Private Wealth in a Developing Country: Evidence from South Africa

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The point of departure of Thomas Piketty's influential *Capital in the Twenty-First Century* (2014) was the dramatic growth of private wealth-income ratios in the advanced economies between 1970 and 2010. Using official balance sheet data for South Africa—the first country to publish such data in the developing world—, this paper examines to what extent this re-emergence of private wealth was also experienced in the developing-country context. First, we find that the South African current wealth-income ratio is very close to its level in 1975 (255 and 240 percent), and thus much lower than those of Piketty's sample of advanced economies (where it increased from 200-300 to 400-700 percent). Second, we show that the discrepancy is explained not only by South Africa's relatively low savings rates, but also by the reduction of wealth before and during the transition to democracy in the 1990s. Since the late 1990s, however, private wealth recovered significantly, indicating that South Africa might resemble the advanced economies more closely in the future.

1   Introduction

Until recently, the macroeconomic literature on developing countries was primarily concerned with the flows of income and expenditure rather than with the stocks of assets and liabilities. This owes not only to the theoretical notion that flows and stocks are consistent over the long term, but also to the scarcity of reliable balance sheet data for empirical analyses: While flow variables have been recorded in the national accounts since the 1940s, stock variables are only gradually being included in official statistics.

When Thomas Piketty used these novel balance sheet data for a sweeping account of the accumulation and distribution of wealth in the major advanced economies, it therefore attracted considerable attention. *Capital in the Twenty-First Century* (2014) presented the argument that private wealth re-emerged in the second half of the twentieth century following the great contraction during and after the world wars, approaching levels last seen in the rentier-societies of nineteenth-

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century Europe. He argued that as wealth gains importance over incomes, wealth inequality—which typically exceeds income inequality significantly—plays an increasing role in shaping overall inequality, therefore raising the redistributive potential of capital relative to labour-related taxes: In an environment where national income is dwarfed by private wealth, the redistribution of income alone is likely insufficient to effectively reduce overall inequality (see also Piketty 2015; Piketty and Zucman 2014).

Although Piketty's analyses were confined to the largest advanced economies, his work has been highly influential even in the developing world.[4] But to what extent are his conclusions really applicable to emerging economies, in which persisting capital scarcity tends to cause at least as much concern as increasing wealth concentration? An important obstacle in answering this question is that reliable information on wealth is even scarcer in developing countries than in the advanced economies. To the authors' knowledge, South Africa is the only emerging market for which sufficiently detailed sectoral balance sheets exist such that Piketty's analyses on wealth-income ratios can be replicated. With retrospective estimates dating back to 1975, we are able to study private wealth over the same period in which the wealth-income ratios of rich countries expanded from their historic low-point of about 200-300 percent to their current levels of 400-700 percent.

The analyses presented in this paper suggest that the South African experience contrasts with those of the advanced economies. First, we compare the wealth income ratios of South Africa and the eight major advanced economies over the 1975-2010 horizon, and use Piketty and Zucman's methodology to decompose their development into quantity (saving-induced) and price (revaluation-induced) effects. While we find that the wealth-income ratio for South Africa was comparable to the rich countries at the beginning of this period (at 240 percent in 1975), the experiences diverged thereafter: instead of seeing the emergence of dominant private wealth, South Africa's wealth-income ratio of 255 percent today is very close to its level in 1975. While the South Africa's structurally lower savings rate contributed to this divergence, the relatively less pronounced asset price boom also played a role.

Second, we study the South African wealth-income ratio over time, as the long-term view masks important shorter-term dynamics. Rather than remaining stable as the comparison between 1975 and 2014 suggests, wealth-income ratios actually trended downward from the mid-1980s to the mid-1990s, reflecting dwindling asset prices in a period of economic sanctions against the apartheid regime and political uncertainty over the transfer of power. From the late 1990s onwards, private wealth recovered, as asset price increases more than compensated for steadily falling savings rates. South Africa's wealth-income ratio is thus still substantially lower than those of the advanced economies. It is possible to argue that it could be on a

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[4] Piketty's influence in South Africa is particularly visible in the ongoing reform of the tax system (see, for example, the *First Interim Report on Estate Duty for the Minister of Finance* of the Davis Tax Committee, January 2015).

