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2020-04
Southern Centre for Inequality Studies (SCIS)
https://hdl.handle.net/10539/33928

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WID.world WORKING PAPER N° 2020/06

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This working paper is the result of a collaboration between the Southern Centre for Inequality Studies and the World Inequality Lab.





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Abstract

This paper estimates the distribution of personal wealth in South Africa by combining tax microdata covering the universe of income tax returns, household surveys and macroeconomic balance sheets statistics. We systematically compare estimates of the wealth distribution obtained by direct measurement of net worth, rescaling of reported wealth to balance sheets totals, and capitalisation of income flows. We document major inconsistencies between available data sources, in particular regarding the measurement of dividends, corporate assets and wealth held through trusts. Both household surveys and tax data remain insufficient to properly capture capital incomes. Notwithstanding a significant degree of uncertainty, our findings reveal unparalleled levels of wealth concentration. The top 10 per cent own 86 per cent of aggregate wealth and the top 0.1 per cent close to one third. The top 0.01 per cent of the distribution (3,500 individuals) concentrate 15 per cent of household net worth, more than the bottom 90 per cent as a whole. Such high levels of inequality can be accounted for in all forms of assets at the top end, including housing, pension funds and other financial assets. Our series show no sign of decreasing wealth inequality since apartheid: if anything, we find that inequality has remained broadly stable and has even slightly increased within top wealth groups.

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1 Introduction

South Africa is by most contemporary measures the most unequal country in the world. This is a clear legacy of colonialism and apartheid, where minority rule was premised on racially motivated exclusion of the majority from ownership and participation in the economy. However, despite having a progressive constitution and policy mandate, post-apartheid democratic society seems to have reproduced inequality along the same lines. To study this evolution, most analyses of inequality have focused on inequality of incomes and opportunities, but relatively little attention has been given to wealth inequality. However the available evidence suggests that wealth is significantly more unequally distributed than income and thus may greatly contribute to maintain or exacerbate the discrepancies in standards of living and access to economic opportunities. Studying wealth inequalities is therefore crucial to accurately measure its concentration over time, identify the root causes of the current persistence of extremely high levels of inequality in South Africa, to eventually understand how to best overcome it. In this respect this study comes at timely moment given the current policy debate about the different reforms needed to address wealth inequality, such as wealth tax (Davis Tax Committee 2018) or expropriation without compensation.[1]

This paper estimates the wealth distribution in South Africa from 1993 to 2018, and advances the literature in several ways. First, we systematically contrast all existing data sources in South Africa that can inform estimations on wealth, including macro-economic data, all relevant household surveys, and newly available tax microdata from 2010 to 2017. This inspection demonstrates the crucial lack of fully comprehensive and reliable data available to directly measure the distribution of wealth in South Africa. We further show that some key income components, which could be used to indirectly estimate wealth concentration, are also insufficiently captured, even by the most recent and accurate tax microdata available. This is particularly salient for capital incomes such as rental income, interests and dividends - which almost exclusively benefit the very highest income earners. Secondly, we contribute to the methodological literature on wealth measurement (e.g. Saez and Zucman 2016; Roine and Waldenström 2010) by systematically comparing alternative methods of estimating the wealth distribution when only incomplete data is available, namely: partial direct measurement, rescaling and income capitalisation. Specifically, this paper is the first to systematically apply the income capitalisation method to estimate the distribution of wealth in South Africa. This method allows to measure wealth inequality in spite of the absence of reliable microdata directly measuring wealth, by estimating wealth stocks from the income flows they generate. Thirdly, we improve on existing studies by using a combination of the above-mentioned methods, merging tax microdata with surveys to account for the fact that higher incomes are better captured by fiscal data, and harmonising the resulting distribution with the National Accounts to ensure aggregates are consistent with macro totals. This paper thus contributes to the Distributional National Accounts (Alvaredo et al. 2016) agenda by creating new ways to bridge the gap between macro and micro data to retrieve consistent distributional estimates. Finally, assuming that under-representation of top wealth groups in surveys has remained constant before 2011, we are able to use the income capitalisation method to reconstruct a time series since 1994.

The rest of the paper unfolds as follow: section 2 reviews the literature on wealth in South Africa, section 3 discusses the available sources on aggregate wealth, section 4 discusses the available microdata sources on the distribution of wealth, section 5 discusses the different methods, section 6 presents the results, and concludes by comparing our favorite estimates with that of other countries.

[1] For a broader discussion on the importance of research on wealth inequality in South Africa, see Chatterjee (2019).

2 Measuring the wealth distribution: South Africa in an international perspective

Although the estimation of wealth inequality has a long history (e.g. Mallet 1908; Clay 1925; Langley 1950; Daniels and Campion 1936; Atkinson and Harrison 1974), recent improvements in available data and methodological approaches has led to a resurgence in studies on the distribution of wealth. Accordingly, a new body of literature has studied long terms trends in wealth inequality (Piketty 2011), the importance of tax havens (Zucman 2014), the use of different techniques to estimate wealth concentration and the importance of combining available data sources in conducting this research (e.g. Garbinti, Goupille-Lebret, and Piketty 2018; Saez and Zucman 2016).

To understand how we can estimate a wealth distribution in South Africa, we briefly review the main studies and techniques, and locate key papers on the South African case within this. We group the literature according to the essential components of such a studies: aggregate household wealth, survey sources of information about the distribution, and administrative data sources of information about the distribution.

2.1 Literature on aggregate household wealth

Recent studies internationally have relied on official household sector balance sheet statistics (referred to as the household balance sheet). These form part of a system of national accounts that capture all economic activity, in the form of both stocks and flows, and which therefore provides internally consistent and internationally comparable estimates of aggregate household wealth. The development of national account statistics to include stocks and wealth concepts is relatively recent. For example, the US household balance sheet was systematically developed in the late 1980s (Wolff 1989), in Germany, the first official balance sheets were released in 2010 (Piketty and Zucman 2014). The System of National Accounts, an international standard for national accounting, first included guidelines for wealth only in 1993. The standards that inform present statistics come from 2008 (United Nations 2009).

In this context, South Africa has firmly been part of this international trend, with the first household balance sheet estimated in 1999 (Muellbauer and Aron 1999). Since then it has been continuously consolidated and now forms part of the official quarterly statistical release of the National Accounts of the South African Reserve Bank (e.g. South African Reserve Bank 2015). The household balance sheet has been estimated backward until 1970 which interestingly allows for long-run analyses.

The household balance sheets show that net household wealth, as a percentage of households disposable income, fell from an average of 315 percent in 1980-1998 to 283 percent for the 1999-2003 period, but rose again above 300 percent in 2005. The decomposition reveals a declining significance of liquid assets and the rise of share-holding, pension assets and debt, in line with South Africa's liberalisation policies (Aron, Muellbauer, and Prinsloo 2006, 2007). Muellbauer and Aron (1999) estimate that from the early 1980s to 1997, the value of housing wealth declined, with pension wealth overtaking it as a proportion of personal disposable income in the early 1990s. Liquid assets, such as bank and building society deposits, declined from the early 1980s, while personal debt rose. After this period, pension wealth was a significant contributor to the recovery in household wealth, while housing wealth recovered due to valuation increases in the private property market and equity prices (Kuhn 2010). These trends continued until the global financial crisis affected property wealth and household debt in 2011 (Walters 2011).[2]

[2] The aggregate balance sheet also provides useful sources of data for decomposition analysis, as per Piketty and Zucman (2014). See Orthofer (2015) for a study on the proportion of South African household wealth changes in South Africa from 1970 to 2014 that are a result of quantity (saving-induced) versus price (revaluation-induced) effects.

2.2 Distribution of wealth using complete micro administrative data

Some researchers have been able to take advantage of national wealth databases, which consist of complete records of assets and liabilities. For example, Boserup, Kopczuk, and Kreiner (2016) use administrative tax records from the Danish Tax Agency (SKAT), which collects, in addition to information of various income sources, information about the values of asset holdings and liabilities measured at the last day of the year for all Danes. Wealth and debt components, such as all deposits, stocks, bonds, value of property, and deposited mortgages, as well as all types of debt, are third-party reported and linked to the individual ID numbers. There are also records that allow matching the identification numbers of parents and children to study the intergenerational transmission of wealth.

The data is unfortunately not currently organised like this in South Africa. However, it is important to note that all the components to do so are in place. Third party reporting is already done by all financial institutions to the South African Revenue Service (SARS), but the data has not been made available. Organising this data to link with individual income tax records would not only benefit researchers, but also SARS, as such a dataset can be used to cross check the consistency of the reported income level with the change in net wealth during the year under the assumption of a given estimated consumption level. Incidentally these types of records have proved extremely successful in helping tax enforcement (Kleven, Knudsen, Kreiner, Pedersen, and Saez 2011). The identification numbers linking individuals to their parents are administratively required by South African Home Affairs. Combining this information with administrative data about wealth would allow researchers to study intergenerational dynamics in wealth transmission.

2.3 Distribution of wealth according to survey data

Data on aggregate wealth informs trends in levels and composition of wealth at the national level, but does not allow us to specify how wealth is distributed over the population. In the absence of disaggregated administrative data, studies on wealth distribution typically rely on survey instruments such as the Survey of Consumer Finances (SCF) for the US - which provides regular information on assets and debts since the 1960s - or the Household Finance and Consumption Survey (HFCS) which collects data on the assets and liabilities of households in 18 European countries since 2010.

The National Income Dynamics Survey (NIDS), a household panel survey conducted in South Africa, has collected information on the assets and liabilities of South African residents at the household and individual levels in three waves since 2008. Comparing wealth aggregates from the SARB with the one they estimated from the NIDS, Daniels and Augustine (2016) observe that the NIDS survey only captures approximately 3 per cent of the financial assets recorded in the national accounts. Lower levels of financial assets in the NIDS suggest that the survey failed to capture the top end of the wealth distribution. Non-financial assets from the NIDS are around four times higher than the national accounts due to the inclusion of durable assets, not usually included in measures of aggregate net wealth. Mbewe and Woolard (2016) explore two waves of this data, 2010-2011 (wave 2) and 2014-2015 (wave 4) to build measures of household net worth. They estimate that the share of the top 10 per cent accounts for 87 per cent of total net assets in wave 2, and 85 per cent in wave 4 (excluding durable assets). Furthermore, the bottom decile has negative wealth, while the next seven deciles together hold 4 and 7.6 per cent of net wealth in waves 2 and 4 respectively. Exploiting NIDS' demographic dimensions, they also reveal that approximately 60 per cent of the top decile are White individuals.[3] Within-race inequality is very pronounced as well. The Gini index for wealth among the White group is equal to 0.74, compared to 0.98 among the Black group (wave 2).

[3] Notice however that the authors exclude the Asian group from their estimates due to undersampling.

There is potentially another source of survey data measuring wealth, but this has not been considered for this paper due to the proprietary nature of the data. Van Tonder, Van Aardt, and De Clercq build a set of distributional balance sheets using private sector survey data, the Momentum/Unisa Household Financial Wellness Index surveys conducted between 2011-2015, which cover 12,500 households. They merge these surveys with data from the Bureau of Market Research (BMR) Household Income and Expenditure Database to derive 2016 distributional balance sheet statistics. A slightly different point of reference, they find that the top income decile holds about 51 per cent of household net wealth. This viewpoint however only limits the wealth held to those in the labour market, and so underestimates wealth and its distribution at the top end. The survey records aggregate household net wealth at R 7,344 billion in the fourth quarter of 2017, compared to the National Accounts which estimate it at R 10,835 billion in 2017. However, the methodology used to derive these figures remains very opaque, which makes it hard to understand sources of differences with NIDS and SARB data. Making this survey and data publicly available in an appropriate form to researchers would be key to contrasting it to other data sources and to improving our understanding of the wealth distribution in South Africa.

In any case, studies relying on survey data are limited when estimating the top shares due to under-sampling, non-response and under-reporting issues which are particularly pronounced at the top end of the distribution. Given the extreme levels of wealth concentration in South Africa, this implies that estimates based on surveys can only depict a truncated picture of the reality. In this regard, administrative sources are generally more exhaustive and usefully complement estimates relying on survey data alone.

2.4 Distribution of wealth using estate duty and personal income tax data

Estate duty data has been commonly used to estimate wealth distributions. Mallet (1908) used estate duty data as early as 1908, and this method has since been developed to estimate a historical series even with minimal but useful summary data, as in, for example, Atkinson and Harrison (1974) and Piketty, Postel-Vinay, and Rosenthal (2006). Indeed, one of the earliest studies to look at the distribution of wealth in South Africa used estate duty returns in the Natal province in 1974/75 (McGrath 1982). The data was obtained from Master of Supreme Court (rather than from the tax authority, which had no demographic information attached to the estate duty records). Adjusting the provincial data to make it nationally representative, and using a mortality multiplier, the assets of the deceased were used to estimate the assets of the living. McGrath estimated that the top 5 per cent of the population owned 88 per cent of total household wealth. Assuming that 94 per cent of all wealth was held by the white population at that time (as per the information in the estate duty records), the demographic breakdown also provides some interesting statistics. Among the White population, the top 10 per cent held 65 per cent of wealth, while among the Coloured and Asian groups, it held 96 and 94 per cent of wealth respectively. The advantage of this approach is that estates of the deceased are directly measured. Unfortunately, even though there is an estate duty collected regularly in South Africa today, we have not been able to access data on estate duty records. Access to such data would be crucial to improve our understanding of the wealth distribution and its intergenerational dynamics.

Another set of data useful to estimate the top shares of the wealth distribution is personal income tax data. This provides indirect information on wealth through declarations of income derived from capital ownership. These incomes can then be capitalised to estimate their asset bases (see Saez and Zucman (2016) and Garbinti, Goupille-Lebret, and Piketty (2017) for recent studies in the case of the US and France respectively). In South Africa, Orthofer (2016) has used reported incomes from administrative personal income tax data (PIT) to approximate the wealth distribution, comparing this to the distribution of wealth measured in the NIDS. Given that this study takes an approach which is closest to ours, let us briefly discuss it in more detail. For her estimates using PIT data, which does not cover the lower end of the distribution because of filing rules, Orthofer fits a lognormal distribution below the filing threshold to simulate a bottom end. She then uses the sum of investment incomes (interest, dividends and rental

income) and pension contributions as a proxy for wealth. For her estimates using NIDS data, she takes the sum of assets and liabilities reported in the survey; she also re-samples the top of the distribution from a Pareto distribution to account for the underrepresentation of top income and wealth groups in the survey. In both cases, she estimates that the top 10 per cent share lies between 90 per cent and 95 per cent, and the top 1 per cent share between 50 per cent and 60 per cent.

This study has made an important contribution in being the first to use both surveys and income tax data to measure wealth inequality in South Africa. However, it suffers from at least three major limitations that we seek to address in this paper. Firstly, her PIT estimates only cover specific components of wealth, those who correspond to investment income (i.e. financial assets) and pension contributions (i.e. pension assets). They exclude owner-occupied housing wealth altogether, which we find to amount to as much as 28 per cent of household wealth in 2018 (see section 3). Secondly, her results based on PIT data do not account for the fact that the composition of income is not the same as the composition of wealth. Because assets have different rates of return (for example, bonds tend to have lower rates or return than corporate shares), the income capitalisation method requires applying differential multipliers by asset class. As a result, Orthofer's estimates using PIT data better correspond to the distribution of financial incomes than to the distribution of wealth. The difference between these two distributions is now well-known in the literature: in the case of the United States, for instance, Saez and Zucman (2016) show that wealth is typically less concentrated than capital income.

When it comes to estimates using the NIDS, we believe that the extraordinarily high levels of wealth concentration found by Orthofer are in large part due to the mismeasurement of pension assets. According to her results, the top 1% owns as much as 99% of pension assets in the economy (see table 5, p. 18). This seems unrealistically high, given that more than 10% of the South African adult population contribute to pension funds, and at least 6% of the South African adult population received private pension income from a pension fund in 2017.[4] Looking closer at the NIDS, we find this inconsistency to be due to massive under-reporting in the survey data: indeed, a large share of pensioners and wage earners with positive pension contributions declare having no pension asset, which is by definition impossible. We correct for this discrepancy by imputing pension assets to individuals contributing to pension funds or receiving private pension income, using predictive mean matching. This increases the share of individuals with positive pension assets in the survey data from 6% to 16% of the adult population. It also improves considerably the coverage of aggregate pension assets in the survey, which increases from about a third of the macro total reported by the SARB to close to 100%.

This paper builds upon this existing literature by combining surveys and tax data, but with significant differences. Firstly, we systematically contrast all data sources that can inform estimations on wealth inequality (including all household surveys useful for this purpose, as well as tax data). Secondly, we directly combine surveys and tax data at the individual level, rather than resampling individuals from these two types of datasets. This requires us to thoroughly harmonise income concepts, but it allows us to study the entire distribution with a greater level of precision. Thirdly, we also capitalise incomes from surveys alone, and compare our results to those obtained when combining surveys and tax data. To the best of our knowledge, our study is the first to apply the income capitalisation directly to survey data, with no correction for the under-representation of top income groups, and to assess the consequences of this under-representation on the measurement of top wealth inequality. Quite surprisingly, we find in our case that both approaches yield very similar results. We interpret this as evidence that while surveys do understate the concentration of incomes at the top end, they still allow us to capture the core structure of wealth concentration as long as assets and liabilities are properly rescaled to match macroeconomic totals.

[4] Authors' computations using data from income surveys (pension contributions) and data from the matched IRP5-ITR12 income tax panel (pension income).

Fourthly, we systematically match specific wealth components with the corresponding balance sheets totals. Our wealth distribution is therefore fully consistent with official macroeconomic figures published by the South African Reserve Bank. Correcting for such micro-macro discrepancies is in our view crucial to both better measuring the distribution of wealth and improving the international comparability of existing studies. To be sure, the estimates of aggregate wealth published by statistical institutes are far from being perfect, and they are also likely to suffer from measurement error. Yet, the framework outlined by the United Nations' System of National Accounts does represent the best attempt to provide internally consistent, comparable and measurable definitions of household wealth. Ignoring the fact that surveys massively understate major components of wealth seems in our opinion a much stronger assumption than attempting, even in an imperfect way, to address existing measurement errors. We know with a relatively high degree of confidence, for instance, that the NIDS survey does not cover more than 4% of bonds and stock held in the economy. Estimates which do not attempt to account for this problem effectively leave out more than 30% of household wealth held in South Africa. To our knowledge, our study is the first one in South Africa to correct for these micro-macro gaps.

Fifthly, the tax microdata we use covers the entire universe of taxpayers. This allows us to go beyond the top 10 per cent or the top 1 per cent and to derive estimates of average wealth covering the very top end of the distribution. As we show in section 5, understanding wealth inequality within top wealth groups is absolutely crucial for the study of wealth inequality in South Africa, both in terms of measurement and policy, as the top 0.1 per cent alone owns a substantial share of household wealth. Finally, our methodology allows to estimate a time series, rather than a point estimate, that gives us a sense of longer term trends since 1993.

3 Data sources on aggregate wealth

This section discusses the data sources available to measure total household wealth and its composition in South Africa. We then turn to a systematic comparison of micro and macro data sources in the next section.

