPENDIX E. ROBUSTNESS CHECKS

### 1 RAW SERIES

Since the most controversial adjustment was the imputation of non-taxable incomes, Figure E1 contrasts the preferred (imputed) series with the two non-imputed series underlying it. Total and taxable income shares run parallel in the 1970s and early 1980s; the two series diverge only after inflation rates increased dramatically. Thus, the stable relationship during this period offers the best information on total income for the preceding decades.

FIGURE E1

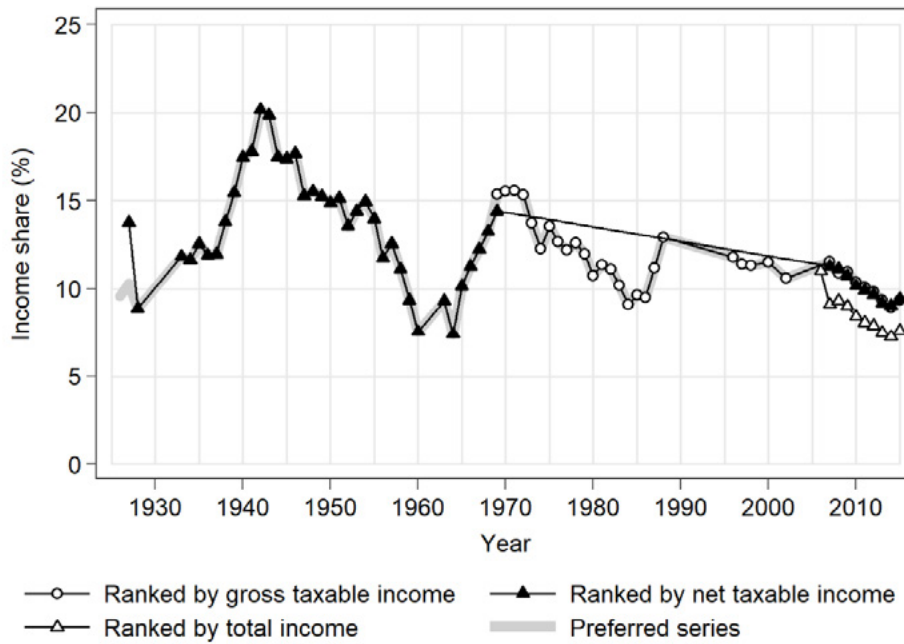
**Top 1 per cent income share in the preferred and the non-imputed series (%)—Brazil, 1926–2015**



Sources: Author's calculations based on tax returns and national accounts data; see Section 4 and Appendix B for more information.

FIGURE E2

**Top 1 per cent taxable income share in the preferred series and according to tabulations ranked by different income concepts (%)—Brazil, 1926–2015**