trajectory to resemble the experience of developed countries more closely, but as we will discuss later, the U-shaped relationship (in line with Rognlie (2015) for the US) does not support the argument that there is a clear correlation between the capital-income ratio and capital share

Third, we analyse cross-sectional differences in the structure of wealth. Wealth accumulation in South Africa has been dominated by corporate profits and the appreciation of stock prices, from which households benefit through their shareholdings. This contrasts with the advanced economies, where the remarkable accumulation of household wealth was primarily driven by a prolonged boom in house prices (Piketty 2014; Rognlie 2015). The fact that wealth accumulation in South Africa is dominated by a different source of wealth compared with the developed country experience suggests that we need to think more critically about the 'accumulation view', which according to Rognlie (2015:2) suggests that 'capital's share has risen, and will continue to rise, because of capital accumulation'. Since financial wealth tends to be more highly concentrated than housing assets, the South African dynamics are likely to have different distributional implications than those of Piketty's sample of rich countries. These cross-sectional differences are likely to be due to institutional differences between countries as proposed by Acemoglu and Robinson (2015).

This point leads to a more general caveat: While the household sector balance sheets allow us to study private wealth on the aggregate level, we still have little information about the distribution of wealth between households and individuals. This article can thus only provide an indication of the distributional consequences of rising wealth-income ratios on the aggregate level – i.e. regarding the factor distribution between capital and labour. We know, however, that wealth is typically more concentrated than incomes, and several pieces of scattered evidence— surveys, tax records, 'rich lists' and the aforementioned implications from the portfolio composition— suggest that the degree of wealth inequality might be even more pronounced in South Africa than elsewhere. If this is the case, the distributional concerns raised by Piketty's observations for the advanced economies could largely be shared in South Africa, regardless of the fact that the overall wealth-income ratio is still substantially lower. As balance sheet data becomes available in other countries, it will be interesting to see how these findings compare to other developing countries too.

2 Data and methodology

2.1 Wealth in the national accounts

The reason the empirical literature on wealth is still young is that reliable balance sheet data are much scarcer than flow data on incomes and expenditures. While the System of National Accounts (SNA)—the international standard for national accounting—was first published in 1953, recommendations on the compilation of sectoral balance sheets were only included in 1993. Since the 2000s, these recommendations have gradually been implemented in most advanced economies,

whereby official balance sheet data were released as early as 1970 in France and as late as 2010 in Germany (Piketty 2011; Piketty and Zucman 2014).

In South Africa the responsibility for compiling the sectoral balance sheets lies with the South African Reserve Bank (SARB). While the construction of fully integrated sectoral accounts is still ongoing, the first balance sheets for the household sector were already released in 2006, and now contain retrospective data back until 1975.[5] Being based on the work of Aron, Muellbauer and Prinsloo (2006), these household sector balance sheets are the first of their kind for a developing country (Aron, Muellbauer and Prinsloo 2008). Although select sectoral balance sheet statistics have since become available in Korea, Mexico and Turkey, South Africa remains one of at most a few emerging economies with complete household sector balance sheet data today (Stierli et al. 2014).[6]

To ensure comparability with Piketty's analyses, we follow his concepts and measures closely. The majority of these data come straight from the national accounts. For this reason, the following paragraphs provide only a high-level overview of the main concepts used: assets, liabilities and wealth (section 2.1.1), the split of national wealth into private and public wealth (2.1.2), the link between national wealth and domestic capital (2.1.3) as well as the concepts of income and saving which will be used to calculate wealth-income ratios and study their development (sections 2.2.1 and 2.2.2). A more detailed description of the South African balance sheets is provided by Aron, Muellbauer and Prinsloo (2006, 2008).

2.1.1 Assets, liabilities and wealth

Wealth is defined as the residual between the market value of all assets and liabilities, a quantity also known as 'net worth'. Although the combined assets of the household sector typically exceed its liabilities, the net worth of individual households can also be negative.

The SNA includes all marketable financial and non-financial assets as assets, but excludes non-marketable assets such as human or institutional capital. Non-financial assets include housing assets (residential buildings and land) and other tangible assets (non-residential buildings and land, plant and machinery, as well as cultivated assets) of the household sector. Financial assets consist of cash equivalents, bonds, equities and foreign financial assets.