3.1 The household balance sheets

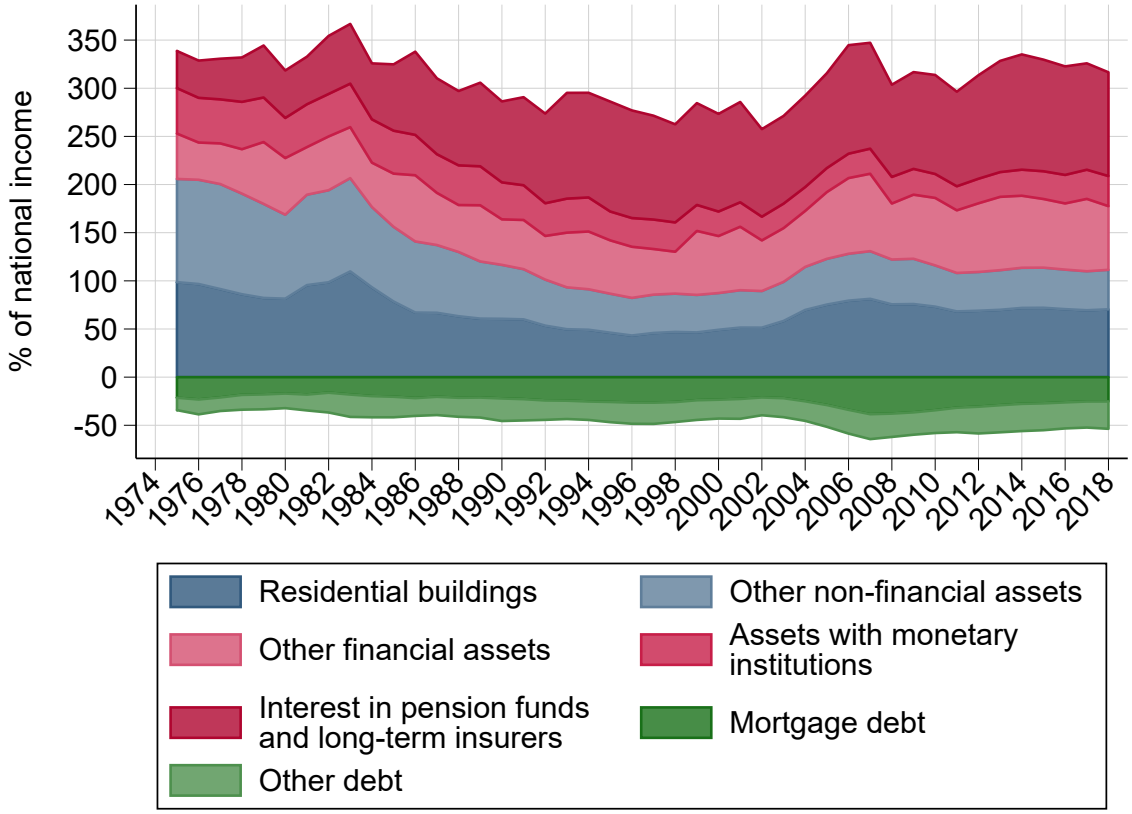
In South Africa, the first comprehensive attempt to estimate the value of total household wealth in the economy goes back to Muellbauer and Aron (1999), who collect and combine a number of data sources to provide figures on the market value of the assets and the liabilities of the household sector since 1975. The South African Reserve Bank (SARB) has since then updated and revised these figures on a yearly basis.

Non-financial assets are divided into residential buildings and other non-financial assets. Residential buildings correspond to the market value of residential properties owned by households. Other non-financial assets include both land underlying dwellings and business assets.

Financial assets are divided into interest in pension funds and long-term insurers, assets with monetary institutions, and other financial assets. Interest in pension funds and long-term insurers corresponds to all pension assets holdings of the household sector. It is the sum of the total assets of official pension and provident funds (series KBP2215 in Capital Markets Statistics), the total liabilities of private self-administered pension and provident funds (KBP2339), and the liabilities of long-term insurers under unmatured policies from the pension business (KBP2215).[5] Assets with monetary institutions include

[5] The original estimates of the South African household balance sheets done by Muellbauer and Aron (1999) excluded life insurance assets and all other assets associated with the non-pension business of long-term insurers. However, these items are now included by the SARB in line with the SNA guidelines.

Figure 1: The evolution of household wealth in South Africa, 1975-2018



Notes: This figure shows the level and composition of household wealth in South Africa between 1975 and 2018, expressed as a share of the net national income.

Source: authors' compilation based on data from the South African Reserve Bank.

all forms of currency and deposits with banks, mutual banks, the Land and Agricultural Bank, and the Post Bank, as well as notes and coins held by households. This category therefore includes both deposits generating interest income (savings accounts) and other liquid assets which have no corresponding measurable income flow (such as cheque accounts, notes or coins). Other financial assets include investment in government and public entities stock, collective investment schemes, corporate bonds and equities, other long-term deposits and households' investment in foreign assets.

Finally, the SARB decomposes household debt into mortgage advances, corresponding to loans provided by the commercial bank sector, and other debt, which includes trade credit, personal bank loans, credit card debt, instalment sales and lease agreements, non-bank loans granted by micro-lenders, and other loans.

Figure 1 plots the evolution and composition of total household wealth between 1975 and 2018, expressed as a share of national income. Aggregate net wealth has followed a U-shaped curve, declining from about 300 per cent of national income in 1975 to 220 per cent at the end of the 1990s, and rising back to more than 260 per cent at the beginning of the twenty-first century. In 2018, financial assets amounted to two years of national income. Within financial assets, pension assets have risen significantly and are now the biggest component of household wealth. Non-financial assets amounted to one year of national income in 2018, declining in importance over the years from just under two years of national income in 1974. Household debt rose significantly between 1975 and 2008, in large part due to a boom in mortgage advances in the early 2000s (see Figure A4), and has slightly declined since then, amounting to about 55 per cent of the national income today.

3.2 The limitations of available balance sheets: from institutions to asset classes

As discussed in section 2, we aim to estimate the distribution of household wealth by combining information on capital income flows with directly measured stock data, not previously done for South Africa. There are at least five limitations to available balance sheets statistics which we discuss below: the decomposition of non-financial assets, the decomposition of housing wealth into tenant-occupied and owner-occupied, the decomposition of financial assets, the decomposition of pension and life insurance assets, and the inclusion of wealth held offshore in tax havens.

Land underlying dwellings

The first issue is that the other non-financial assets category provided by the SARB includes both land underlying dwellings and business assets. These two components are arguably distributed very differently. For our purpose, in particular, it is reasonable to assume that land underlying dwellings is distributed similarly to residential buildings – therefore defining total housing assets are the sum of land and residential buildings. We assume that 70% of other non-financial assets corresponds to land underlying dwellings, the remaining 30% amounting to the assets held by unincorporated businesses.

Tenant- versus owner-occupied housing

The two important components of "Residential buildings" are tenant-occupied housing, and owner-occupied housing. Available studies combining surveys with tax microdata typically assume that the distribution of tenant-occupied housing can be well approximated by the distribution of rental income, while owner-occupied housing assets are better captured using direct measurement available from surveys or administrative data (Saez and Zucman 2016; Garbinti et al. 2017). Unfortunately, the "Residential buildings" category published by the SARB does not provide this decomposition, so we choose to estimate the proportions from survey data. The General Household Survey is the only survey that systematically asks both tenants and owners to provide a value for the dwelling in which they live. Our results show that between 22 per cent and 26 per cent of household housing assets are owned by households renting to private individuals over the 2013-2018 period (see appendix for method).

Non-pension financial wealth

"Assets with monetary institutions" and "other financial assets" gather together very different forms of financial assets. "Assets with monetary institutions" include both non-interest bearing deposits such as cheque accounts, which do not generate any income flow, and interest bearing deposits which generate interest income. "Other financial assets" include both bonds and corporate shares, which generate interest and dividends respectively. We follow Orthofer (2015) and assume that the composition of other financial assets held by households is similar to that reported by unit trusts.[6] This implies that between 80 per cent and 95 per cent of other financial assets consist in corporate shares over the 1975-2018 period, the remaining being classified as interest-bearing deposits.[7] Finally, we separate currency, notes and coins from interest-bearing deposits by using published data from the Money and Banking Statistics

[6] As discussed by Orthofer (2015), "A breakdown by asset class can be estimated by applying the portfolio composition of the respective counterparties (monetary institutions, pension funds and long-term insurers as well as unit trusts) to the total of household assets held with these institutions. In practice, we consider all assets with monetary institutions as cash equivalents and apply the portfolio composition of unit trusts to the other financial assets component."

[7] More precisely, we estimate the share of corporate shares in other financial assets by comparing the market value of ordinary shares held by unit trusts (KBP 2412) to the sum of the market values of security holdings of public sector entities, stocks and debentures held by unit trusts (KBP 2410 + KBP 2411) in the capital market statistics published by the SARB.

Table 1: The level and composition of household wealth in South Africa in 2018

	Market value (R billion)	% of national income	% of net wealth
Non-financial assets	4504	111.4 %	42.4 %
Owner-occupied housing	3020	74.7 %	28.4 %
Tenant-occupied housing	988	24.4 %	9.3 %
Business assets	497	12.3 %	4.7 %
Financial assets	8294	205.1 %	78.0 %
Pension assets	2944	72.8 %	27.7 %
Life insurance assets	1412	34.9 %	13.3 %
Bonds and interest deposits	1798	44.5 %	16.9 %
Currency, notes and coins	87	2.2 %	0.8 %
Corporate shares	2053	50.8 %	19.3 %
Total liabilities	2170	53.7 %	20.4 %
Mortgage debt	1022	25.3 %	9.6 %
Non-mortgage debt	1148	28.4 %	10.8 %
Net household wealth	10629	262.9 %	100.0 %
Offshore wealth	575	14.2 %	5.4 %
Net wealth incl. offshore wealth	11204	277.1 %	105.4 %

Notes: The table shows the level and composition of household wealth in South Africa in 2018. The market value of each component is expressed in current billion rands.
Source: Own estimates combining available data sources from the SARB.

of the SARB (series KBP1312).[8] These amount to 0.8% of net wealth, which is relatively comparable to figures from other countries where balance sheets data are available: in the US, for instance, non-interest financial assets amount to about 1 per cent of personal wealth in recent years (Saez and Zucman 2016).

Pension assets and life insurance

Pension assets correspond to the assets accumulated by wage earners through contributions to pension funds throughout their career, so they should in large part be distributed to wage earners and pensioners receiving pension income or annuities. Life insurance assets, by contrast, corresponds more to a form of savings device, but they do not directly generate interest income, so they cannot be categorised with interest deposits or bonds and have to be distributed differently. As explained above, the share of interest in pension funds and long-term insurers corresponding to assets held by long-term insurers is recorded in the Capital Markets Statistics published by the SARB under series KBP2215, "liabilities of long-term insurers under unmatured policies from the pension business", so we can measure directly total life insurance assets held by households in the economy accordingly.

Offshore wealth

Offshore wealth corresponds to the assets held abroad by South African residents, mainly for tax avoidance purposes. By definition, these assets are not recorded in official records and are therefore not included in the household balance sheets. Alstadsæter, Johannesen, and Zucman (2018) combine a number of macroeconomic data sources to measure the total amount of financial assets held in offshore tax havens and distribute it to specific countries. They estimate that the equivalent of about 11.8 per cent of South African GDP was held offshore in 2007. We add this quantity to total household wealth in 2007 and extrapolate it to other years by assuming that it has remained a constant fraction of GDP. Given that offshore wealth is known to have grown globally, this is a relatively conservative assumption: if anything, wealth inequality could have increased more since 1993 than what our estimates suggest (see

[8] This variable, "Monetary sector liabilities: banknotes and coins in circulation", includes currency, notes and coins held by all institutions, not only households. We assume that 70% of the total can be attributed to households.Given the small share of this component in total wealth, especially at the top of the wealth distribution, our results are not affected by alternative scenarios.

Table 2: Ownership rates and coverage of household balance sheets by asset class in NIDS

	% of adults with asset or debt		% of balance sheets covered	
	Wave 4	Wave 5	Wave 4	Wave 5
Household assets				
Owner-occupied housing	72.3 %	65.2 %	151.7 %	220.8 %
Tenant-occupied housing	3.3 %	3.5 %	122.4 %	97.2 %
Business assets	5.6 %	5.0 %	135.4 %	59.6 %
Pension and life insurance	25.7 %	24.4 %	110.0 %	104.3 %
Bonds and stock	1.5 %	1.3 %	3.9 %	3.8 %
Household debts				
Mortgage debt	8.0 %	7.0 %	71.0 %	56.8 %
Other debts	36.3 %	33.7 %	54.5 %	37.0 %

Notes: The table shows the share of South Africans who declare having a particular type of asset or debt, along with the share of the total value of this asset or debt in the economy captured by the NIDS survey.
Source: authors' computations based on data. The unit of observation is the adult individual aged 20 or above. Calculations based on weighted sample using design weights.

section 5), as offshore wealth is well-known for been concentrated at the very top end of the distribution (Alstadsæter et al. 2018).

The level and composition of household wealth in 2018

Table 1 shows the detailed composition of household wealth in 2018 after breaking down the balance sheets categories. Pension assets and owner-occupied housing are the largest component of household assets and liabilities, each amounting to about 28 per cent of net wealth. The next most important categories are corporate shares (19 per cent), bonds and interest deposits (17 per cent) and life insurance assets (13 per cent). Business assets are equal to less than 5 per cent of net wealth. Tenant-occupied housing and currency and non-interest deposits represent 9 per cent and less than one per cent of net wealth respectively. Accounting for offshore wealth increases net household wealth by 5 per cent and brings the net personal wealth to national income ratio to more than 275 per cent.

4 Data sources on the distribution of household wealth

This section reviews the data sources available in South Africa that can be used to inform a distribution function of household net assets, and ultimately be applied to the National Accounts' aggregates, described above.

4.1 Household surveys

Surveys can provide information either that directly measure household assets, and/or have information about incomes and outflows. The National Income Dynamics Survey, mentioned in section 2, is the only publicly available survey that explicitly collects data on wealth. Out of the five waves of the survey, wave 2, 4 and 5 have wealth modules that can inform both households' and, for wave 4 and 5, individuals' net worth. For the purposes of this paper, we only consider the variables that allow us to build a net wealth concept consistent with the System of National Accounts guidelines (United Nations 2009) for comparability and consistency. The surveys have information on business wealth, housing properties and land, life insurance, pension and other retirement assets, equity wealth, debt and bonds. However, we faced several challenges to extract reliable wealth estimates from this source.

Firstly, we uncovered issues in coverage and reliability in each of the five components of wealth. Looking at housing first, approximately 40 per cent of debtors do not know the house bond value. With pension and other retirement funds, the information is quite inconsistent. For example, in wave 5 of the

Table 3: The coverage of selected national accounts components in South African surveys

	Gross wages	Mixed income	Rental income	Interest and dividends
PSLSD, 1993	87.7 %	51.7 %	38.4 %	11.5 %
IES, 1995	76.9 %	55.0 %	9.9 %	8.8 %
IES, 2000	70.9 %	37.2 %	23.1 %	3.4 %
IES, 2005	80.5 %	64.2 %	21.7 %	3.8 %
IES, 2010	80.2 %	71.9 %	13.5 %	4.5 %
LCS, 2008	77.7 %	75.8 %	16.3 %	8.4 %
LCS, 2015	74.6 %	86.8 %	21.6 %	12.6 %
NIDS, wave 1	62.7 %	12.0 %	65.4 %	7.3 %
NIDS, wave 2	67.6 %	4.1 %	13.0 %	0.8 %
NIDS, wave 3	65.7 %	20.6 %	20.7 %	7.3 %
NIDS, wave 4	73.5 %	12.9 %	43.9 %	2.5 %
NIDS, wave 5	72.1 %	14.1 %	41.0 %	5.5 %

Notes: The table shows the ratio of total income reported in surveys to the total corresponding income reported in the national accounts published by the SARB. PSLSD: Project for Statistics on Living Standards and Development. IES: Income and Expenditure Survey. LCS: Living Conditions Survey. NIDS: National Income Dynamics Study.

Source: authors' computations based on data. The unit of observation is the adult individual aged 20 or above. Calculations based on weighted samples using weights calibrated by the authors' (see appendix).

survey, 61 per cent of individuals declaring contributions to pensions funds declare having no "pension or retirement annuity", while 77 per cent of individuals declaring income from a pension or provident fund declare no "pension or retirement annuity". We correct for these gaps by imputing all missing values using predictive mean matching. For housing wealth, the market value of the house is modelled by number of rooms, number of adults, province and household income. Similarly, we impute missing business wealth for self-employed individuals, as well as pension funds and corporate shares based on factor income, contributions to pension funds and pension income.

The comparison of household assets and liabilities reported in NIDS to macroeconomic statistics show important inconsistencies (see table 2). The market value of owner-occupied housing wealth is between 50 per cent and 120 per cent higher in NIDS than in the balance sheets, while tenant-occupied housing is closer to the macro aggregate. This most likely reflects the different methods in measuring market values.[9] Business assets are covered very differently in the two waves: they are overestimated in wave 4 and underestimated in wave 5. Pension and life insurance assets, after the correction, seem to be relatively close to balance sheets figures, and they even slightly overestimate them. Other financial assets are extremely badly covered: the total reported in NIDS does not exceed 4 per cent of households' bonds and stock reported in the balance sheets by the SARB. Household debts are slightly better covered, but still fall significantly below macroeconomic statistics.

An alternate method to estimate wealth distribution consists of capitalising incomes (usually the method used for estimating the top end of the distribution from tax data). As more surveys deal with incomes, and generally income reporting is seen as more credible, this provides alternate sources of information for the wealth distribution. The method is discussed in more detail in section 5.1. In this section, we compare incomes from surveys to the corresponding totals recorded in the national accounts. For our

[9] It is beyond the scope of this paper to discuss and evaluate these methods. However, this issue is not one specific to South Africa - in the US, survey values have also been found to be higher than in balance sheets figures, and which source of information provides the more accurate estimate of market values is contested (Blanchet 2016; Henriques and Hsu 2014; Dettling, Devlin-Foltz, Krimmel, Pack, and Thompson 2015). As a robustness check, we show in appendix figure A11 that our estimates of the wealth distribution are only marginally affected if one assumes that the balance sheets underestimate housing assets by a factor of two. Another potential issue is how to treat RDP housing, a government-funded social housing project in South Africa, due to compexities around owneship. However, given the typical low market value of these properties, it is unlikely to affect our distributional estimates.

Table 4: The coverage of owner-occupied housing, mortgage debt and other debt in South African surveys

	Owner-occupied housing	Mortgage debt	Other debt
PSLSD, 1993	143.5 %	86.5 %	37.4 %
IES, 1995	121.7 %	27.2 %	16.5 %
IES, 2000		40.3 %	34.9 %
IES, 2005	105.9 %	67.9 %	41.5 %
IES, 2010	193.9 %	16.4 %	20.5 %
LCS, 2008	145.4 %	13.9 %	18.4 %
LCS, 2015	179.5 %	51.0 %	22.2 %
NIDS, wave 4	122.3 %	74.3 %	57.4 %
NIDS, wave 5	258.8 %	56.8 %	37.0 %

Notes: The table shows the ratio of total assets or debts reported in surveys to the corresponding totals reported in the household balance sheets. PSLSD: Project for Statistics on Living Standards and Development. IES: Income and Expenditure Survey. LCS: Living Conditions Survey. NIDS: National Income Dynamics Study.

Source: authors' computations based on data. The unit of observation is the adult individual aged 20 or above. Calculations based on weighted samples using weights calibrated by the authors' (see appendix).

purposes, the components we consider are gross wages (to capitalise pension wealth), mixed income (income from unincorporated enterprises, to capitalise non-financial assets), rental income (to capitalise tenant-occupied housing) and interest and dividends (for equity and bonds). The surveys we consider were designed to capture information about consumption, expenditure and earnings: these are the Project for Statistics on Living Standards and Development (PSLSD) conducted in 1993, the Income and Expenditure Surveys (IES) from 1995 to 2010, the Living Conditions Surveys (LCS) of 2008 and 2015, and the NIDS.[10] The labour force surveys which provide wage data only cover labour incomes, so would not be appropriate for this exercise.