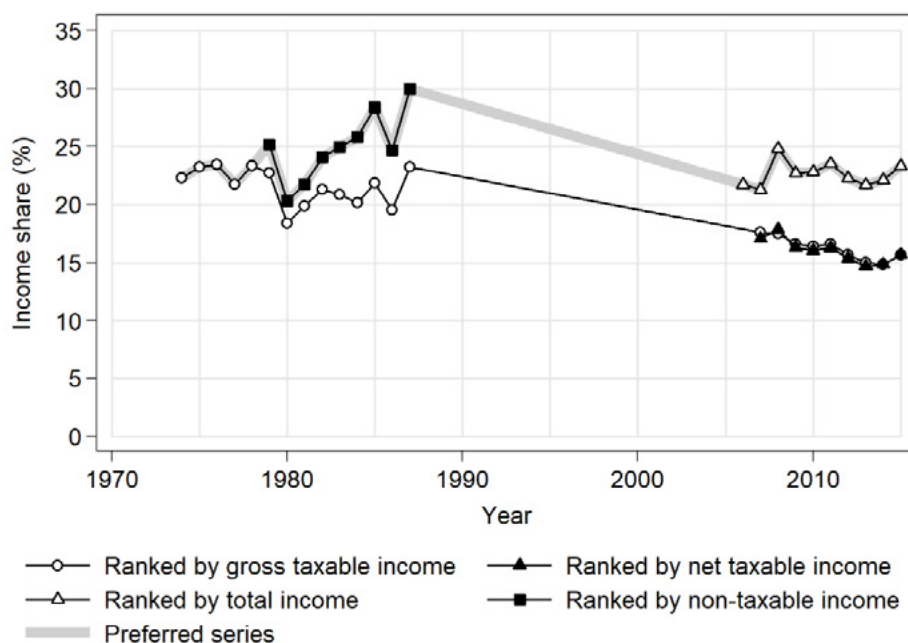


Sources: Author's calculations based on tax returns and national accounts data; see Section 4 and Appendix B for more information.

Figures E2 and E3 present the share of the top 1 per cent in the preferred estimates alongside series derived from tabulations ranked by different income concepts. There are no sharp discontinuities in years when the preferred estimates switch from one tabulation to another; for instance, the transitions in the late 1960s and in the late 1970s are seamless. Discrepancies are larger in recent years due to tax laws. Fortunately, tabulations ranked by total income for this period are available.

FIGURE E3

**Top 1 per cent total income share in the preferred series and according to tabulations ranked by different income concepts (%)—Brazil, 1974–2015**



Sources: Author's calculations based on tax returns and national accounts data; see Section 4 and Appendix B for more information.

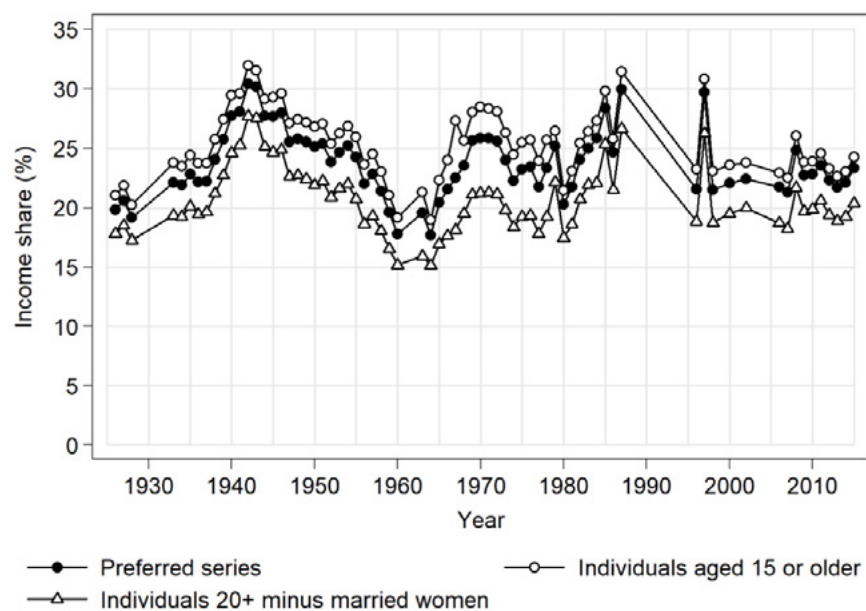
## 2 DIFFERENT CONTROLS FOR TOTAL POPULATION

Figure E4 shows the income share of the top 1 per cent in the preferred series and in two series with two alternative controls. The preferred series is based on an adult population of individuals aged 20 or older. One of the alternative controls lowers the age threshold to 15, while the other keeps the same cut-off age but subtracts married women to account for joint filing by married couples.

Neither alternative control changes the results of this paper. Inequality levels shift up or down modestly, whereas the sine wave pattern over time is completely unaffected.