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[5] With data for 1975-2014, we have a 40-year period at our disposal, which is not much less than for half of Piketty's advanced country sample. All data is available online: wwwrs.resbank.co.za/ qbquery/TimeSeriesQuery.aspx

[6] There is no authoritative overview to what extent different countries have implemented sectoral balance sheets. According to an IMF conference paper on this subject (Shreshta et al. 2011, p.10), Korea had complete sectoral financial and non-financial balance sheets in 2011 while Mexico had sectoral financial balance sheets compiled through the OECD. However, the report mistakenly holds that South Africa does not provide these data. According to the Credit Suisse *Global Wealth Report*, in contrast, Korea and Mexico both provide only financial balance sheets for the household sector, and South Africa is the only developing country with sectoral balance sheets today. Turkey produces economy-wide financial balance sheets, but no sectoral splits. In Chile, China, India and Indonesia, complete financial and non-financial wealth data are available from survey data.

In the South African balance sheets financial assets are recorded as assets with monetary institutions, interests in pension funds and long-term insurers, and other financial assets. 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. For consistency with Piketty's asset split, we continue to consider pension and insurance assets as a separate asset class.

2.1.2 Private wealth, public wealth and national wealth

Since the national accounts are based on the residency principle, the wealth of a nation is the wealth of its residents (all institutional units with a 'center of economic interest' in the country). In the national accounts, these residents are grouped into three institutional sectors: households, corporations and the public sector. The household sector includes private households, non-profit institutions serving households as well as private trusts and friendly societies. The public sector comprises all levels of government, non-profit institutions controlled by the government and social security funds. The corporate sector consists of financial and non-financial corporations and quasi-corporations (unincorporated businesses with separate financial accounts), whether they are owned by households or government entities. Unincorporated businesses *without* separate financial accounts are included in the household or the public sector respectively.

When it comes to flow variables, the household and corporate sector are typically added together to form the private sector. With regards to *wealth*, however, we assume, in line with Piketty (2014) and Piketty and Zucman (2014), that the household sector alone is sufficient to represent the private sector. This is because all assets and liabilities of businesses are ultimately owned by the shareholders – households, government entities or foreigners. In the first and second case, they are reflected in the household and public sector balance sheets respectively; in the third case, they enter the net foreign asset position (see section 2.1.3).

Since the compilation of the balance sheets for the public (and corporate) sectors is ongoing at the time of writing, this article is limited to the analysis of *household wealth*, which we refer to interchangeably as *private wealth* or *wealth, because of the assumption that the household sector alone is sufficient to represent the private sector*. Denoting it by W, public wealth by W_p and and national wealth by W_n, the relationship between all three variables can be written as:

$$W_n = W + W_p.$$

2.1.3   National wealth, domestic wealth and net foreign assets

In a closed economy, the wealth of a country's residents is equivalent to the domestic capital stock (K), i.e. the capital available for production and housing within the country's boundaries.[7] In an open economy, however, the capital stock of a country can differ from the wealth of its residents, as part of the national wealth is invested abroad while part of the domestic capital is held by foreigners.

The value of a country's external assets (+) and liabilities (-) is recorded in its international investment position (IIP). A positive IIP means that a country's external assets exceed its external liabilities or that the country is a net creditor, which indicates that its residents invest part of their wealth abroad. With a negative IIP, a country is a net debtor, and its capital stock exceeds the wealth of its residents:[8]

$$W_n = K + IIP.$$

2.2   Income and savings in the national accounts

2.2.1   Income

Following Piketty, we use net national income rather than the gross domestic product as the denominator of our wealth-income ratios. Net national income equals gross domestic product minus the consumption of fixed capital plus net foreign income from abroad, and is thus consistent with the concept of national wealth discussed previously. In this text, the terms *national income* and *income* all denote net national income.

The national accounts report national income at current prices and at constant 2010 prices. Since we are interested in real rather than nominal changes in income and wealth, we use the latter series. We also use the implicit deflator between the two national income series to convert all other nominal variables—notably savings and wealth—in a consistent manner.

2.2.2   Savings

While the data described up to this point allow us to calculate the private wealth-income ratios, we still need savings data to decompose these ratios into quantity and price effects. For consistency with Piketty's work, we use the savings figures

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[7] We include housing assets in the capital stock for consistency with Piketty's work. In general, housing assets are not considered to form part of the productive capital of the economy.