As table 3 shows, rental income, interest and dividends are very poorly covered in household surveys. This is due to this sort of income being concentrated by those at the upper end of the income distribution, who are typically underrepresented in surveys due to issues of sampling and non-response. This motivates our use of the tax microdata to better cover top incomes. Gross wages and mixed income are much better covered in the PSLSD, IES, and LCS than in NIDS. Owner-occupied housing seems to be over-stated relative to the balance sheets in these surveys as in NIDS, echoing the earlier discussion (see table 4). Debts are always below balance sheets totals, but with important fluctuations across surveys. All these limitations justify the need to correct for discrepancies between micro and macro totals. Indeed, the households balance sheets have the advantage of tracking the evolution of wealth consistently, in contrast with surveys which show much greater fluctuations in reported aggregates. By mapping the surveys with macroeconomic statistics, we are at least able to get estimates of the wealth distribution which are consistent with what we know of the level of aggregate wealth and its composition over time, which is what we do in the next section.

4.2 Tax data

The tax data, for purposes of this paper, refers to two data sources - the IRP5 data, and the ITR12 data. The IRP5 forms are income tax forms submitted to the South African Revenue Service (SARS) by employers on behalf of their employees, hence covers incomes related to the employment relationship. Specific variables of interest include gross wages as well as contributions to retirement assets (pension, annuities, etc). The ITR12 forms are self-assessment forms, that require taxpayers to disclose income

[10]There are concerns about whether these surveys are comparable: see for instance Berg and Louw (2005); Leibbrandt, Woolard, and Woolard (2009); Yu (2005); Pauw and Mncube (2007).

Table 5: The coverage of capital income in the tax microdata

	Rental income	Interest income	Dividends
2010	9.5 %	25.4 %	2.4 %
2011	11.7 %	25.0 %	5.3 %
2012	12.3 %	28.3 %	3.9 %
2013	13.4 %	28.8 %	5.2 %
2014	12.1 %	27.8 %	25.1 %
2015	12.3 %	27.8 %	10.6 %
2016	13.7 %	31.0 %	13.1 %
2017	6.9 %	18.3 %	15.8 %

Notes: The table shows the ratio of total income reported in the tax microdata to the corresponding total reported in the national accounts published by the SARB.
Source: authors' computations based on data.

from sources other than employment, so that taxable income can be calculated. Thus, data from this form provides information on business, rental, interest and dividend incomes, which can be capitalised to calculate the asset bases from which the incomes derive. These data sources have been combined into a panel that provides detailed information about all incomes, allowances and deductions (for an overview and discussion of the dataset, see Ebrahim and Axelson 2019).

Due to its administrative nature, this data covers the full tax paying population, including individual observations at the top of the distribution. As it is not a sample, it identifies all individual taxpayers, which greatly increases the granularity of measured income flows. This is an advantage over surveys which often suffer from low sample biases. That being said, there are a number of limitations with tax microdata which should also be emphasised. The fact that the ITR12 forms are self-assessed implies that there may be tax evasion or under-reporting of income flows, especially if the likelihood of being controlled by tax authorities is low. More importantly, tax microdata only covers forms of incomes which are useful for tax collection and deductions purposes, which implies that other forms of non-taxable incomes are not reported in the data. This, as we show below, is particular problematic for the measurement of capital incomes.

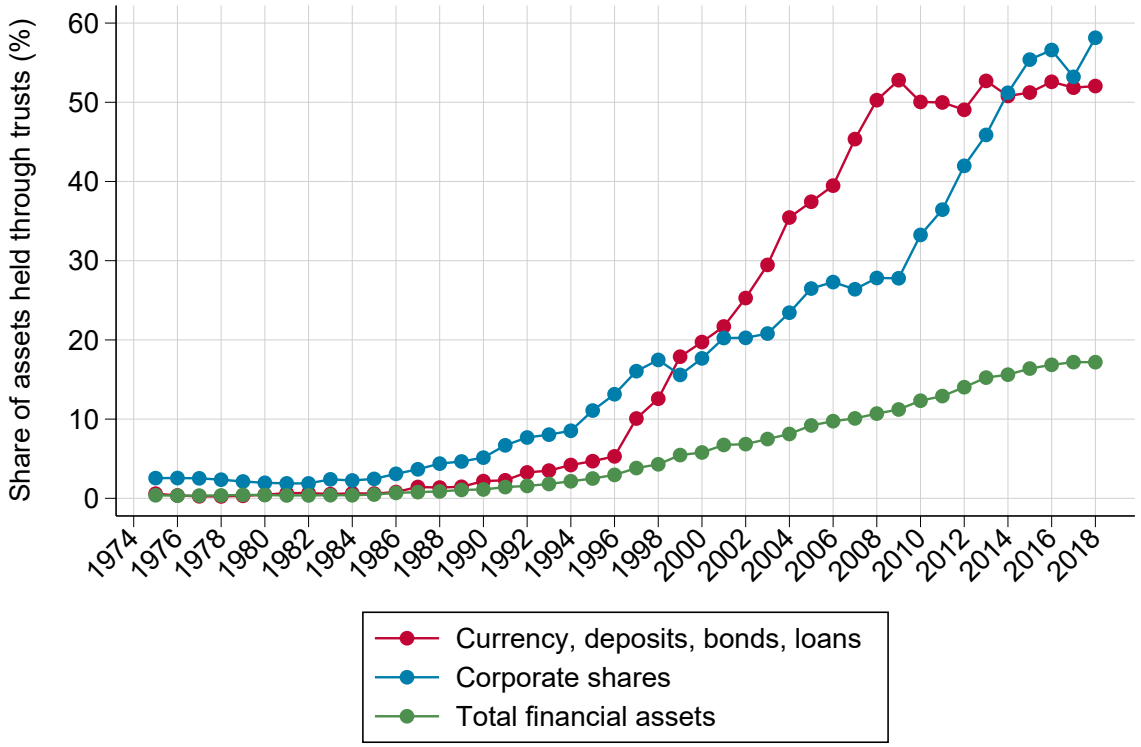
In order to combine the tax data with survey data at the bottom of the distribution and capitalise income flows, we categorise the source codes reported in the tax data into seven broad categories: gross wages, business income, pension contributions, pension income, interest income, rental income and dividends (see appendix table A2).[11] Table 5 shows that when looking specifically at capital incomes in the tax data, the reported totals fall significantly below the national accounts. Interest income is better measured than rental income and dividends, reaching between 25 per cent and 30 per cent of total interest received by households in the national accounts. Rental income and dividends are significantly lower and inconsistent, covering between 2 per cent to 25 per cent of national accounts totals. [12]

This under-representation of capital incomes in the tax data is due to three main factors. First, the taxable incomes are different from incomes reported in the national accounts, due to filing rules and tax base. This is particularly problematic for dividends, which in the ITR12 relate to dividends from equities that form part of compensation packages, such as equity share plans. These sort of dividends are subject to income tax, and so part of this data set, whereas dividends from regular ownership of equity is subject to a separate dividend tax. Approximately 80 per cent of dividend information would

[11]The IRP5 and ITR12 data are presented in the form of source codes corresponding to specific taxable income concepts, exemptions and deductions. See Ebrahim and Axelson (2019) for a more complete discussion.

[12]The particularly low figures obtained in 2017 (fiscal year 2018) are mainly due to the fact that assessment was incomplete at the time of writing.

Figure 2: Share of financial assets held through trusts, 1975-2018



Notes: The figure shows the share of total household assets in the economy held by unit trusts.
Source: authors' compilation based on data from the SARB.

be recorded through this dividend tax returns (DTR01/2 forms), and this information is urgently required to make our estimate more reliable.

Secondly, there may be issues of misreporting of incomes by individual taxpayers. Interest income seems to be poorly covered as a result of incomplete tax filing by taxpayers. In principle, the South African Reserve Bank receives direct information from banks and financial services that they provide about interest. Banks and financial service providers separately supply customers with a tax certificate (IT3(b) certificate), which is meant to inform the interest income declared by the taxpayer. At the same time, the bank sends the South African Revenue Service a third-party submission about incomes its customers' receive. However, given that interest income is typically low relative to total taxable income, it is possible that small interest income received go unreported. The misreporting of rental income received by individual taxpayers is likely to be more significant, given that rental income is self-reported and that there may be a significant amount of informal letting of fixed property. [13]

Finally, the most important issue regarding the coverage of capital incomes in the tax microdata is likely to be due to the definition of the taxpayer. The tax data covers only individuals and does not account forms of capital incomes received through units trusts or investment funds. This is particularly problematic in the case of South Africa, both because wealth is highly concentrated at the top of the distribution and because top wealth groups rely extensively on unit trusts. As shown in figure 2, the share of financial assets held through trusts exploded around the time of, politically, the end of apartheid, and economically, liberalisation and financialisation. Over half of specifically interest bearing and dividend

[13]Notice here that total rental income paid to individuals in the economy is estimated by the authors based on data from the PSLSD, the IES and the GHS surveys on total rental income paid by households to individual landlords. Therefore, this includes informal rents paid, which may explain why the rental income the tax data is so low compared to the macro aggregate.

earnings financial assets are held in trusts. Trusts in South Africa are used more extensively, including housing mutual funds, as well as tax avoidance vehicles, and one mechanism of several to protect against wealth dilation (wealth loss across generations) (Ytterberg and Weller 2010). There is therefore a clear need to access data on trusts to gain clearer estimates of wealth at the top of the distribution, as well as to understand the mechanisms that results in the persistence of wealth concentration. Trusts are required to submit ITR12T forms, this is discussed in the appendix.

5 Bridging the micro-macro gap: the distribution of wealth in South Africa

This section brings together micro and macro data sources on household wealth in South Africa and discusses several main methods available to estimate the distribution of personal assets and liabilities that are harmonised to the national aggregates. We compare the results from what we identify as three broad approaches to measuring wealth inequality: direct measurement of wealth, rescaling of reported wealth, and capitalisation of income flows.

5.1 Methodological approaches: direct measurement, rescaling and capitalisation

For our purpose, it is interesting to compare three different ways of estimating the distribution of household wealth. The first one, henceforth direct measurement, consists in using reported data on the market value of the assets and liabilities of households. In South Africa, the only publicly available data source enabling such measurement for the entire spectrum of household wealth components is the NIDS survey. This approach is likely to suffer from strong under-estimation of wealth inequality due to non-response and under-sampling issues at the top of the distribution. In particular, the direct measurement approach implies that figures are not consistent with macroeconomic statistics, both in terms of levels and composition of household wealth. In the case of the NIDS we showed in section 4 that the direct measurement approach implies overstating the importance of housing assets and understating the significance of non-pension financial assets.

A second way of measuring the distribution of wealth, which we coin as “rescaling" in what follows, consists in assuming that the distribution of recorded wealth components and their correlation is relatively well measured by the household survey, but that it is mainly the average amounts of each component which are understated or overstated. In this case, one can obtain an estimate of the wealth distribution by effectively blowing up individual-level assets and liabilities to match the totals recorded in the national accounts. The core identifying assumption is that individuals overestimate or underestimate the value of the assets and liabilities that they report, but that this misreporting is uncorrelated to rank within each asset class. This approach, as we show below, is problematic in our case because it tends to create a number of outliers, both at the top and at the bottom ends of the distribution. This is in large part because debts are very badly measured in survey data, so that rescaling reported values leads to giving unrealistic levels of debt at the very bottom of the distribution.

A third approach to measuring wealth inequality is the income capitalisation method. This approach consists in using the capital income flows corresponding to the assets and liabilities of households to approximate the distribution of wealth. In practice, this involves multiplying the income flow of a given asset class by the inverse of the rate of return of this type of asset. Just as in the case of rescaling, the capitalisation of income flows has the advantage of leading to figures which are consistent with aggregate household wealth. The identifying assumption in this case is that of constant rates of return by asset class. If the return to a given asset increases with wealth, for instance, then the income capitalisation method will lead to overestimating wealth concentration.

The capitalisation method is only possible for types of assets and liabilities generating income flows. In this paper, we rather propose a “mixed approach" as our preferred methodology to estimate the distribu-

Table 6: Estimating the distribution of personal wealth in South Africa: a mixed approach

Asset / liability	Variable	Measurement method
Non-financial assets		
Owner-occupied dwellings	Value of home (GHS)	Rescaling
Tenant-occupied dwellings	Rental income	Capitalisation
Business assets	Business income	Capitalisation
Financial assets		
Pension assets	Pension contributions and pension income	Mixed method
Life insurance assets	Factor income	Mixed method
Currency, notes and coins	Bank account balance (NIDS)	Rescaling
Bonds and interest deposits	Interest income	Capitalisation
Corporate shares and equity	Dividends	Capitalisation
Liabilities		
Mortgage debt	Reported debt and house value	Mixed method
Other debts	Reported debts and consumption	Mixed method

Notes: The table shows the methodological approach used to estimate distribution of the different assets and liabilities reported in the household balance sheets. Direct measurement corresponds to reported data on the market value of assets or liabilities. Capitalisation corresponds to assuming that the distribution of an asset follows that of one or several corresponding income flows. GHS: General Household Survey. NIDS: National Income Dynamics Survey.
Source: authors' elaboration.

tion of wealth, by combining income capitalisation for available income flows with rescaling when no flow counterpart data is available. As shown in table 6, two types of household assets, owner-occupied dwellings and currency, notes and coins cannot be capitalised and have to be measured directly from available household surveys. We choose to capitalise six types of assets: tenant-occupied dwellings from the rental income received by individual landowners; business assets from the business income received by the business owners of unincorporated entreprises; pension assets from the pension contributions and pension income of formal wage earners and pensioners; life insurance assets from factor income; bonds and interest deposits from interest income; and corporate shares and equity from dividends received.[14]

Mortgage debt and other forms of debts have been recorded consistently in the NIDS and other household surveys, but as we showed in section 2, the coverage of liabilities remains partial and inconsistent. As a result, rescaling debts to balance sheets totals may result in overestimating the number of individuals with negative net worth and extrapolating implausibly high debt values. Instead, we follow a mixed method: we assume that the mortgage debt from the huosehold balance sheet is distributed proportionally to the value of the house of mortgagors in the surveys, and that other forms of debts are distributed proportionally to the consumption of those declaring having contracted debts. These are conservative assumptions, as mortgages and other forms of debt are likely to be more unequally distributed than house values and consumption respectively.

[14]In the case of pension assets, we follow the approach proposed by Saez and Zucman (2016) in allocating them to wage earners and pensioners so as to match their distribution recorded in the NIDS. In our case, we assume that 75 per cent of pension assets belong to formal wage earners proportionally to pension contributions paid, and 25 per cent belong to pensioners proportionally to pension income received. As we show in the appendix (figure A5), this capitalisation technique applied to the NIDS data yields results which are very similar to those obtained from direct measurement. For life insurance assets, we assume that 50% belong to wage earners proportionally to factor income – the sum of wages, self-employment income and pension income – and that 50% belong to all other adults proportionally to factor income. This again reproduces well the distribution of life insurance assets reported in NIDS (see figure A6).

Table 7: Shares of household wealth held by groups in South Africa: survey-based results

	Bottom 50%	Middle 40%	Top 10%	Top 1%	Top 0.1%
Direct measurement					
NIDS, wave 4	-3.3 %	18.4 %	84.9 %	41.3 %	9.7 %
NIDS, wave 5	-0.5 %	16.9 %	83.6 %	40.2 %	8.6 %
Rescaling					
NIDS, wave 4	-8.2 %	10.9 %	97.3 %	58.3 %	24.6 %
NIDS, wave 5	-7.0 %	8.0 %	99.1 %	63.9 %	29.3 %
Mixed approach					
NIDS, wave 4	-4.5 %	14.5 %	90.0 %	58.5 %	25.2 %
NIDS, wave 5	-3.3 %	12.5 %	90.8 %	60.6 %	30.1 %
PSLSD, 1993	-1.3 %	12.0 %	89.3 %	51.7 %	20.6 %
IES, 1995	-5.1 %	15.3 %	89.8 %	50.6 %	23.7 %
IES, 2000	-1.8 %	14.9 %	86.9 %	52.8 %	26.0 %
IES, 2005	-0.2 %	13.6 %	86.6 %	54.2 %	28.6 %
LCS, 2008	-8.0 %	14.0 %	94.0 %	52.3 %	22.4 %
IES, 2010	-7.3 %	14.8 %	92.4 %	60.0 %	31.7 %
LCS, 2015	-3.2 %	14.0 %	89.2 %	51.1 %	20.0 %

Notes: The table compares estimates of the share of household wealth owned by the bottom 50 per cent (p0p50), the middle 40 per cent (p50p90), the top 10 per cent (p90p100), the top 1 per cent (p99p100 and the top 0.1 per cent (p99.9p100) obtained from household surveys using different methodological approaches. The unit of observation is the individual adult aged 20 or above. PSLSD: Project for Statistics on Living Standards and Development. IES: Income and Expenditure Survey. LCS: Living Conditions Survey. NIDS: National Income Dynamics Study.
Source: authors' computations based on data.

5.2 Measuring wealth inequality using survey data

We start by looking at the distribution of personal wealth estimated from survey data. For all the following results, we take the individual adult aged 20 or above as the unit of analysis.[15] Table 7 compares estimates of the share of wealth held by the bottom 50 per cent (p0p50), the middle 40 per cent (p50p90), the top 10 per cent (p90p100), the top 1 per cent (p99p100) and the top 0.1 per cent (p99.9p100) obtained from direct measurement, rescaling and the mixed approach. The NIDS survey is the only survey collecting direct data on wealth and thus for which the results from the three methodologies can be compared. Other household surveys collect data on the value of owner-occupied housing and household debts, so they can be used to estimate the wealth distribution with the mixed approach.[16]

The first result which clearly stands out is that all approaches converge in revealing an extreme degree of wealth concentration. Regardless of the methodology, the bottom 50 per cent of the South African adult population is consistently negative, while the top 10 per cent is higher than 80 per cent in all surveys and

[15]We therefore provide "individual" wealth inequality series rather than series where wealth is divided among spouses (narrow equal-split), among adult household members (broad equal-split) or among both children and adult household members (per capita). The main motivation is that the tax microdata is only available at the individual level, so that applying equivalence scales to the survey data but not to the tax data would imply that the results are not comparable. Notice however that there are wealth components which are only measured at the household level – namely owner-occupied housing wealth, mortgage debt and non-mortgage debt. We split equally these components among adult members of the household. This is far from being a perfect solution, but overall wealth inequality is only moderately affected by changes in units of observation, especially at the top of the distribution. We report in the appendix (figure A9) how changes in equivalence scales affect survey-based top and bottom wealth shares.

[16]The PSLSD, IES and LCS surveys did not collect data on currency and non-interest deposits, so we impute their value from the NIDS by assuming that their distribution has remained constant, both in terms of overall concentration and conditionally to post-tax income. Given the small share of currency and non-interest deposits in aggregate wealth, this imputation does not affect our results. Also notice that the data on owner-occupied housing wealth in the IES and LCS surveys is very erratic, so we keep the rank of housing wealth reported in these surveys but force its distribution to match that observed in the GHS between 2002 and 2018.

Table 8: Shares of household wealth held by groups in South Africa: results from tax microdata and survey combined

	Bottom 50%	Middle 40%	Top 10%	Top 1%	Top 0.1%
2010	-6.8 %	16.6 %	90.2 %	57.3 %	30.0 %
2011	-6.4 %	16.7 %	89.8 %	57.0 %	29.3 %
2012	-5.3 %	16.5 %	88.9 %	57.2 %	33.5 %
2013	-4.0 %	16.0 %	87.9 %	56.3 %	32.1 %
2014	-3.0 %	16.2 %	86.8 %	54.5 %	29.9 %
2015	-2.9 %	16.0 %	86.9 %	55.0 %	29.2 %
2016	-2.9 %	16.2 %	86.7 %	53.5 %	27.5 %
2017	-2.5 %	16.9 %	85.6 %	54.7 %	29.8 %

Notes: The table shows estimates of the share of household wealth owned by the bottom 50 per cent (p0p50), the middle 40 per cent (p50p90), the top 10 per cent (p90p100), the top 1 per cent (p99p100 and the top 0.1 per cent (p99.9p100) obtained from the income capitalisation method combining surveys and tax microdata. The unit of observation is the individual adult aged 20 or above.
Source: authors' computations based on data.

methods. According to these results, wealth inequality in South Africa appears to be substantially larger than in any other country for which relatively reliable data is available (see below).