FIGURE E4

**Top 1 per cent total income share in the preferred series and with alternative controls for total population (%)—Brazil, 1926–2015**

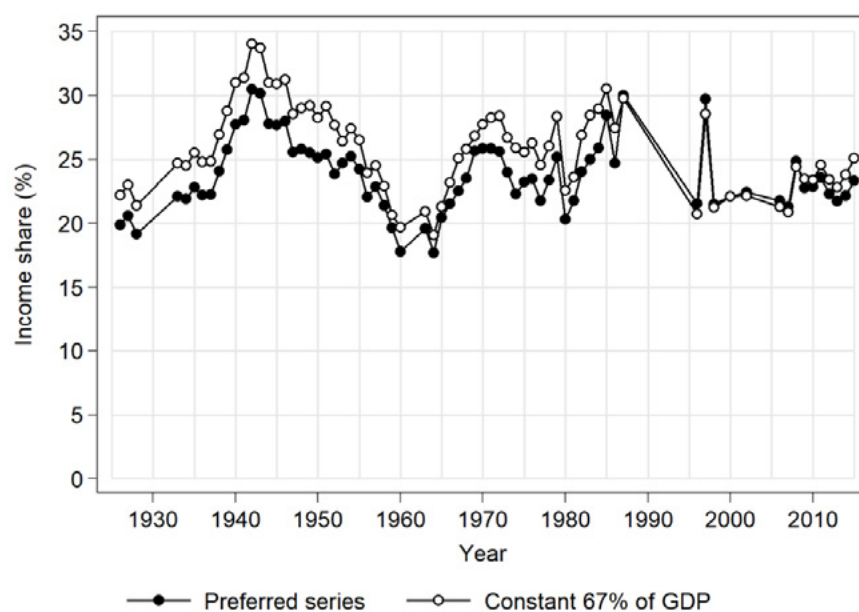


Sources: Author's calculations based on tax returns and national accounts data; see Section 4 and Appendix B for more information.

Note: The control for total population in the preferred series is all individuals aged 20 or older.

FIGURE E5

**Top 1 per cent total income share in the preferred series and with an alternative control for total income (%)—Brazil, 1926–2015**



Sources: Author's calculations based on tax returns and national accounts data; see Section 4 and Appendix B for more information.



### 3 DIFFERENT CONTROLS FOR TOTAL INCOME

Figure E5 compares the top 1 per cent income share in the preferred series with the top shares computed with a constant percentage of GDP as income denominator. Neither levels nor trends change noticeably; if anything, the constant percentage control overstates the rise and fall of the share of the top 1 per cent over time.

## APPENDIX F. TAX EVASION AND TAX AVOIDANCE

There are no data to assess empirically whether tax evasion and tax avoidance are a serious issue in Brazil. Still, there is some evidence that neither is likely to introduce serious biases. First, tax evasion elsewhere seems to display an inverse U-shaped pattern, which led some researchers to posit that lower rates of evasion at the top might follow from the fact that rich people are usually quite visible to tax authorities. The general conclusion is that the problem is not serious enough to discredit the use of tax data (Atkinson et al. 2011, 36–40; Alvaredo 2010, 290–292).

Second, changes in top shares in Brazil do not seem to be purely a response to change in marginal tax rates, and that holds even when one examines only gross taxable incomes, a point also noted by Morgan (2015, 72–73). Incidentally, top income shares in Brazil would reach uncharted territory if tax evasion and tax avoidance were so widespread.

Changes in tax enforcement over time seem to be a more serious concern, but most of the anecdotal evidence (Nóbrega 2014, 54–62) focuses more narrowly on the Second World War period. Income tax revenue rose quickly, so more strict tax enforcement could explain part of the rise in top shares in this period. However, top shares declined after 1943; given the fiscal woes of the State, it is difficult to discern why tax collection would regress instantly after the war.

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## NOTES

1. The volume edited by Tolipan and Tinelli (1975) collected some of the main contributions of this heated public debate.
2. The IPUMS-International census subsamples used in this paper are 15 to 25 times larger than the PNAD, which typically covers around 120,000 households.
3. All authors mentioned earlier found a much larger increase between the 1960 and 1970 censuses because they generally restricted their samples to individuals with positive earnings.
4. Available at <<http://seriesestatisticas.ibge.gov.br/>>. Accessed 1 January 2017.
5. Available at <<http://www.ipeadata.gov.br/>>. Accessed 17 January 2017.



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