[8] While stock variables have only recently reappeared in closed-economy macroeconomics, they have been used somewhat longer in international macroeconomics (see Hausmann and Sturzenegger 2007; Lane and Milesi-Ferretti 2007). Most countries now publish an IIP (which records the value of external assets and liabilities at discrete points in time) alongside their balance of payments (which measures the inflows and outflows of capital over any period of time), although not all countries value IIP consistently at market value. Piketty refers to the IIP as 'net foreign assets', a term that we avoid due to conflicting use in the South African accounts.

straight from the institutional sector accounts, where net savings are calculated as the residual between disposable income, consumption expenditure and the consumption of fixed capital. Section 2.3 describes the decomposition methodology, and section 2.4 discusses in detail which savings rate we use.

2.3 The decomposition of the wealth-income ratio

2.3.1 The multiplicative decomposition methodology

The change in the value of assets between two points in time depends on the change in the quantity of assets at constant prices and the change in their respective market prices. As shown in Orthofer (2015), the quantity effect corresponds broadly with what is measured as savings in the national accounts, allowing us to talk about a saving-induced and a revaluation-induced component of any change in wealth.[9]

We follow the multiplicative decomposition methodology of the change in the value of assets that was proposed by Piketty and Zucman (2014).[10] Denoting real wealth and real asset prices (asset prices relative to consumer prices) at the end of period t as W_t and P_t, and denoting real income and the savings rate during period t as Y_t and s_t, real wealth at the end of period $t + 1$ can be expressed as

$$W_{t+1} = (W_t + s_{t+1}Y_{t+1})(1 + \frac{P_{t+1}}{P_t})$$

(1)

Denoting the total growth rate of wealth between period t and $t + 1$ as g_{t+1}^{w}, the saving-induced growth rate of wealth as $g_{t+1}^{w,s}$ and the revaluation-induced growth rate of wealth as $g_{t+1}^{w,r}$, this equation can be rewritten as

$$W_{t+1} = (1 + g_{t+1}^{w,s})(1 + g_{t+1}^{w,r})W_t$$

(1')

where $g_{t+1}^{w,s} = s_{t+1}\frac{Y_{t+1}}{W_t}$ and $g_{t+1}^{w,r} = \frac{P_{t+1}}{P_t}$. Finally, denoting the growth rate of income as g_t^y, the change in the wealth-income ratio β between two years becomes

$$\beta_{t+1} = \frac{(1 + g_{t+1}^{w,s})(1 + g_{t+1}^{w,r})}{1 + g_{t+1}^{y}}\beta_t$$

(2)

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[9] In addition to what is measured as savings, the quantity effect also comprises capital transfers from other institutional sectors or the rest of the world and other changes in the volume of assets, such as due to destruction and discovery. For South Africa, capital transfers are only available for 1995-2014, and data on other changes in the volume of assets are currently still under construction in the accumulation accounts. However, in other countries these categories are generally of negligible size compared to savings and revaluations; in South Africa, net capital transfers to the household sector have averaged 0.4 percent of national income since 1995.

[10] The methodology is described in detail in the Data Appendix to the working paper version of the article (Piketty and Zucman 2014). We use somewhat different notation, and change the formula $W_{t+1} = (W_t + s_t Y_t)(1 + q_{t+1})$ to $W_{t+1} = (W_t + s_{t+1}Y_{t+1})(1 + q_{t+1})$ to reflect that we use end-of-period values for wealth. It is also worth noting that revaluations on existing wealth and new savings are described with an average price change P_{t+1}/P_t, which may not be a good approximation in years in which certain asset classes experience very large price changes.

The dynamics of the wealth-income ratio thus depend on the growth in wealth relative to the growth in incomes. Letting growth rates without subscripts denote compound annual growth rates over a period spanning n years, the decomposition of a change in wealth and the wealth-income ratio over time can be generalized through equations (3)   and (4):

$$W_{t+n} = (1 + g^{w,s})^n (1 + g^{w,r})^n W_t$$

$$\beta_{t+n} = \frac{(1 + g^{w,s})^n (1 + g^{w,r})^n}{(1 + g^y)^n} \beta_t$$

(3)

(4)

2.3.2 Infinite-horizon solution: steady-state

If asset prices do not diverge systematically from the prices of goods and services in the long run, the steady-state (characterized by stable savings and growth rates) wealth-income ratio converges toward the ratio between the savings rate and the growth rate of income::

$$\beta_{t+n} \to \beta = \frac{s}{g^y}$$

(5)

This equation is the steady-state result of standard neoclassical growth models and a mathematical identity as long as s and g^y are constant and $g_t^{w,r}$ is zero (Piketty and Zucman 2014).