The second result is that there are some important differences in the results obtained from the three different approaches, especially at the top of the distribution. Direct measurement in the NIDS implies a top 0.1 per cent share below 10 per cent, more than twice lower than most of the results obtained from rescaling or the mixed approach. This is mainly due to the very poor coverage of other financial assets in the NIDS, which are particularly concentrated at the top end of the wealth distribution. Rescaling financial assets to balance sheets totals or capitalising income flows corrects for this micro-macro discrepancy. Rescaling the value of assets and liabilities increases wealth inequality significantly compared to the mixed approach. This is mainly due to the fact that blowing up debts to balance sheets totals creates a large number of households with strongly negative net worth (the bottom 50 per cent goes down by several percentage points). Finally, it is interesting to note that the mixed approach yields relatively close results across years and data sources: the top 10 per cent share lies between 85 per cent and 90 per cent and the top 1 per cent is estimated to be between 50 per cent and 60 per cent in most cases. This suggests that despite the fact that these households surveys were conducted using different sampling methods and questionnaires, capitalising reported income flows remains somehow an efficient method to broadly capture the structure of wealth concentration in South Africa. Yet, all these surveys are likely to suffer from misreporting or non-response, which implies a misrepresentation of income and wealth inequality at the top end.

5.3 Measuring wealth inequality using tax data

We now turn to the estimation of the distribution of wealth obtained by combining surveys and tax data. As explained in section 4, tax microdata has the advantage of both better covering capital income flows and capturing with a greater degree of precision the levels and composition of incomes at the top end of the distribution. As a result, one may expect that our mixed method will lead to higher measured wealth inequality levels as compared to the capitalisation of income flows in household surveys. That being said, the important limitations of the tax data itself discussed above do prevent us from considering the tax-based estimates presented below as satisfactory.

Income tax data in South Africa does not cover the full adult population: the matched IRP5-ITR12 panel only covers between 40 per cent and 42 per cent of adults over the 2010-2017 period. In order to get a reliable estimate of wealth inequality, we combine the tax data with household surveys in two steps. In a first step, we derive an income concept which is comparable between the two sources, which we

name “merging income", defined as the sum of gross wages, self-employment income, rental income, interest income and private pension income. We then merge the two data sources based on the exact rank of “merging income“ observed at the individual level. In a second step, we identify the quantile of the South African income distribution q starting from which reported merging incomes are higher in the tax data than in the survey data, and we assume that the tax data is more reliable than the survey data only above q. In practice, this implies keeping all variables from the survey data below q, and replacing all comparable variables from the tax data above q – namely wages, self-employment income, rental income, interest, dividends, private pension income, and contributions to pension funds. Between 2010 and 2017, we find q to be consistently located between the 70^{th} and the 75^{th} percentiles (see appendix figures A7 and A8).[17]

Table 8 shows the results obtained from combining the surveys and tax data and applying the mixed approach. Wealth inequality appears to be relatively similar when measured by combining surveys with tax data than when measured solely from the surveys available in similar years (the NIDS, the IES 2010 and the LCS 2015). The top 10 per cent wealth share stands at between 86 per cent and 90 per cent over the 2010-2017 period. The top 0.1 per cent share exceeds 30 per cent, compared to 20 per cent to 30 per cent in household surveys. This is a relatively surprising result, as one would expect the under-representation of top incomes in surveys to imply significantly lower levels of wealth concentration. A careful look at the particular structure of capital income concentration in South Africa can help solve this apparent paradox. The relative consistency between the two sources is mainly due to the fact that both in the surveys and the tax data, financial incomes (interest, dividends and rental income) are extremely concentrated, so that both sources imply attributing a substantial share of wealth – and in particular of tenant-occupied housing, bonds and shares – to the top 0.1 per cent of the distribution. [18] Thus the benefit of tax data in providing more reliability of estimates of wealth at the top end is undermined by the lack of data on capital incomes.

6 The distribution of wealth in South Africa: key results and comparative perspectives

We now present some key figures on the levels, evolution and structure of wealth inequality in South Africa. Our preferred estimate of the wealth distribution is the one obtained from combining household surveys with the tax microdata and applying the mixed method. For the years preceding 2010, we use household surveys to estimate wealth inequality using the mixed method, and we assume that the under-representation of top wealth groups is similar to that observed during the 2010-2017 period. Finally, we combine the PSLSD, the IES and the LCS with labour force surveys to have a more consistent estimate of wage inequality and business income inequality – and therefore of pension and business assets –, as well as to have yearly estimates over the entire 1993-2018 period. We explain the methodology used to combine these various data sources in the appendix. We stress again that none of the results presented

[17]Our choice of a merging point based on an income concept differs slightly from the approach of Hundenborn, Woolard, and Jellema (2018), who rather derive a taxable income concept from survey data, and then keep the tax data above the filing threshold of taxable income. The main reason for merging our two datasets based on a broad income concept is twofold. First, our IRP5-ITR12 panel covers a large number of individuals who are below the filing threshold, given that all employers in South Africa are now required to file an IRP5 tax form for all their employees, regardless of their level of remuneration. However, as is emphasised in the SARS' Tax Statistics, this rule was not followed strictly by all employers, so that the tax data cannot be considered to be representative of the universe of formal wage earners. In other words, our data covers relatively well the top of the distribution up to a certain point, below which it contains a mix of low- and middle-income wage earners. It seems therefore most useful to keep as many individuals as possible from the tax data, while removing those whose location in the distribution of income cannot be identified precisely, which is what our method does in a simple way. Secondly, defining taxable income remains a complex task, and it remains unclear whether this can be done with a sufficient level of precision and consistency, in particular given that surveys tend to not properly capture the top of the distribution.

[18]According to our matched survey-tax dataset, about half of rental income and 60 per cent of interest income were received by 0.1 per cent of the South African population in 2017.

Table 9: The distribution of personal wealth in South Africa in 2017

	Number of adults	Wealth threshold	Average (2018 R)	Average (2018 PPP $)	Wealth Share
Full population	35,400,000		R 326,000	$ 52,200	100%
Bottom 90% (p0p90)	31,860,000		R 94,100	$ 15,100	14.4%
Bottom 50% (p0p50)	17,700,000		R -16,000	$ -2,600	-2.5%
Middle 40% (p50p90)	14,160,000	R 27,700	R 138,000	$ 22,000	16.9%
Top 10% (p90p100)	3,540,000	R 496,000	R 2,790,000	$ 447,000	85.6%
Top 1% (p99p100)	354,000	R 3,820,000	R 17,830,000	$ 2,860,000	54.7%
Top 0.1% (p99.9p100)	35,400	R 30,350,000	R 96,970,000	$ 15,540,000	29.8%
Top 0.01% (p99.99p100)	3,540	R 146,890,000	R 486,200,000	$ 77,920,000	14.9%

Notes: The table shows the distribution of household wealth in South Africa in 2017. The unit of observation is the individual adult aged 20 or above. Wealth thresholds are in 2018 Rands.
Source: authors' computations based on data.

below are fully satisfactory given the lack of proper data available to measure the distribution of wealth and in particular of financial assets in South Africa (see sections 3 and 4).

The distribution of wealth in South Africa in 2017

Table 9 provides information on the number of adults, the entry thresholds, the average wealth and the share of wealth of various groups of the wealth distribution in 2017. Average wealth per adult in South Africa amounts to about 326,000 rands, or 52,200 dollars at purchasing power parity. This is three times higher than the national income per adult, which stands at about 110,000 rands (18,000 dollars) per year or 9200 rands (1450 dollars) per month.

Average wealth varies hugely across the distribution. The bottom 50 per cent of the South African population have negative net worth: the levels of the debts that they owe exceeds the market value of the assets they own. The middle 40 per cent of the distribution – individuals located between the median and the 90^{th} percentile – have a net worth more than twice lower than the average wealth per adult. Together, the bottom 90 per cent of the South African population own about 14 per cent of total personal wealth in the economy, while the remaining 86 per cent belong to the top decile. The average wealth of the bottom 90 per cent of the population is about four times lower than the national average, while the top 10 per cent has an average wealth about nine times higher than the average wealth per adult.

Ownership is not only polarised between top and bottom wealth groups, it is also extremely concentrated within the top 10 per cent. The top 1 per cent of the South African adult population (350,000 individuals) own 55 per cent of aggregate personal wealth, and the top 0.1 per cent alone (35,000 individuals) own almost a third of wealth. The top 0.01 per cent of the distribution, amounting to some 3,500 individuals, own about 15% of household wealth, greater than the share of wealth owned by the bottom 90 per cent of the population consisting of 32 million individuals. They have an average wealth which is more than 1500 times that of the average South African adult, and 6000 times that of the bottom 90 per cent.

The composition of personal wealth across the distribution

The extreme degree of wealth inequality that we observe is in large part driven by the relative exclusion of poorer wealth groups from any form of wealth accumulation, and by the concentration of all forms of assets at the top end of the distribution. Table 10 provides some insights into this polarisation by showing the share of different types of assets held by wealth groups across the distribution. The top 10 per cent own more than 55 per cent of all forms of assets, including pension assets, housing wealth, business assets and currency, notes and coins. They own more than 99 per cent of all bonds and stock held in the economy. The top 1 per cent alone holds more than a tenth of all forms of assets and as much as 90 per cent of bonds and corporate shares. Currency and housing wealth are the least concentrated

Table 10: Share of total assets held by wealth group by asset class, 2017

	Currency	Business assets	Housing	Pensions / life insurance	Bonds & Stock
Bottom 90% (p0p90)	37.3%	40.4%	41.2%	36.2%	0.2%
Bottom 50% (p0p50)	9.7%	1.4%	14.0%	5.3%	0.0%
Middle 40% (p50p90)	27.7%	39.1%	27.2%	30.9%	0.2%
Top 10% (p90p100)	62.7%	59.6%	58.8%	63.8%	99.8%
Top 1% (p99p100)	10.6%	41.9%	27.8%	14.1%	95.2%
Top 0.01% (p99.99p100)	1.5%	13.4%	8.5%	2.1%	62.7%
% of total assets	0.6%	3.6%	28.8%	32.5%	34.6%

Notes: The table shows the shares of different types of assets held by specific wealth groups in 2017. The unit of observation is the individual adult aged 20 or above. In 2017, the top 1 per cent of South Africans in terms of net worth owned 95 per cent of the bonds and corporate shares in the economy. Bonds and shares represented 34.1 per cent of total household assets in the economy at this date. Figures may not add up due to rounding.
Source: authors' computations based on data.

form of wealth, but low wealth groups only possess a small share of them: the bottom 50 per cent of the wealth distribution own about 10 per cent of currency, notes and coins, and less than 15 per cent of housing assets.

Figure 3 gives another view of the link between forms of asset and wealth inequality by showing the portfolio composition of percentiles in the wealth distribution. Currency, notes and coins are the main form of assets held by poorest South African adults, while owner-occupied housing, pensions and life insurance form the majority of assets for most remaining income groups within the bottom 90 per cent. Business assets represent a small share of portfolios for the upper-middle class. Bonds and stock, finally, represent a large share of wealth for the top 1 per cent and the bulk of assets of wealth groups within the top 0.1 per cent.

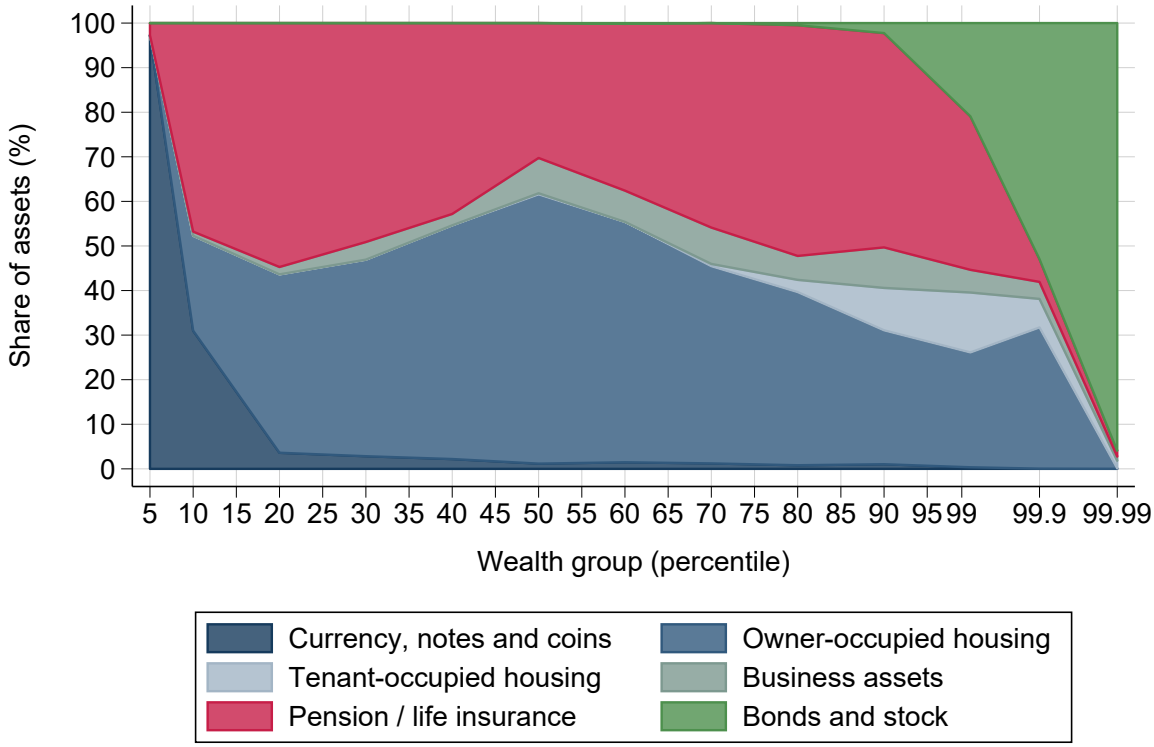
Wealth and age[19]

How does wealth change during the life cycle, and to what extent wealth accumulation and reduction throughout the lifetime account for wealth inequalities? Figure 4 shows a stable relationship between age and average wealth over the 2012-2017 period. Average net worth rises significantly and linearly between ages 20 and 55: individuals aged between 20 and 25 have an average net worth lower than 25 per cent of the national average, while those aged between 50 and 55 are between 50 per cent and two times wealthier than the average adult. Average wealth then stabilises between ages 50 and 65 and decreases slightly for older individuals, but still remains more than 50 per cent higher than the national average for individuals older than 75. Interestingly, this pattern is almost perfectly similar to that found in the case of France (see Garbinti et al. 2017, figure 5).

While average wealth does vary significantly across age groups, age does not explain the observed levels of wealth concentration. Top wealth shares are almost perfectly similar within each age group than in South Africa as a whole: the share of wealth held by the top 10 per cent exceeds 85 per cent, and the top 1 per cent share is higher than 55 per cent, whether one restricts the analysis to those aged between 20 and 39, between 40 and 59, or older than 60 (figure 5). This apparent paradox can be better understood when directly comparing differences across age groups to differences across wealth groups in the distribution. The average wealth of those aged 20 to 25 was about 6.5 times lower than that of those aged 75 or above in 2017. In comparison, the average wealth of the top 10 per cent was about 30 times higher than the average net worth of the bottom 90 per cent of the distribution. Our results therefore point to inequalities in access to wealth accumulation across the life cycle – via income inequality, debt and savings patterns

[19]There are other important categories to investigate in the context of wealth inequality in South Africa. Although the tax data is more complete, it has less covariates than the surveys, therefore, given our methodology, we are restricting our decomposition to age. We leave gender, race and other related categories for future work.

Figure 3: The composition of assets by wealth group in 2017



Notes: The figure shows the composition of assets of various groups in the distribution of household assets in South Africa in 2017. The unit of observation is the adult aged 20 or above. The results come the harmonised survey data file, and wealth is split equally among adult members of the household, except for the top 1 per cent and above for which the individual data built from the combined survey and tax microdata are used.

Source: authors' computations based on data.

– as well as inequalities in access to inheritance as being the primary drivers of the high levels of wealth concentration observed in South Africa.[20]

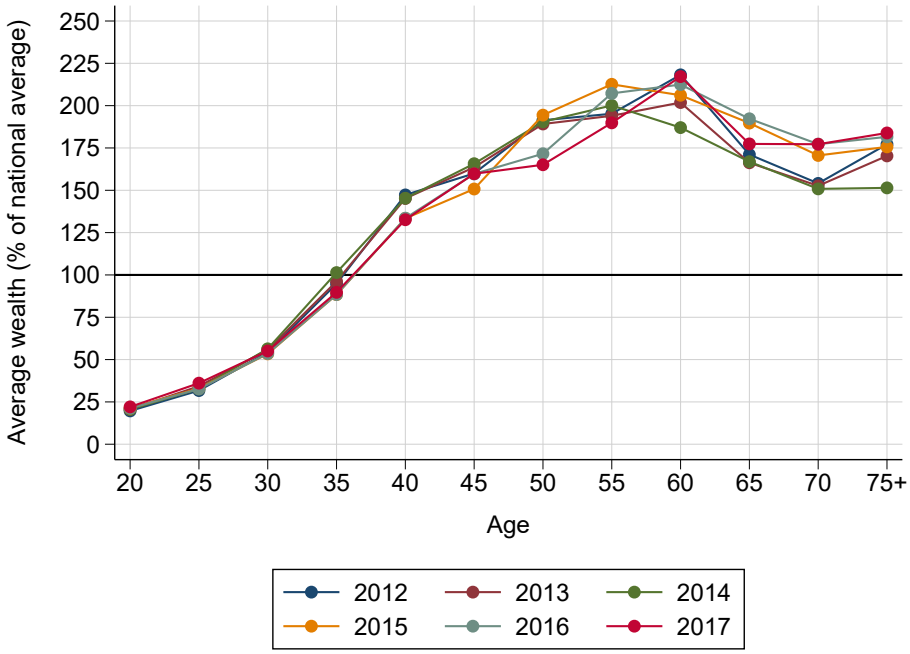
Long-run trends and comparative perspectives

We conclude this paper by bringing together our South African wealth inequality series with comparable data on other countries. For all the countries outlined below, corresponding studies followed the Distributional National Accounts methodology by combining all available micro and macro data sources to distribute household wealth (see Alvaredo et al. 2016). They are therefore directly comparable to our estimates. Figure 6 plots the evolution of the share of wealth accruing to the top 10 per cent in South Africa, China, Russia, India and the United States.[21] The top 10 per cent wealth share has risen in all

[20]Notice that the estimates presented here correspond to individual series, rather than to "equal-split" series where wealth would be split equally among household adult members. In practice, splitting wealth among household members would imply redistributing wealth to younger individuals, thereby making the wealth-age profile less steep. If anything, this reinforces our argument that age is not a primary determinant of wealth inequality in South Africa.

[21]Notice that the wealth shares presented here for South Africa are based on individualisation of assets, given the difficulty to split wealth equally among household members or spouses after combining surveys and tax data. In the capitalised survey series, moving from individual series to broad equal-split series decreases slightly the top 10 per cent share by 4-5 percentage points, and has a more limited effect on top 1 per cent and top 0.1 per cent wealth groups (see figure A9). This implies that our series are not perfectly comparable to that of other countries, which generally split wealth equally among spouses (narrow equal-split). From available evidence on the differences between individual, broad equal-split and narrow equal-split series, we can except top shares in narrow equal-split series for South Africa to be lying between the broad equal-split and the individual-based results, so the top 10 per cent share would be lower by between 1 and 3 percentage points (see Blanchet, Chancel, and

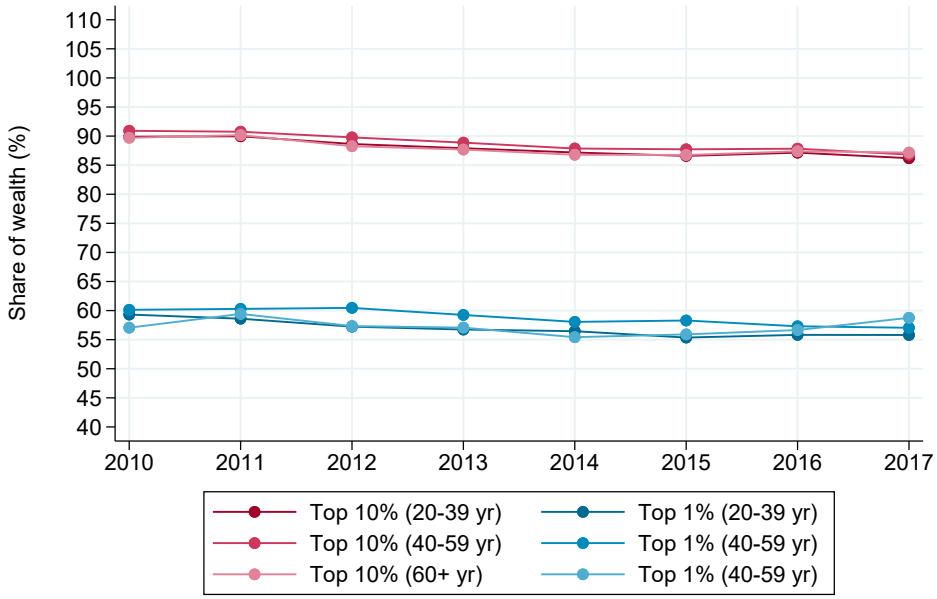
Figure 4: Average wealth by age relative to average wealth per adult, 2010-2017



Notes: The figure shows the mean net worth of South African adults by age group relative to the national average. The unit of observation is the individual adult aged 20 or above.

Source: authors' computations based on data.

Figure 5: Wealth inequality within age groups, 2010-2017



Notes: The figure shows top 10 per cent wealth share and the top 1 per cent wealth share estimated when splitting the South African population into three age groups (20-39 years old, 40-59 years old, and 60+ years old). The unit of observation is the individual adult aged 20 or above.

Source: authors' computations based on data.

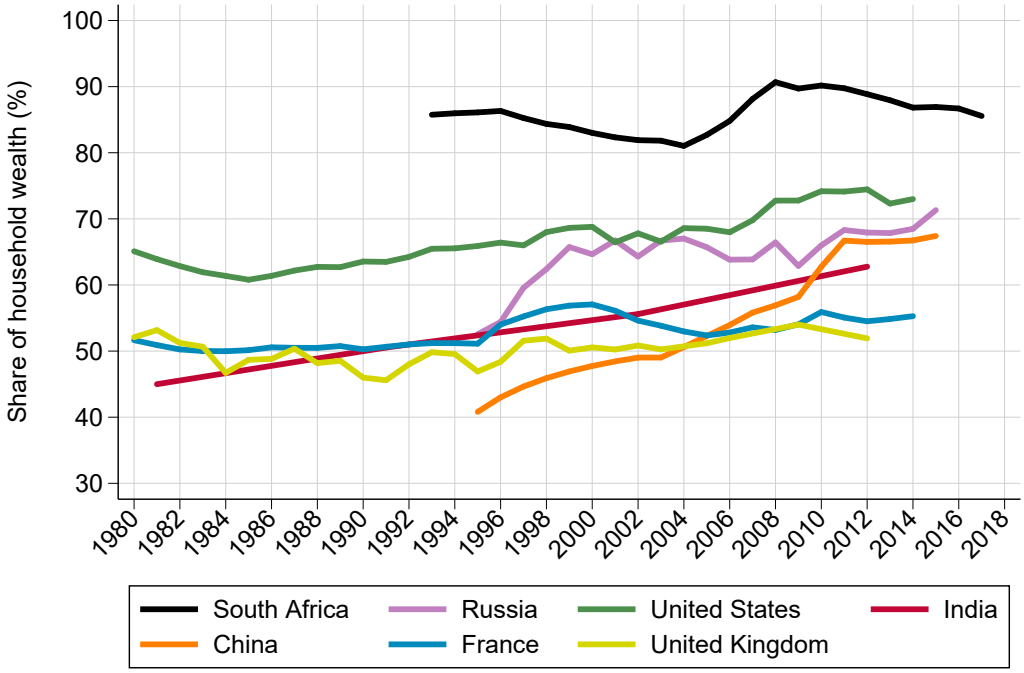
these countries, while in the long run it has remained more stable in South Africa, increasing between 2005 and 2010 but gradually moving back to its level of the early 2000s since then. Wealth concentration has remained substantially higher in South Africa since the beginning of the 1990s than in any other country for which comparable data is available. The South African top 10 per cent wealth share has fluctuated between 80 per cent and 90 per cent during the 1993-2018 period, while it has remained below 75 per cent in the US, 70 per cent in Russia and China, 65 per cent in India and 55 per cent in France or the United Kingdom. The same result holds for the top end of the distribution: the top 1 per cent wealth share was 55 per cent in South Africa in 2017, compared to 43 per cent in Russia, 39 per cent in the United States, 31 per cent in India, 30 per cent in China and less than 25 per cent in France and the UK (figure 7).

In terms of trends, our results suggest that wealth inequalities in South Africa have remained stable at very high levels since 1993. Two facts are however worth noticing. First, wealth concentration seems to have rapidly increased between 2005 and 2008 before slowly coming back to its long-run level between 2009 and 2017. This short-run dynamic was in large part due to the strong fall in the bottom 90 per cent share driven by the boom and bust in mortgage advances in the 2000s, which temporarily drove a higher share of households into negative net worth. Between 2004 and 2008, in particular, mortgage debt increased from 9 per cent of net household wealth to almost 15 per cent, and decreased back to 9 per cent in 2018 (see figure A4). This temporary fall in bottom wealth shares driven by expanding debts mirrors that observed in the US at about the same period (figure A3). In the appendix, we discuss in greater detail the importance of household debt in South Africa and how it explains why bottom wealth shares have remained significantly negative throughout our period of interest. We also show that the concentration of household assets has remained remarkably constant (i.e. excluding debts from the analysis removes virtually all fluctuations across the period): the top 10 per cent share of assets has remained at about 80 per cent between 1993 and 2018 (see appendix figure A13).

A second result which appears from our long-run series is that while the top 10 per cent share has remained broadly stable, there seems to have been a slight increase in inequality within the top 10 per cent. Between 1993 and 2017, the top 1 per cent share increased from 54 per cent to 57 per cent and the top 0.1 per cent share from 22 per cent to 31 per cent (figure A2). This is likely to be due to two factors: the increase in the share of non-pension financial assets from 19 per cent to 24 per cent of net household wealth between 1992 and 2018, and the increase in wage inequality in South Africa during this period – which indirectly affected the distribution of pension assets. That being said, we should stress that the low quality and the important issues regarding the comparability of the household surveys conducted during this period do not allow us to conclude to an increase in wealth inequality with a high degree of certainty. The best we can say with a certain level of confidence is that there is no evidence that wealth inequality in South Africa has decreased since the end of apartheid, and that South Africa remains significantly more unequal than any emerging or developed country for which good-quality data on the distribution of wealth is available throughout the world.

Gethin 2019, for a longer discussion of the impact of different equivalence scales on inequality). Changing equivalence scale will therefore have no consequence on our main conclusions.

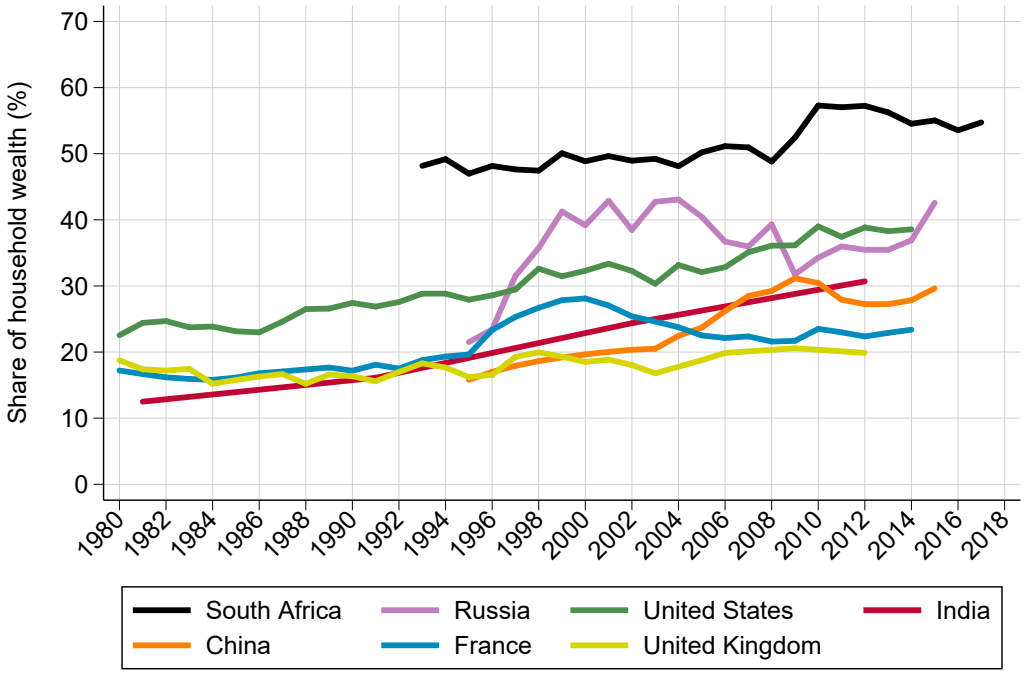
Figure 6: South African wealth inequality in comparative perspective: Top 10 per cent wealth share



Notes: The figure compares the top 10 per cent wealth share in South Africa to that of other countries. The unit of observation is the individual adult aged 20 or above. Wealth is individualised (South Africa) or split equally among adult household members (other countries).

Source: authors' computations based on data for South Africa; World Inequality Database (http://wid.world) for other countries.

Figure 7: South African wealth inequality in comparative perspective: Top 1 per cent wealth share



Notes: The figure compares the top 1 per cent wealth share in South Africa to that of other countries. The unit of observation is the individual adult aged 20 or above. Wealth is individualised (South Africa) or split equally among adult household members (other countries).

Source: authors' computations based on data for South Africa; World Inequality Database (http://wid.world) for other countries.

7 Conclusion

This paper presented a first attempt to systematically compare income and wealth reported in surveys and tax data to official macroeconomic statistics in South Africa, and to assess several methods to correct the micro-macro gap in the measurement of households' net worth. Our analysis has revealed two main findings.

Firstly, the data sources available to measure wealth in South Africa remain largely unsatisfactory. Reported housing wealth is substantially higher in household surveys than in balance sheets statistics, while most surveys cover very poorly business assets, financial assets and household debts. More importantly, two major limitations will have to be addressed in future research: the absence of any reliable source of the distribution of dividends received by households, and the lack of distributional data on the wealth held through unit trusts, which represents a substantial part of the net worth of top end groups in recent years. While such data exist – through the trust forms and dividends tax forms reported by taxpayers to the South African Revenue Service –, they have unfortunately not yet been made available to academic researchers. Access to such data will be crucial to understand not only the distribution of wealth, but also the processes by which wealth gets accumulated, transmitted and redistributed in the economy.

Secondly, all data sources do suggest that wealth inequality in South Africa is the highest among all countries for which data is available. The top 10 per cent own more than 85 per cent of wealth, and the top 0.1 per cent at least 25 per cent. Drawing on household surveys, we find no evidence that wealth concentration has decreased since apartheid. This finding calls for further research on the dynamics of asset transmission and on the factors accounting for the persistence of wealth inequality in the post-apartheid era.

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Appendix

Estimation of the share of tenant-occupied housing in total housing assets

In order to be able to use the income capitalization method to estimate the distribution of tenant-occupied housing, we need to decompose aggregate housing wealth between tenant-occupied and owner-occupied housing. The Reserve Bank household balance sheets do not provide this decomposition, so we derive it using survey data. To the best of our knowledge, the only available surveys collecting information on housing values for both tenants and owner-occupiers are the IES and LCS (1995, 2005, 2008, 2010) as well as the GHS since 2008. These surveys suggest that the share of tenant-occupied housing assets in total housing assets amounts to about 20 per cent in recent years, down from some 25 per cent in 1995.

Notice however that we are considering all housing assets, including those owned by the government, corporations and other institutions in the denominator, as well as houses which are rented for free. In order to reach an aggregate closer to households' housing assets, we exclude tenants living in their dwelling without paying rents, as well as those declaring that they are renting from entities other than individuals. This leaves us with a clear distinction between tenants paying income to individual landlords, and formal owners of their houses, which is the concept we are interested in. This decomposition only exists in the GHS from 2013 onwards. The results show a decrease in owner-occupied housing wealth from above 75 per cent in 2008 to 71 per cent in 2013. We extrapolate this share to earlier years and apply it to the total reported in the households' balance sheets.

Harmonisation of household survey data, 1993-2018

Broadly speaking, two main types of nationally representative surveys covering the distribution of income and wealth have been conducted in South Africa since 1993: surveys covering all main types of income sources (such as wages, self-employment income, rental income, interest or pension income) and labour force surveys covering only wages and self-employment income. The first type of survey includes the 1993 Project for Statistics on Living Standards and Development (PSLSD); the Income Expenditure Surveys (IES) conducted in 1995, 2000, 2005, 2010; the Living Conditions Surveys (LCS) conducted in 2008 and 2015; and the National Income Dynamics Study (NIDS) conducted five times between 2008 and 2017. Labour force surveys include the October Household Surveys (OHS) conducted once a year between 1994 and 1999; the Labour Force Surveys (LFS) conducted twice a year between 2000 and 2007; and the Quarterly Labour Force Surveys (QLFS) conducted every three months since 2008.

In order to get yearly estimates of the wealth distribution between 1993 and 2018, we build a harmonised survey microfile by combining all these surveys in two steps. In a first step, we combine income surveys in the following way: for a given year y, we append the two surveys available in surrounding years and reweigh the data to give a weight to each survey which is proportional to the distance from the year considered. For 1997, for instance, we combine the 1995 IES survey and the 2000 IES survey, and we multiply the weights by 1/2 for the former and 1/3 for the latter. This is similar to an interpolation strategy: it corresponds to considering that in 1997 the distribution of income was somewhere between that of 1995 and that of 2000, and was closer to that of 1995 if inequality evolved linearly. Given issues of comparability in income variables and sampling methods, we rely solely on the PSLSD, the IES and the LCS and we do not incorporate the NIDS into our harmonised file.

In a second step, we take advantage of the fact that while income surveys do provide information on the distribution of wages and self-employment income, labour force surveys are a superior source of data and are available on yearly basis. We therefore rank income surveys according to wages and self-employment income and force the distribution of these two variables in these surveys to match that ob-

served in the LFS or QLFS during the corresponding years by rescaling average incomes by rank.[22] Finally, we extract yearly data on the distribution of the South African population by age, gender, province and population groups from the PALMS dataset and use simple linear calibration to calibrate the survey weights on the distribution of these sociodemographic variables.

Negative net worth and the measurement of household wealth at the bottom end

Household debts are among the most difficult components of personal wealth to estimate, in part due to the difficulty for survey respondents to properly assess their remaining debt balances. As we showed in table 4, the coverage of debt is very erratic in South African surveys, who cover from 14% to 87% of mortgage debt, and from 17% to 57% of other forms of debt. These difficulties are not specific to South Africa: in France, for instance, Garbinti et al. (2017) choose to set negative net wealth values to zero, given the unavailability of proper information on the net worth of poorest households. Other recent comparable studies on India (Bharti 2018), China (Piketty, Yang, and Zucman 2019), Russia (Novokmet, Piketty, and Zucman 2018) or the United States (Saez and Zucman 2016) have generally found negative net worth to be restricted to the bottom 5% or 10% of the population, with the exception of the United States where households are highly leveraged.

In South Africa, in spite of the lack of high-quality data, there is considerable evidence that a substantial share of households have either zero or negative net worth. The National Income Dynamics Survey, for instance, asks specifically to adults: "Suppose you (and your household members living here) were to sell off everything that you have (including your home and vehicles), cash in your investments and pay all your debts – would you have money left over, breakeven or be in debt?" In 2017, 50% of households declared they would have something left over, 24% declared they would more or less break even, and 4% declared that they would still be in debt. The remaining 22% declared not knowing whether they would still have something left, which is a relatively clear indication of net wealth being very close to zero. Notice in particular that this question includes household durables, which are excluded from our SNA definitions of household wealth, so that the share of negative-net-worth households is clearly underestimated in this question. In any case, the evidence is suggestive of a substantial share of the population (at least between 30% and 50%) having either negative wealth, or wealth very close to zero.

Other evidence points to the concentration of debts among the bottom of the wealth distribution, and the lack of assets covering these debts. According to the 2019 Eighty 20 and XDS Credit Stress Report, the number of unsecured credit products – that is, debt which is not backed by any form of asset – far outweighed those holding secured accounts (Eighty 20 and XDS 2019). In terms of values, unsecured debts amounted to 28% of total consumer credit products in South Africa in the third quarter of 2019. At the same period, the default rate was as high as 20% among consumers aged 18 to 24. These figures clearly indicate that a very large share of the South African population is highly leveraged, contracting consumer credits with no corresponding assets to back them – which means that they are by definition in negative net worth.

Our benchmark method for allocating debt to households is to rely on the share of households declaring debt and on a proxy variable of ability to pay rather than on direct measurement of debt balances. This avoids having too many households with unsustainable debt levels, while at the same time allowing us to fully close the micro-macro gap and distribute all debts recorded in households' balance sheets. For mortgages, we rely on the reported market value of the house, which is arguably a reasonable proxy for the average size of the mortgage balance across the wealth distribution. This method is comparable to that used by Saez and Zucman (2016), who distribute US mortgages proportionally to reported mortgage

[22]Due to difficulties in creating consistent inequality series from the OHS, especially regarding self-employment income, we choose to not exploit this data source and keep the PSLSD 1993 and the IES 1995 as our only survey data sources for the 1990s.

payments. For other debts, given the lack of other data, we rely on consumption, which is less unequally distributed than incomes and therefore evens out debts across the wealth distribution. After splitting wealth equally among adult members of the household, our estimates imply that that 10% of the adult population has negative net worth; the entry thresholds for the next deciles are R 0, R 1700, R 10,000 and R 18,000. Median wealth amounts to R 30,000 (about 4800 dollars at purchasing power parity, or about a quarter of the average national income per adult). These low levels are consistent with the descriptive evidence above suggesting that some 30% to 50% of South Africans have close to zero wealth. In any case, as we show in figure A13, top wealth shares are only moderately affected by the exclusion of debts from our framework: assets are extremely concentrated, with the top 10% owning 80% of the total.