In their joint paper on wealth-income ratios in rich countries, Piketty and Zucman (2014) find that this steady-state prediction indeed describes wealth dynamics reasonably well over the very long run and at highly aggregated levels. Over shorter horizons in individual countries, however, valuation effects remain important, causing the wealth-income ratio to deviate from the saving-induced level. The shorter the horizon, the more the wealth-income ratio is also determined by the initial wealth-income ratio at the beginning of the period under analysis, requiring a different explanation for finite horizons.

2.3.3 Finite-horizon solution

Using the multiplicative decomposition over a finite horizon involves two steps. First, the growth rate of wealth is decomposed into a saving-induced and a price-induced component. For this purpose, equation (3) is rewritten as:

$$(1 + g^w)^n = (1 + g^{w,s})^n (1 + g^{w,r})^n$$

(3')

The cumulative growth of wealth, $(1 + g^w)^n = (1 + g^w_{t+1}) \times \ldots \times (1 + g^w_{t+n})$ can be calculated from annual balance sheet data on wealth, $W_t, \ldots, W_{t+n}$. Analogously, the cumulative saving-induced growth rate of wealth $(1 + g^{w,s})^n = (1 + g^{w,s}_{t+1}) \times \ldots \times (1 + g^{w,s}_{t+n})$
can be calculated from data on $s_t, \ldots, s_{t+n}$ and $\beta_t, \ldots, \beta_{t+n}$, using the definition that

$g_{t+1}^{w,s} = s_{t+1} \times Y_{t+1}/W_t$. Taking the n-th root yields the uniform-growth-weighted average annual rates g^w and $g^{w,s}$. The revaluation-induced component is the residual.

These rates can then be used to decompose the wealth-income ratio into three components: the impact of the initial wealth-income ratio, β_{ini}, a saving-induced component β_{sav} and a revaluation-induced component, β_{rev}:

$$\beta_{t+n} = \beta_{ini} + \beta_{sav} + \beta_{rev} \tag{6}$$

$$\beta_{ini} = \beta_t \times \frac{1}{(1+g^w)^n} \tag{6a}$$

$$\beta_{sav} = (\beta_{t+n} - \beta_{ini}) \times \frac{g^{w,s}}{g^w} \tag{6b}$$

$$\beta_{rev} = (\beta_{t+n} - \beta_{ini}) \times \frac{g^{w,r}}{g^w} \tag{6c}$$

2.4   Which savings rate?

We have argued that the *household sector* balance sheets are a good measure for the wealth of the entire *private sector*, because they include the assets and liabilities of the South African corporate sector to the extent that these businesses are owned by South African residents (as opposed to public sector or the rest of the world). Savings, in contrast, are recorded separately for the household and the corporate sector, regardless of the fact that the household sector ultimately has claims on corporate savings as the major shareholder of the corporate sector. At any point in time, corporations can choose between paying their profits out as dividends (or through share repurchases) or retaining them internally, thus increasing shareholders' claims on future payouts. The Modigliani-Miller invariance proposition predicts that, under restrictive conditions, shareholders would be indifferent between these two options, such that dividend payouts always translate into an equivalent drop in shareholder value (Miller and Modigliani 1961). In light of the substitutability of corporate and household savings, it has been suggested that total private savings may be a more meaningful measure than household savings when flow measures are used (see, for instance, David and Scadding 1974). In accordance with this reasoning, Piketty uses the private rather than the household savings rate in decomposing private wealth.

But this approach is not without limitations either. While the household sector is generally the largest shareholder of a country's corporate sector, it is not the only one – most corporations are at least partially owned by foreigners and/or the government. Similarly, households typically own at least some shares in foreign companies, despite the home bias in equity portfolios. Piketty and Zucman (2014) argue that their approach remains a good approximation because government ownership has become fairly small across countries, while net foreign asset positions are largely balanced (implying that each country gives and receives a comparable share of corporate savings). However, the approximation might be less valid in the context of developing countries, where state-owned enterprises constitute a substantial share of the corporate sector. Moreover, it seems that large

discrepancies in the corporate savings rates across countries would also render the approximation less valid, even where net foreign asset positions are relatively small.