That being said, it is important to note that durable goods are not included in the SNA definition of wealth, but that debts associated to the purchase of durable goods are. Given the importance of consumer credits and their use to buy cars or furniture among poorer households in South Africa, this may explain in large part why wealth is so negative at the bottom of the distribution. Whether durable goods should be included in wealth or not is a subject of debate. On the one hand, one might argue that the goods purchased with household debt should be included in households' net worth for consistency with individuals' experiences of what they own. On the other hand, debts are a form of stock generating an income flow, while consumer durables are not - they are consumed in a relatively short time, or depreciate at a comparatively high rate, and they do not generally generate any income flow -, so that one could argue that all consumer credits should be included in net worth, while consumer durables should not. Finally, let us also stress that survey data does not allow us to capture other forms of collective ownership – such as rights to land or cattle, which are particularly important in rural areas, both economically and symbolically – as surveys are restricted to wealth held at the household level. The inclusion of these components in household wealth can also be debated and should in any case be the subject of future research.

Extrapolation of tax data series back to 1993

Our wealth inequality series based on tax data cover the 2011-2017 period, while we can go back to 1993 by capitalising the income flows reported in household surveys. Series based on tax data typically show slightly higher levels of wealth concentration, so one meaningful way to extrapolate the tax data series back to 1993 is to assume that the underrepresentation of top wealth groups in surveys has remained constant before 2011.

We correct the survey series before 2011 by following the methodology developed by Blanchet et al. (2019) to correct a distribution based on observed relationships between quantile functions covering different concepts and data sources. Formally, consider for a given quantile $p \in [0;1]$ the quantile function of the wealth survey series $Q_S(p)$ and the quantile function of the tax data series $Q_T(p)$. To impute the tax data series from the survey series, one can write:

$$Q_T(p) = Q_S(p) \times \beta(p)$$

Where $\beta(p) = Q_T(p)/Q_S(p)$. Therefore, it suffices in our case to estimate $\hat{\beta}(p)$ over the 2011-2017 period (where both survey and tax data series are available) and to then multiply $Q_S(p)$ by $\hat{\beta}(p)$ before 2011 to get a corrected survey series. This will be an efficient method, however, only in the case where both $Q_T(p)$ and $Q_S(p)$ are strictly positive, which is not true in our case since our wealth quantile functions include a significant share of zero and negative values. Blanchet et al. (2019) show that a good way of accounting for zeros and negative values is instead to work with the following transformation:

Table A1: Trust data (ITR12T) descriptive statistics

	2014	2015	2016	2017	2018
Number of trusts	138859	134106	127457	115825	93379
Dividends (% of household dividends)	0.0%	0.3%	0.5%	0.5%	0.3%
Interest income (% of household interest)	3.1%	2.9%	2.5%	2.6%	1.7%
Capital gain (% of property income)	1.3%	1.6%	2.4%	1.4%	0.6%
Rental income (% of household rental income)	2.4%	2.4%	2.1%	1.9%	1.4%
Business income (% of mixed income)	1.7%	1.6%	1.6%	1.4%	1.0%
Total trust income (% of property income)	4.6%	5.2%	5.9%	4.7%	2.9%

Notes: The table provides information on the number of trusts filing ITR12T forms in South Africa, as well as coverage of selected national income components.
Source: authors' computations based on data.

$$Q_T(p) = sinh\big(asinh[Q_S(p)] + \beta'(p)\big)$$

With $\beta'(p) = asinh(Q_T(p)) - asinh(Q_S(p))$, and where *sinh* is the hyperbolic sine and *asinh* is the inverse hyperbolic sine. We apply this method to get consistent series covering the 1993-2017 period.

Availability and limitations of trust data

Trusts are major vehicles used by South African individuals for the accumulation of wealth, and are particularly prevalent among the wealthy. As we saw in figure 2, more than half of bonds and stock in South Africa are held through trusts. In the complete absence of data on trust ownership, we are therefore completely missing more than 15% of wealth, which is likely to be concentrated at the very top end of the distribution.

To be sure, relatively good data on trust ownership and trust incomes should exist. Just like individuals, all unit trusts in South Africa are required to file an ITR12T form covering all non-dividend sources of income, as well as a dividends tax form separately. The ITR12T form also contains information on taxpayer reference numbers and passport numbers of the beneficiary to whom income, capital or assets were distributed or vested with the highest monetary value. In parallel, individuals filing ITR12 returns are asked to provide detailed information on all forms of income distributed or vested to them as a beneficiary of a trust, as well as the trust name, the trust registration number and the trust tax reference number. In theory, this provides largely sufficient information to link trusts to their beneficiaries and accordingly distribute trust income and trust wealth.

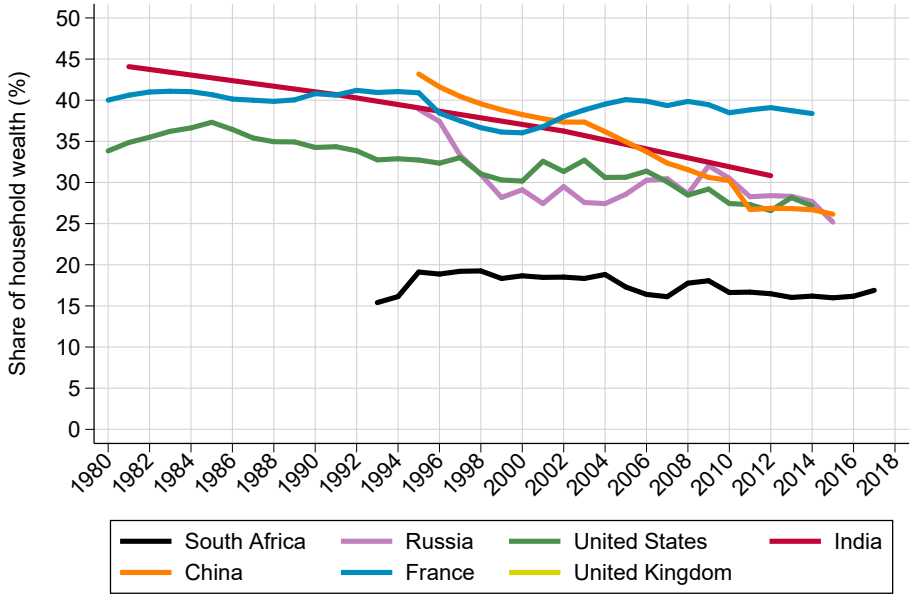
Unfortunately, the tax microdata provided by SARS does not include these entries, who were not extracted during the process of making the data accessible to researchers. In the ITR12 data, there is no trust information at all. SARS does provide researchers with the ITR12T data, but available variables are very limited, being restricted to the sources of income received by the different trusts, without any information on who owns them. This makes it impossible to distribute non-dividend trust income in any meaningful way, since individuals may have accounts in multiple trusts, and accounts may belong to multiple individuals. Furthermore, given that about 90% of trust assets correspond to corporate shares, the ITR12T data is only of very limited use at it excludes dividends from ownership of regular shares.

Table A1 shows descriptive statistics computed from the ITR12T data. The number of tax returns has decreased from about 140,000 to 94,000 between 2014 and 2018, probably due to incomplete assessments at the time of writing. This implies that there was one trust for about 2400 adults in South Africa in 2014, which shows how the use of trusts is widespread in the country. When it comes to sources of incomes assessed however, the quantities observed appear to be extremely low, in particular knowing

that trusts hold a substantial share of financial wealth. Interest income received by trusts amounts to only 3% of total interest received by households in the national accounts. The corresponding figures are 2% of rental income and less than 2% of business income. Less than 0.5% of dividends are covered, which is consistent with the fact that only very specific types of dividends are covered in this data, the bulk of them being filed separately through the dividends tax form. Capital gains are among the biggest components of trust income, amounting to between 1% and 2% of total property income received by households (the sum of interest, rental income and dividends). Overall, summing up all forms of trust income – including other receipts and accruals, and excluding losses –, we only reach between 4.5% and 6% of total property income received by households, or 0.3% to 0.45% of the national income. This is very puzzling, and points to potentially huge under-reporting, evasion or exemptions.

Additional figures and tables

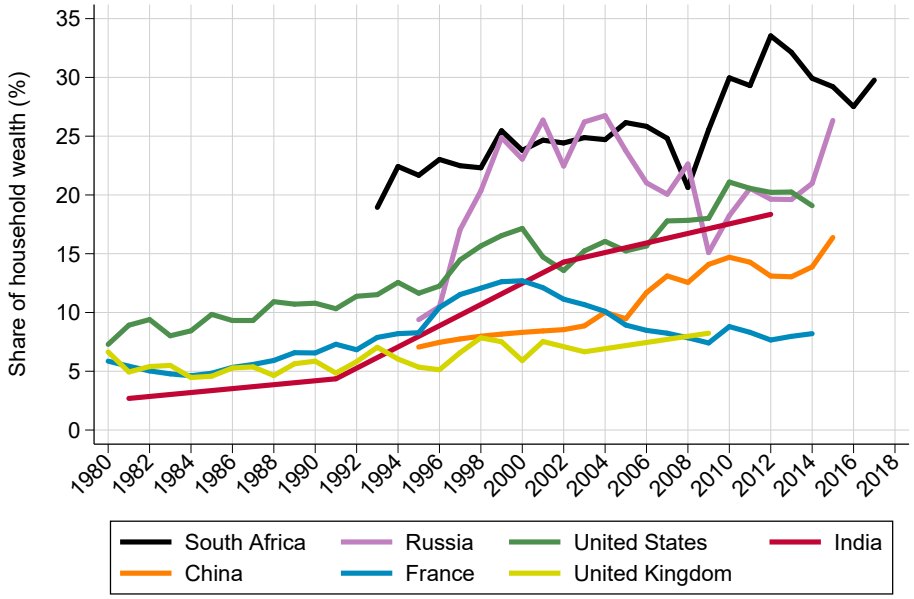
Figure A1: South African wealth inequality in comparative perspective: Middle 40 per cent wealth share



Notes: The figure compares the middle 40 per cent wealth share in South Africa to that of other countries. The unit of observation is the individual adult aged 20 or above. Wealth is individualised (South Africa) or split equally among adult household members (other countries).

Source: authors' computations based on data for South Africa; World Inequality Database (http://wid.world) for other countries.

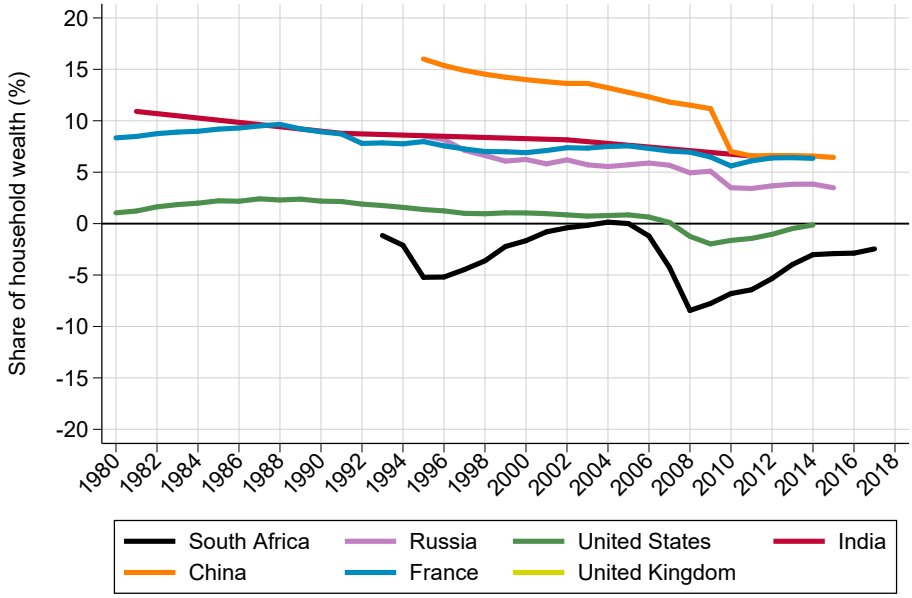
Figure A2: South African wealth inequality in comparative perspective: Top 0.1 per cent wealth share



Notes: The figure compares the top 0.1 per cent wealth share in South Africa to that of other countries. The unit of observation is the individual adult aged 20 or above. Wealth is individualised (South Africa) or split equally among adult household members (other countries).

Source: authors' computations based on data for South Africa; World Inequality Database (http://wid.world) for other countries.

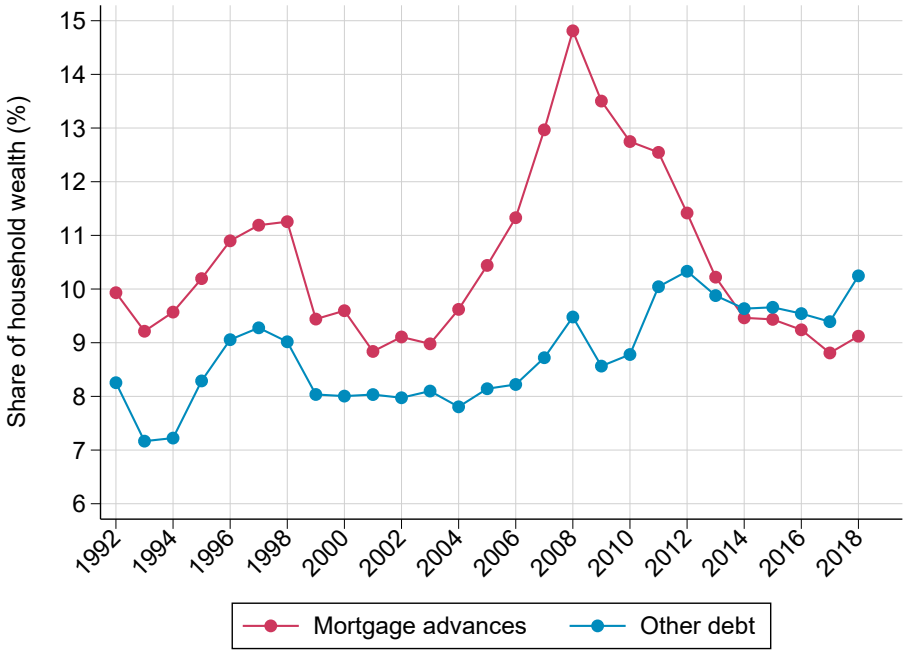
Figure A3: South African wealth inequality in comparative perspective: Bottom 50 per cent wealth share



Notes: The figure compares the bottom 50 per cent wealth share in South Africa to that of other countries. The unit of observation is the individual adult aged 20 or above. Wealth is individualised (South Africa) or split equally among adult household members (other countries).

Source: authors' computations based on data for South Africa; World Inequality Database (http://wid.world) for other countries.

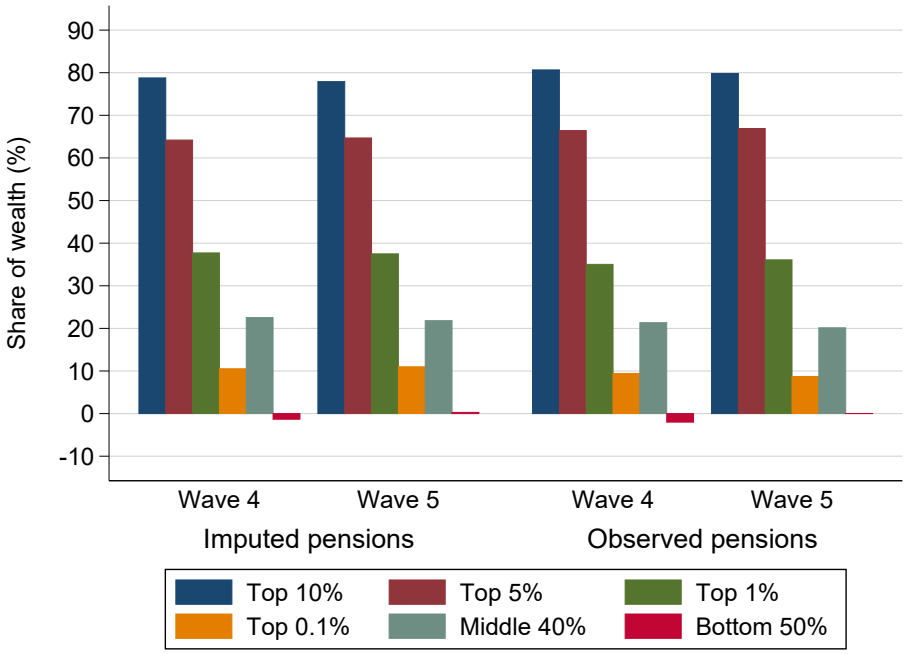
Figure A4: The evolution of household debt in South Africa, 1992-2018: the boom and bust of mortgage debt



Notes: The figure shows the evolution of total household mortgage advances and total other household debts between 1992 and 2018, expressed as a share of household net wealth.

Source: authors' computations based on data from the SARB.

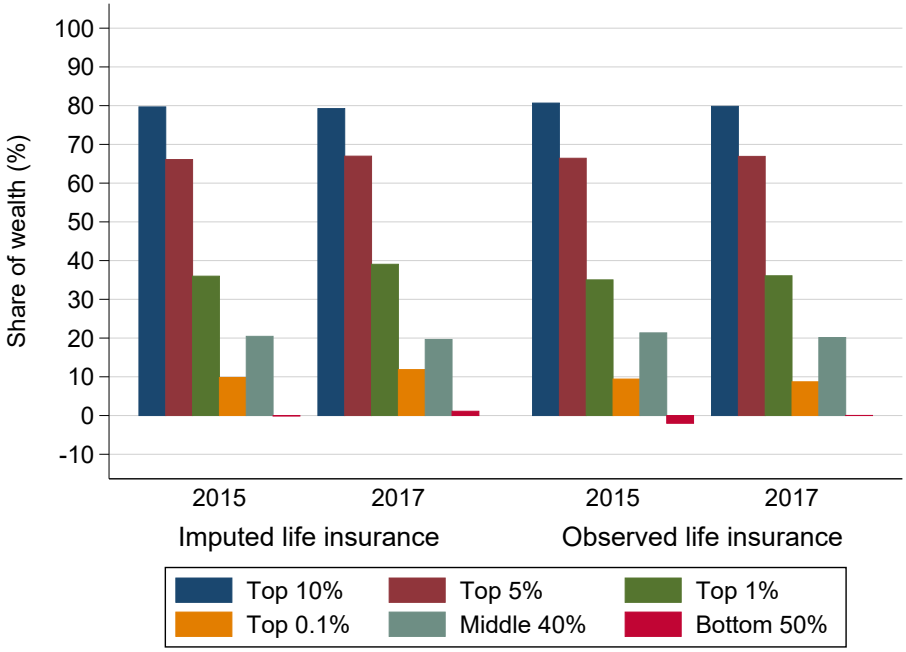
Figure A5: Wealth inequality in NIDS: reported vs. capitalised pension wealth



Notes: The figure compares the wealth shares estimated after capitalising pension wealth in NIDS (assuming that 75 per cent of pension assets go to wage earners proportionally to pension contributions, and 25 per cent belong to pensioners proportionally to pension income) to the wealth shares estimated by direct measurement of pension assets in NIDS.

Source: authors' computations based on data.

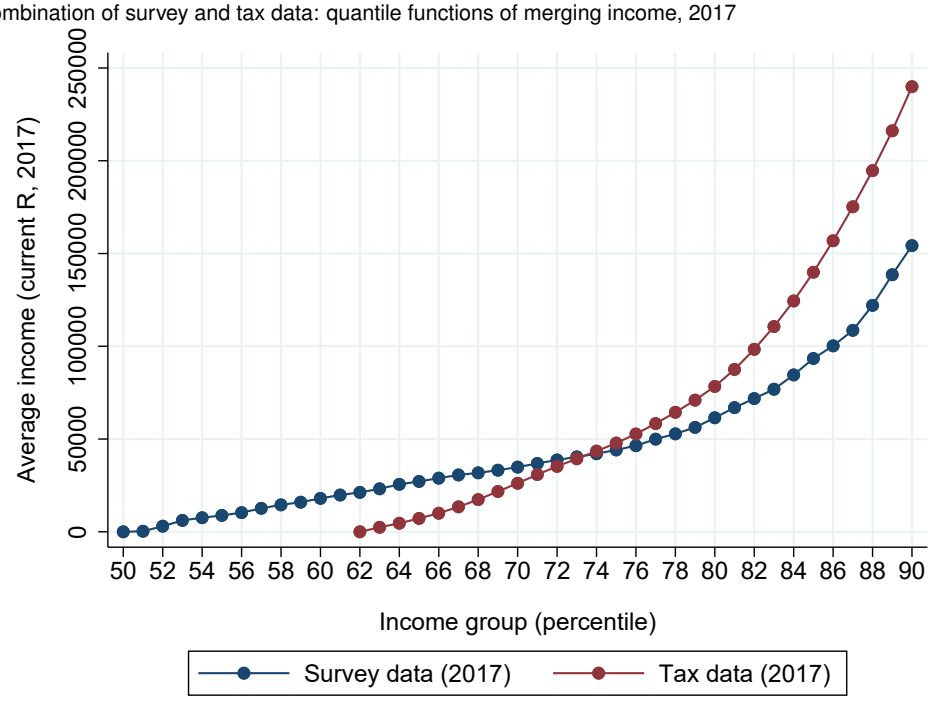
Figure A6: Wealth inequality in NIDS: reported vs. capitalised life insurance assets



Notes: The figure compares the wealth shares estimated after capitalising life insurance assets in NIDS (assuming that 50 per cent go to wage earners proportionally to factor income, and 50 per cent to other earners proportionally to factor income) to the wealth shares estimated by direct measurement of life insurance assets in NIDS.

Source: authors' computations based on data.

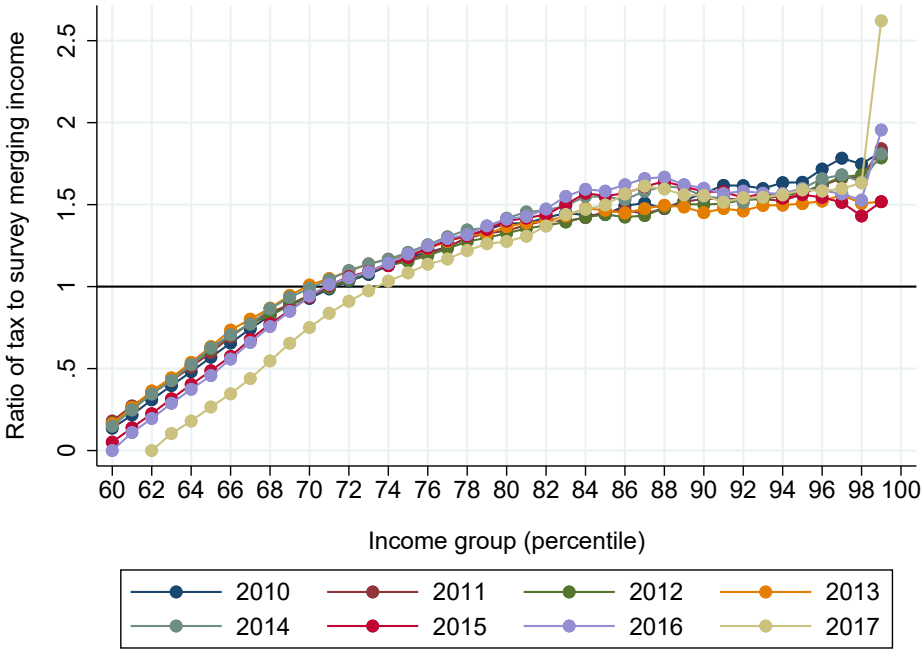
Figure A7: Combination of survey and tax data: quantile functions of merging income, 2017



Notes: The figure compares the average merging income by percentile in the survey and in the tax microdata in 2017. Merging income is the sum of gross wages, business income, rental income, interest income and private pension income.

Source: authors' computations based on data.

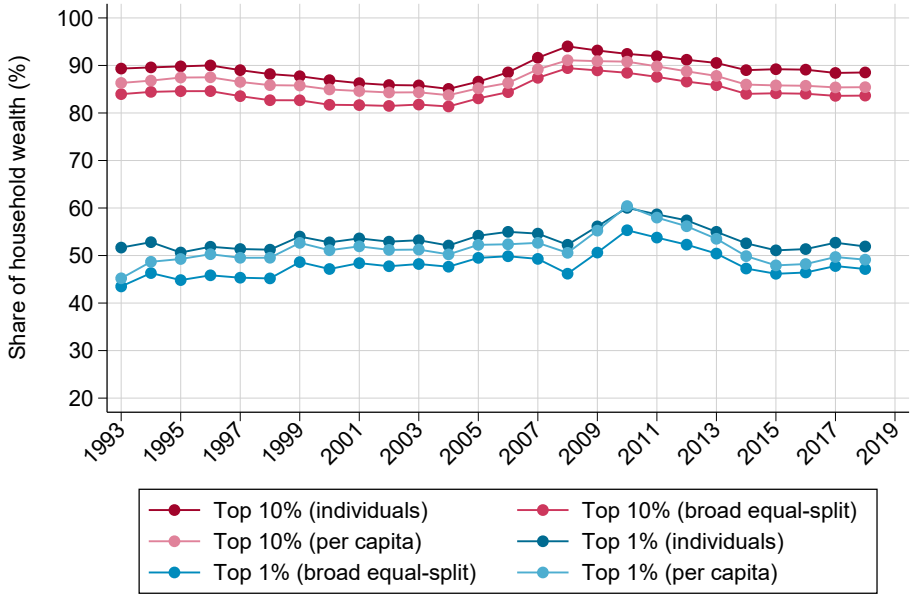
Figure A8: Combination of survey and tax data: ratio of quantile functions of merging income, 2010-2017



Notes: The figure plots the ratio of average merging income by percentile in the tax microdata to the harmonised survey data between 2010 and 2017. Merging income is the sum of gross wages, business income, rental income, interest income and private pension income.

Source: authors' computations based on data.

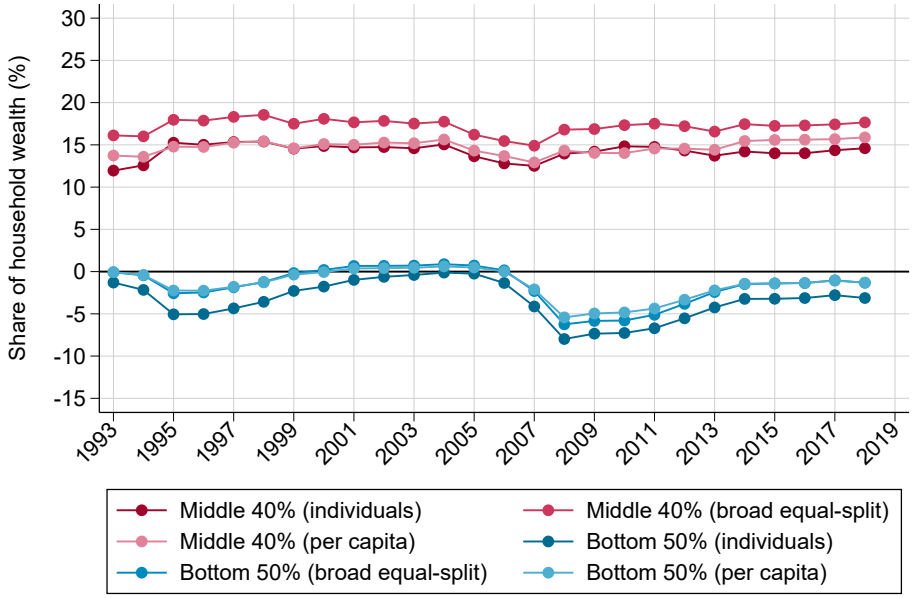
Figure A9: Impact of changes in equivalence scales on wealth inequality: Top 10 per cent and Top 1 per cent shares



Notes: The figure compares the wealth shares estimated from the mixed method applied to household surveys depending on three different equivalence scales: individual series, broad equal-split series and per capita series.

Source: authors' computations based on data.

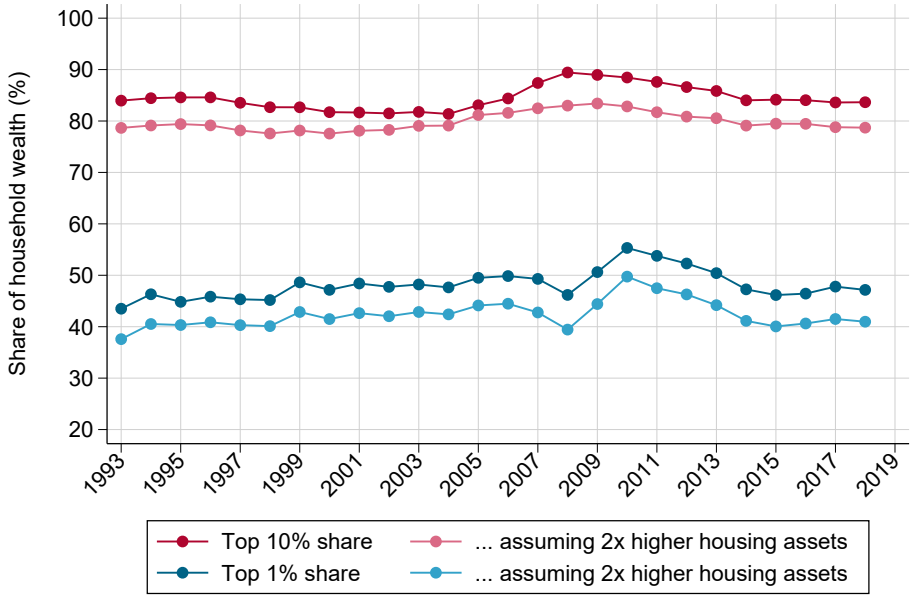
Figure A10: Impact of changes in equivalence scales on wealth inequality: Middle 40 per cent and Bottom 50 per cent wealth shares



Notes: The figure compares the wealth shares estimated from the mixed method applied to household surveys depending on three different equivalence scales: individual series, broad equal-split series and per capita series.

Source: authors' computations based on data.

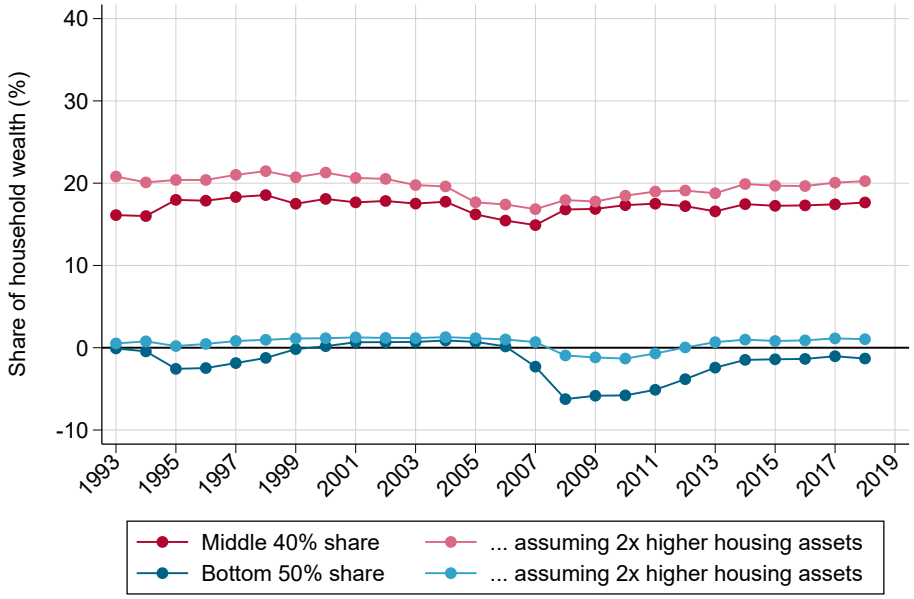
Figure A11: Impact of changes in aggregate housing wealth on wealth inequality: Top 10 per cent and top 1 per cent wealth shares



Notes: The figure compares the wealth shares estimated from the mixed method applied to household surveys under two scenarios: one in which total aggregated housing wealth corresponds to official balance sheets figures, and one in which it is estimated to be twice that amount.

Source: authors' computations based on data.

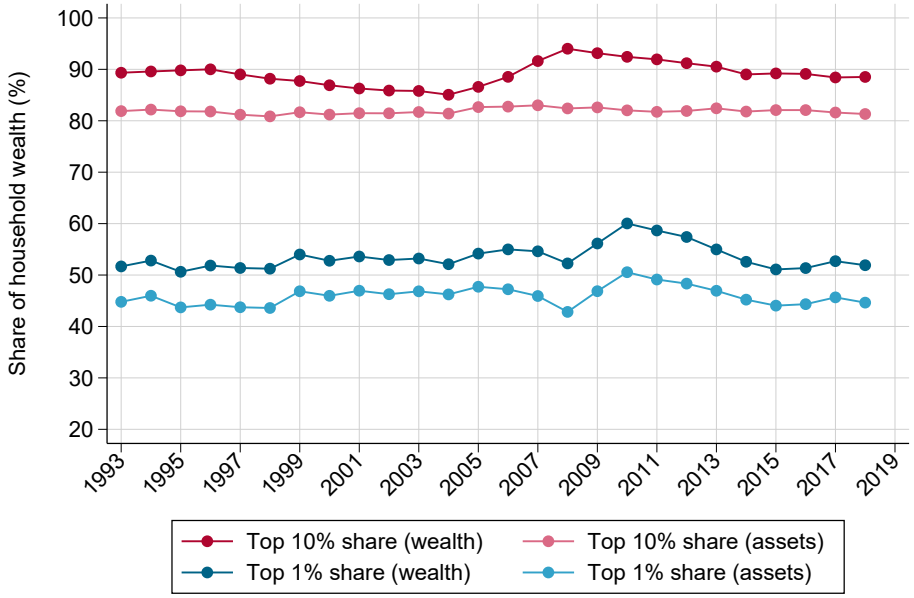
Figure A12: Impact of changes in aggregate housing wealth on wealth inequality: Middle 40 per cent and bottom 50 per cent wealth shares



Notes: The figure compares the wealth shares estimated from the mixed method applied to household surveys under two scenarios: one in which total aggregated housing wealth corresponds to official balance sheets figures, and one in which it is estimated to be twice that amount.

Source: authors' computations based on data.

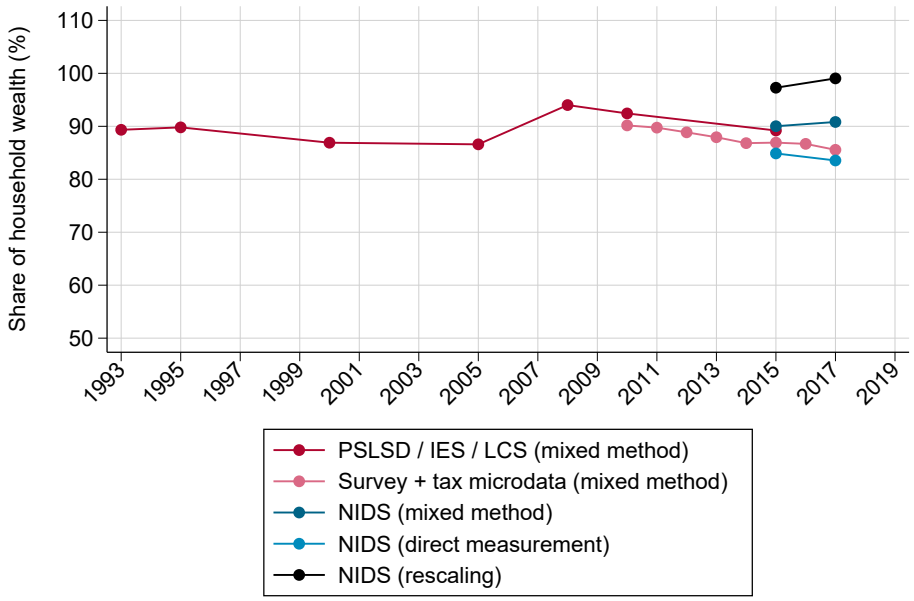
Figure A13: Distribution of wealth vs. distribution of assets: top 10 per cent and top 1 per cent shares



Notes: The figure compares the distribution of wealth and the distribution of assets (that is, excluding debt) in South Africa, estimated from surveys using the mixed method.

Source: authors' computations based on data.

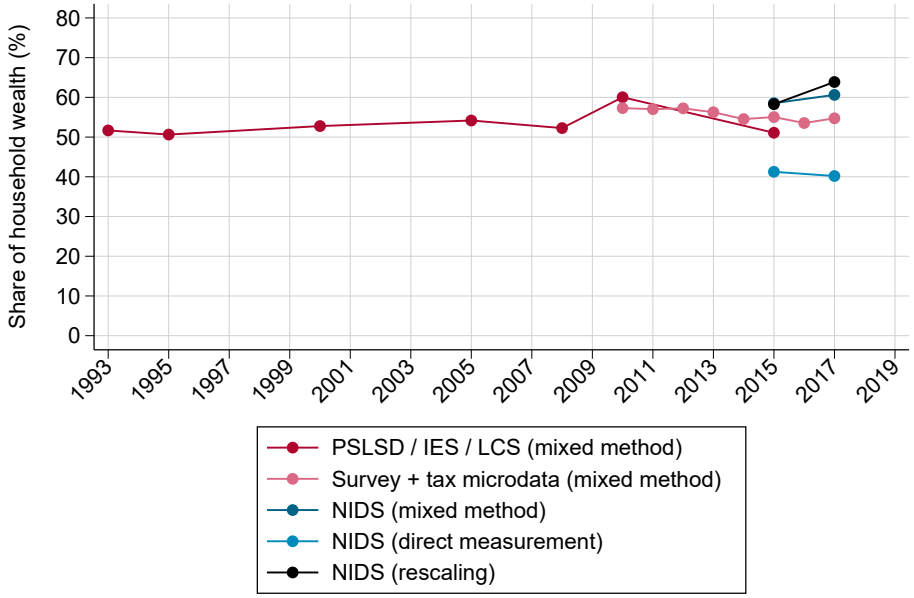
Figure A14: Comparison of methodologies: top 10 per cent share



Notes: The figure compares the wealth shares estimated from the mixed method, direct measurement and rescaling of reported wealth components.

Source: authors' computations based on data.

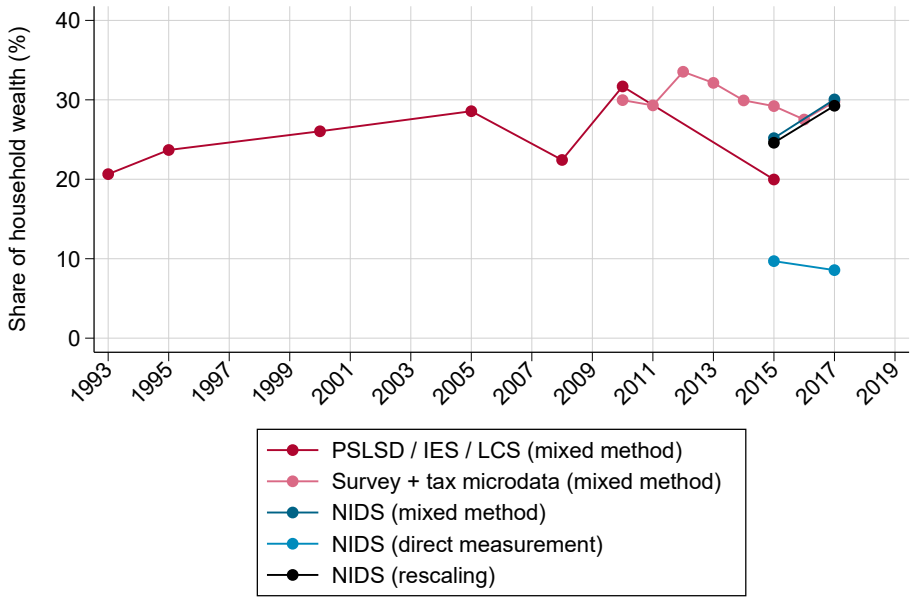
Figure A15: Comparison of methodologies: top 1 per cent share



Notes: The figure compares the wealth shares estimated from the mixed method, direct measurement and rescaling of reported wealth components.