As Piketty and Zucman (2014) point out in their Data Appendix, the national accounts do not systematically report bilateral flows between the resident institutional sectors and the rest of the world, such that there is no straightforward way to improve the matching between private wealth and savings. For consistency with these authors we therefore still use the private savings rate, but complement all analyses with estimates using the household savings rate as well.

3   Private wealth and its composition

3.1   Wealth-income ratios

In 2014 South Africa's private wealth stood at 255 percent of national income; in 2010—the end of Piketty's horizon—just above 230 percent. How does this compare with the eight advanced economies?

As Table 1 shows, South Africa's 2010 wealth-income ratio was about 40 percent lower than that of Germany, Canada and the United States, and 60 percent lower than that of Italy or France. While this is in line with the prediction that developing countries are less capital-abundant and capital-intensive than advanced economies, a higher wealth-income ratio would not have been surprising for a middle-income country that is known for its extraordinary riches – platinum mines, industrial farms, globally operating corporations, the luxury real estate of the Western Cape and a legacy of unequal economic development over three centuries.

Table 1 and Figure 1 also show that the discrepancy between South Africa and the advanced economies was considerably less pronounced back in the 1970s. In 1975, South Africa's wealth-income ratio was on par with Canada's, and even exceeded Germany's. This suggests that today's discrepancy between South Africa and these countries is not explained by a structurally lower wealth-income ratio of South Africa as a developing country or by South Africa's particular political and socio-economic legacy, but by the specific developments that drove the rise of the wealth-income ratios of the rich countries over the past four decades.

[TABLE 1 & FIGURE 1 ABOUT HERE]

The comparison between 1975 and today masks the dynamics within the last decades. While the advanced economies experienced a pronounced increase of the wealth-income ratio over the entire period, the South African development was U-shaped: Between the late 1970s and the late 1990s, the wealth-income ratio declined from over 260 percent to about 190 percent, only to return to earlier levels in the subsequent decade and a half (see Figure 2). The unstable political situation within South Africa in the first half of the period negatively affected asset wealth, denying South Africa an experience matching those of the developed countries (Table 1), a trend that reversed in the late 1990s.

[FIGURE 2 ABOUT HERE]

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3.2   Wealth composition

Before proceeding to the drivers of wealth accumulation, it is useful to consider the composition of wealth. In most countries and for most individuals, housing assets constitute the bulk of their wealth (OECD 2015). It is thus remarkable that housing constitutes only about one quarter of total private assets in South Africa, compared to an average share of 40 percent in Piketty's sample. Given the low asset-to-income ratio, the discrepancy is even bigger: As shown in table 2, housing assets are worth as much as 75 percent of national income in South Africa, compared to 180-380 percent in the advanced economies.

[TABLE 2 & FIGURE 3 ABOUT HERE]

The low housing share implies that three quarters of assets in South Africa are financial, with interests in pension funds and long-term insurers constituting the single largest category. The importance of pension assets for South African households is less surprising when considering that the domestic pension system is almost entirely capitalized and privately administered. This characteristic of the retirement fund landscape dates back to the 1980s and 1990s, when the industry experienced a sweeping transition from partially funded defined benefit to fully funded defined contribution arrangements – a transition that is reflected in the stark increase of financial assets between 1975 and 1995 (see Figure 3).[11]

In most advanced economies, in contrast, pension liabilities are generally not fully funded. Particularly in Continental Europe, most pension schemes are administered by the social security system, and function on a pay-as-you-go basis. Under the accounting rules of the SNA, such pension entitlements are not recorded on households' balance sheets, which explains the comparatively low share of pension assets in Piketty's sample. Even in countries like the United Kingdom and the United States, where the retirement landscape is more diverse, pension wealth constitutes at most a quarter of total assets; in Continental Europe the share is less than 15 percent.[12]

The impact of institutional arrangements (as emphasised by Acemoglu and Robinson (2015)) is quite striking in this case. Aron et al (2008) also provide details

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[11] Although many public sector employees are still covered by defined benefit schemes, the vast majority of private sector employees are now covered by defined contribution arrangements, sponsored by employers, employer groups or trade unions. Under both models, the occupational pensions are currently at least partially funded. Only the government old-age grant, intended to prevent old-age poverty irrespective of previous employment, is funded from current government revenue rather than through funds. For more than three quarters of South Africans in retirement age, the means-tested old-age grant of at most 1,410 ZAR (ca. 100 USD) in 2014 monthly constitutes the main source of income (see *Retirement Fund Reform - A Discussion Paper* by the National Treasury, December 2004).