Source: authors' computations based on data.

Figure A16: Comparison of methodologies: top 0.1 per cent share



Notes: The figure compares the wealth shares estimated from the mixed method, direct measurement and rescaling of reported wealth components.

Source: authors' computations based on data.

Data Appendix: Tax Microdata

The tax microdata used in this paper refers to the “Individual Panel" dataset (see Ebrahim & Axelson 2019). The data was accessed from August 2019 to March 2020. The version of the dataset used in this paper is 2019_1. The table below shows all the source codes used, along with the corresponding income category attributed to each source code.

Table A2: Source codes categories used in tax microdata

Income concept	Source code	Description
Gross wage	3601	Income (subject to PAYE)
Gross wage	3602	Income (non-taxable)
Gross wage	3605	Annual payment (subject to PAYE)
Gross wage	3606	Commission (subject to PAYE)
Gross wage	3607	Overtime (subject to PAYE)
Gross wage	3608	Arbitration award (subject to PAYE)
Gross wage	3609	Arbitration award (non-taxable)
Gross wage	3611	Purchased annuity (subject to PAYE)
Gross wage	3612	Purchased annuity (non-taxable)
Gross wage	3613	Restraint of trade (subject to PAYE)
Gross wage	3615	Director’s remuneration (subject to PAYE)
Gross wage	3616	Independent contractors (subject to PAYE)
Gross wage	3617	Labour Brokers (subject to PAYE)
Gross wage	3619	Labour Brokers (IT)
Gross wage	3620	Directors fees RSA resident
Gross wage	3621	Directors fees non-resident
Gross wage	3651	Foreign income (subject to paye)
Gross wage	3652	Foreign income (non-taxable)
Gross wage	3655	Foreign annual payment (subject to paye)
Gross wage	3656	Foreign commission (subject to paye)
Gross wage	3657	Foreign overtime (subject to paye)
Gross wage	3658	Foreign arbitration award (subject to paye)
Gross wage	3659	Foreign arbitration award (non-taxable)
Gross wage	3661	Foreign purchased annuity (subject to paye)
Gross wage	3662	Foreign purchased annuity (non-taxable)

Table A2: Source codes categories used in tax microdata

Income concept	Source code	Description
Gross wage	3663	Foreign restraint of trade (subject to paye)
Gross wage	3665	Foreign director's remuneration (subject to paye)
Gross wage	3666	Foreign independent contractors (subject to paye)
Gross wage	3667	Foreign labour brokers (subject to paye)
Gross wage	3669	Foreign labour brokers (it)
Gross wage	3670	Foreign directors fees rsa resident
Gross wage	3701	Travel allowance (subject to PAYE)
Gross wage	3702	Reimbursive travel allowance (IT)
Gross wage	3703	Reimbursive travel allowance (non-taxable)
Gross wage	3704	Subsistence allowance local travel (IT)
Gross wage	3705	Subsistence allowance local travel (non-taxable)
Gross wage	3706	Entertainment allowance (subject to PAYE)
Gross wage	3707	Share options exercised (subject to PAYE)
Gross wage	3708	Public office allowance (subject to PAYE)
Gross wage	3709	Uniform allowance (non-taxable)
Gross wage	3710	Tool allowance (subject to PAYE)
Gross wage	3711	Computer allowance (subject to PAYE)
Gross wage	3712	Telephone allowance (subject to PAYE)
Gross wage	3713	Other allowances (subject to PAYE)
Gross wage	3714	Other allowances (non-taxable)
Gross wage	3715	Subsistence allowance foreign travel (IT)
Gross wage	3716	Subsistence allowance foreign travel (non-taxable)
Gross wage	3722	Reimbursive travel allowance
Gross wage	3751	Foreign travel allowance (subject to paye)
Gross wage	3752	Foreign reimbursive travel allowance (it)
Gross wage	3753	Foreign reimbursive travel allowance (non-taxable)
Gross wage	3754	Foreign subsistence allowance local travel (it)
Gross wage	3755	Foreign subsistence allowance local travel (non-taxable)
Gross wage	3756	Foreign entertainment allowance (subject to paye)
Gross wage	3757	Foreign share options exercised (subject to paye)

Table A2: Source codes categories used in tax microdata

Income concept	Source code	Description
Gross wage	3758	Foreign public office allowance (subject to paye)
Gross wage	3759	Foreign uniform allowance (non-taxable)
Gross wage	3760	Foreign tool allowance (subject to paye)
Gross wage	3761	Foreign computer allowance (subject to paye)
Gross wage	3762	Foreign telephone allowance (subject to paye)
Gross wage	3763	Foreign other allowances (subject to paye)
Gross wage	3764	Foreign other allowances (non-taxable)
Gross wage	3765	Foreign subsistence allowance foreign travel (it)
Gross wage	3766	Foreign subsistence allowance foreign travel (non-taxable)
Gross wage	3772	Foreign reimbursive travel allowance
Gross wage	3801	General fringe benefits (subject to PAYE)
Gross wage	3802	Use of motor acquired by employer not via operating lease (subject to PAYE)
Gross wage	3803	Use of asset (subject to PAYE)
Gross wage	3804	Meals etc (subject to PAYE)
Gross wage	3805	Accomodation (subject to PAYE)
Gross wage	3806	Services (subject to PAYE)
Gross wage	3807	Loans or subsidy (subject to PAYE)
Gross wage	3809	Taxable bursaries or scholarships to a non-disabled person basic education (subject to PAYE)
Gross wage	3810	Medical aid contributions (subject to PAYE)
Gross wage	3813	Medical services costs (subject to PAYE)
Gross wage	3815	Non-taxable bursaries or scholarships to non-disabled person basic education
Gross wage	3816	Use of motor vehicle acquired by employers via operating lease (subject to PAYE)
Gross wage	3820	Taxable bursaries or scholarships to a non-disabled person further education (subject to PAYE)
Gross wage	3821	Non-taxable bursaries or scholarships to non-disabled person further education
Gross wage	3822	Non-taxable benefit on acquisition of immovable property
Gross wage	3829	Taxable bursaries or scholarships to a disabled person basic education (subject to PAYE)
Gross wage	3830	Non-taxable bursaries or scholarships to a disabled person basic education
Gross wage	3831	Taxable bursaries or scholarships to a disabled person further education (subject to PAYE)
Gross wage	3832	Non-taxable bursaries or scholarships to a disabled person further education
Gross wage	3851	Foreign general fringe benefits (subject to paye)

Table A2: Source codes categories used in tax microdata

Income concept	Source code	Description
Gross wage	3852	Foreign use of motor acquired by employer not via operating lease (subject to paye)
Gross wage	3853	Foreign use of asset (subject to paye)
Gross wage	3854	Foreign meals etc (subject to paye)
Gross wage	3855	Foreign accomodation (subject to paye)
Gross wage	3856	Foreign services (subject to paye)
Gross wage	3857	Foreign loans or subsidy (subject to paye)
Gross wage	3859	Foreign taxable bursaries or scholarships to a non-disabled person basic education (subject to paye)
Gross wage	3860	Foreign medical aid contributions (subject to paye)
Gross wage	3863	Foreign medical services costs (subject to paye)
Gross wage	3865	Foreign non-taxable bursaries or scholarships to non-disabled person basic education
Gross wage	3866	Foreign use of motor vehicle acquired by employers via operating lease (subject to paye)
Gross wage	3870	Foreign taxable bursaries or scholarships to a non-disabled person further education (subject to paye)
Gross wage	3871	Foreign non-taxable bursaries or scholarships to non-disabled person further education
Gross wage	3872	Foreign non-taxable benefit on acquisition of immovable property
Gross wage	3879	Foreign taxable bursaries or scholarships to a disabled person basic education (subject to paye)
Gross wage	3880	Foreign non-taxable bursaries or scholarships to a disabled person basic education
Gross wage	3881	Foreign taxable bursaries or scholarships to a disabled person further education (subject to paye)
Gross wage	3882	Foreign non-taxable bursaries or scholarships to a disabled person further education
Gross wage	4236	Remuneration from foreign employer for services rendered in South Africa
Business income	102-4222	Business income (gains and losses)
Pension contributions	4001	Total pension fund contributions paid and deemed paid by employee
Pension contributions	4002	Arrear pension fund contributions paid by employee
Pension contributions	4003	Total provident fund contributions paid and deemed paid by employee
Pension contributions	4004	Arrear provident fund contributions paid by employee
Pension contributions	4006	Total retirement annuity fund contributions paid and deemed paid by employee
Pension contributions	4007	Arrear retirement annuity fund contributions paid by employee
Pension income	3603	Pension (subject to PAYE)
Pension income	3604	Pension (non-taxable)
Pension income	3610	Annuity from a RAF (subject to PAYE)
Pension income	3614	Other retirement lump sums (subject to PAYE)

Table A2: Source codes categories used in tax microdata

Income concept	Source code	Description
Pension income	3653	Foreign pension (subject to paye)
Pension income	3654	Foreign pension (non-taxable)
Pension income	3660	Foreign annuity from a raf (subject to paye)
Pension income	3664	Foreign other retirement lump sums (subject to paye)
Pension income	3902	Pension or RAF in respect of withdrawal (subject to PAYE)
Pension income	3903	Pension or RAF in respect of retirement (subject to PAYE)
Pension income	3904	Provident in respect of withdrawal (subject to PAYE)
Pension income	3905	Provident in respect of retirement (subject to PAYE)
Pension income	3908	Surplus apportionments and exempt policy proceeds (non-taxable)
Pension income	3909	Unclaimed benefits
Pension income	3915	Retirement or termination of employment lump sum benefits or commutation of annuities
Pension income	3920	Lump sum withdrawal benefits (subject to PAYE)
Pension income	3921	Living annuity and section 15C of the pension funds act, surplus apportionments (subject to PAYE)
Pension income	3923	Transfer of unclaimed benefits
Pension income	3924	Transfer on retirement (subject to PAYE)
Pension income	3952	Foreign pension or raf in respect of withdrawal (subject to paye)
Pension income	3953	Foreign pension or raf in respect of retirement (subject to paye)
Pension income	3954	Foreign provident in respect of withdrawal (subject to paye)
Pension income	3955	Foreign provident in respect of retirement (subject to paye)
Interest income	4201	Local interest excluding SARS
Interest income	4218	Foreign interest
Interest income	4237	SARS interest received
Interest income	4241	Tax free investment account interest
Rental income	2532	Business income component: property letting income, residential accomodation
Rental income	2533	Business income component: property letting loss, residential accomodation
Rental income	4210	Local rental from letting of fixed property
Rental income	4288	Foreign rental gain
Dividends	3717	Broad-based employee share plan (subject to PAYE)
Dividends	3718	Vesting of equity instruments or return of capital iro restricted instruments (PAYE)
Dividends	3719	Dividends not exempt ito para (dd) of the proviso to s10(1)(k)(i) (PAYE)

Table A2: Source codes categories used in tax microdata

Income concept	Source code	Description
Dividends	3720	Dividends not exempt ito para (ii) of the proviso to s10(1)(k)(i) (PAYE)
Dividends	3721	Dividends not exempt ito para (jj) of the proviso to s10(1)(k)(i) (PAYE)
Dividends	3723	Dividends not exempt ito para (kk) of the proviso to s10(1)(k)(i) (PAYE)
Dividends	3767	Foreign broad-based employee share plan (subject to paye)
Dividends	3768	Foreign vesting of equity instruments or return of capital iro restricted instruments (paye)
Dividends	3769	Foreign dividends not exempt ito para (dd) of the proviso to s10(1)(k)(i) (paye)
Dividends	3770	Foreign dividends not exempt ito para (ii) of the proviso to s10(1)(k)(i) (paye)
Dividends	3771	Foreign dividends not exempt ito para (jj) of the proviso to s10(1)(k)(i) (paye)
Dividends	3773	Foreign dividends not exempt ito para (kk) of the proviso to s10(1)(k)(i) (paye)
Dividends	4216	Foreign dividends
Dividends	4230	Controlled foreign company share of profit
Dividends	4238	Taxable local dividends ie REIT
Dividends	4242	Tax free investment account dividends
Dividends	4257	Tax free investments other
Dividends	4292	Dividends deemed to be income in terms of s8E and s8EA
Not used	3618	Misclassification or undefined
Not used	3695	Misclassification or undefined
Not used	3696	Gross non-taxable income
Not used	3697	Gross retirement funding employment income
Not used	3698	Gross non-retirement funding employment income
Not used	3699	Gross employment income taxable
Not used	3808	Employee's debt (subject to PAYE)
Not used	3817	Benefit employer pension fund contributions (subject to PAYE)
Not used	3818	Misclassification or undefined
Not used	3819	Misclassification or undefined
Not used	3825	Benefit employer provident fund contributions (subject to PAYE)
Not used	3826	Misclassification or undefined
Not used	3827	Misclassification or undefined
Not used	3828	Benefit retirement annuity fund contributions (subject to PAYE)
Not used	3858	Foreign employee's debt (subject to paye)

Table A2: Source codes categories used in tax microdata

Income concept	Source code	Description
Not used	3867	Foreign benefit employer pension fund contributions (subject to paye)
Not used	3875	Foreign benefit employer provident fund contributions (subject to paye)
Not used	3876	Misclassification or undefined
Not used	3877	Misclassification or undefined
Not used	3878	Foreign benefit retirement annuity fund contributions (subject to paye)
Not used	3901	Gratuities and severance benefits (subject to PAYE)
Not used	3906	Special remuneration (subject to PAYE)
Not used	3907	Other lump sums (subject to PAYE)
Not used	3922	Compensation iro of death during employment (non-taxable)
Not used	3951	Foreign gratuities and severance benefits (subject to paye)
Not used	3956	Foreign special remuneration (subject to paye)
Not used	3957	Foreign other lump sums (subject to paye)
Not used	4005	Medical scheme fees paid and deemed paid by employee
Not used	4008	Misclassification or undefined
Not used	4009	Misclassification or undefined
Not used	4011	Donations allowable in terms of section 18a to an approved public benefit organisation
Not used	4014	Misclassification or undefined
Not used	4015	Travel expenses (no allowance, commission income)
Not used	4016	Other deductions
Not used	4017	Expenses against local taxable subsistence allowance
Not used	4018	Premiums paid for loss of income policies
Not used	4019	Expenses against foreign taxable subsistence allowance
Not used	4024	Medical services costs deemed to be paid by the employee
Not used	4025	Medical contribution paid by employee allowed as a deduction for employees tax purposes
Not used	4026	Arrear pension fund contributions non-statutory forces
Not used	4027	Depreciation
Not used	4028	Home office expenses
Not used	4029	Retirement fund contributions total
Not used	4030	Donations deducted from the employee remuneration and paid by employer to organisation
Not used	4031	Section 8C losses

Table A2: Source codes categories used in tax microdata

Income concept	Source code	Description
Not used	4032	Remuneration (s8A/8C gains) taxed on IRP5 but comply with exemption in terms of s10(i)(o)(ii)
Not used	4033	Remuneration taxed on IRP5 but comply with exemption in terms of s10(1)(o)(i)
Not used	4041	Remuneration taxed on IRP5 but comply with exemption in terms of s10(1)(o)(ii) (excluding s 8A/8C gains)
Not used	4042	Amounts refunded ito section 11(nA) and 11(nB)
Not used	4043	Allowable accountancy or administration expenses
Not used	4044	Legal expenses
Not used	4045	Bad debt
Not used	4046	Use of motor vehicle
Not used	4047	Holders of public office deduction
Not used	4048	Misclassification or undefined
Not used	4050	Misclassification or undefined
Not used	4051	Misclassification or undefined
Not used	4101	SITE
Not used	4102	PAYE
Not used	4103	Misclassification or undefined
Not used	4104	Misclassification or undefined
Not used	4110	Misclassification or undefined
Not used	4111	Other foreign tax credits individuals
Not used	4112	Foreign tax credits on such foreign dividends
Not used	4113	Foreign tax credits on foreign interest
Not used	4114	Foreign tax credits in respect of foreign capital gain or loss
Not used	4115	Tax on retirement lump sum and severance benefits
Not used	4116	Medical scheme fees tax credit
Not used	4117	Foreign tax credits in respect of S6quin
Not used	4118	Sum of ETI amounts
Not used	4120	Additional medical expenses tax credit
Not used	4121	Foreign tax credits on foreign rental income
Not used	4141	UIF contribution
Not used	4142	SDL contribution
Not used	4149	Total tax

Table A2: Source codes categories used in tax microdata

Income concept	Source code	Description
Not used	4150	Metadata
Not used	4211	Local rental loss from letting of fixed property
Not used	4212	Royalties
Not used	4213	Loss royalties
Not used	4214	Other receipts and accruals
Not used	4215	Misclassification or undefined
Not used	4219	Tax free investment account contribution
Not used	4220	Misclassification or undefined
Not used	4221	Misclassification or undefined
Not used	4223	Loss foreign business or trading
Not used	4228	Other foreign income
Not used	4229	Loss other foreign income
Not used	4235	Income reflected on a South African IRP5 or IT3a that was subject to tax outside SA
Not used	4239	Tax free investment account net return on investment profit
Not used	4240	Tax free investment account net return on investment loss
Not used	4243	Tax free investment account capital gain
Not used	4244	Tax free investment account capital loss
Not used	4245	Misclassification or undefined
Not used	4246	Tax free investment account transfer in
Not used	4247	Tax free investment account transfer out
Not used	4248	Tax free investment account withdrawal
Not used	4249	Foreign tax credits refunded or discharged in terms of S6quat(1C)
Not used	4250	Local capital gain
Not used	4251	Loss local capital
Not used	4252	Foreign capital gain
Not used	4253	Loss foreign capital
Not used	4278	Foreign royalties
Not used	4279	Loss foreign royalties
Not used	4280	Sporting
Not used	4281	Loss sporting

Table A2: Source codes categories used in tax microdata

Income concept	Source code	Description
Not used	4282	Collectables
Not used	4283	Loss collectables
Not used	4284	Animal showing
Not used	4285	Loss animal showing
Not used	4286	Gambling
Not used	4287	Loss gambling
Not used	4289	Foreign rental loss
Not used	4291	Foreign income in terms of s6quat(1C)
Not used	4301	Misclassification or undefined
Not used	4302	Misclassification or undefined
Not used	4472	Employer pension fund contributions paid for the benefit of employee
Not used	4473	Employer provident fund contributions paid for the benefit of employee
Not used	4474	Employer medical scheme fees paid for the benefit of employee
Not used	4475	Employer retirement annuity fund contributions paid for the benefit of employee
Not used	4476	Misclassification or undefined
Not used	4485	Medical services costs deemed to be paid by the employee for other relatives
Not used	4486	Capped amount determined by employer in terms of section 18(2)(c)(i)
Not used	4487	No value benefits in respect of medical services provided or incurred by the employer
Not used	4493	Employer's medical scheme fees paid for the benefit of a retired/former of the Seventh Schedule
Not used	4497	Total deductions and contributions
Not used	4582	The portion of the allowances and benefits which represents remuneration
Not used	4583	The portion of other allowances and benefits which represents remuneration

Source. Authors' elaboration.