[12] Whether the structure of the pension system also impacts on overall wealth is unclear. Under privately administered pension schemes, the corresponding assets (of households) and liabilities (of financial corporations) are recorded on the sectoral balance sheets. Under social security schemes, in contrast, both assets (of households) and liabilities (of the general government) are unrecorded. From an accounting perspective, the measures of wealth should thus not be distorted. From a behavioural perspective, however, the presence of social security pensions might reduce the accumulation of private wealth *ceteris paribus*.

about how compositional changes in the components of net wealth in South Africa were influenced by institutional and political developments between 1975 and 2005.

4 Decomposing the wealth-income ratio

4.1 International comparison

4.1.1 Steady state decomposition

Table 3 shows the average savings and growth rates for South Africa and Piketty's eight rich countries between 1970 and 2010. Over this period, real national incomes in South Africa grew at g^y = 2.5 percent per year, while the private savings rate s averaged less than eight percent. In terms of the growth rate, South Africa ranks in the middle of the sample, owing largely to much higher-than-average population growth. In terms of savings, in contrast, South Africa ranks close to the bottom. In that context, it is worth noting the composition of savings: While the importance of household savings relative to corporate savings varies widely even across the advanced economies, South Africa stands out in that households contribute merely a quarter of total private savings – much less than anywhere else. While South Africa's corporate savings rate is among the highest in the sample, it is thus the low household savings rate that brings South Africa's private savings rate down in comparison.

[TABLE 3 ABOUT HERE]

Per equation (2): $\beta = s/g^y$, the savings and growth figures suggest that South Africa's wealth-income ratio is structurally lower than those of the advanced economies because the country's savings rate has been low relative to its rate of income growth – regardless of whether the private or household savings rate is considered. Especially when using total private savings, however, the steady-state equation does not provide a satisfactory explanation of the divergence between South Africa and the advanced economies. Although all three countries had fairly similar savings and growth rates, the wealth-income ratio decreased in South Africa, increased by 90 percentage points in the United States and increased by 220 percentage points in the United Kingdom. This indicates that valuation effects played a substantial role in the accumulation of wealth over the past four decades (in line with results by Aron et al (2008) for the period 1975-2005).

4.1.2 Finite horizon decomposition

Table 4 displays the results of the multiplicative decomposition proposed by Piketty and Zucman (2014). In South Africa, national income grew at g^y = 2.5 percent per year between 1975 and 2010, while private wealth grew at a rate of g^w = 2.4 percent. The small discrepancy in the growth rates of income and wealth explains the slight decline in the wealth-income ratio from β_{1975} = 240 percent to β_{2010} = 231 percent.

Plugging the average private savings rate of s^{priv} = 7.7 into formula (3'), we find that we would have predicted wealth to grow by $g^{w,s}$ = 4.1 percent per year in the

absence of valuation effects, implying an increase rather than a decrease in the wealth-income ratio. The fact that wealth grew substantially less pronounced than suggested by the savings rate indicates that valuation effects were negative, amounting to $g^{w,r} = -1.7$ percent per year. This finding contrasts starkly with the advanced economies: Only Germany and Canada experienced slightly negative valuation effects between 1975 and 2010; in the United Kingdom, Australia and the United States, in contrast, asset price increases explained up to half of the total growth in private wealth.

If only the household savings rate of $s^{hh} = 2.2$ is considered instead of the total private savings rate, the saving-induced growth in wealth amounts to only $g^{w,s} = 1.2$ percent per year. In this case, the situation in South Africa is more in line with the advanced economies, where the total valuation effect explains up to three quarters of the increase in wealth. Figure 4 illustrates the bridge between the total revaluation effect from the household perspective and the residual revaluation effect with corporate savings taken into consideration.

The stark discrepancy between the 'total' and 'residual' revaluation effect in South Africa is due to the disproportionate importance of corporate savings relative to household savings. The specific composition of private savings in the wealth accumulation equation also stands out in Figure 5, which displays the results of equation (6). The low contribution of household savings to the increase in private wealth is visible both in absolute (top panel) and relative (bottom panel) terms. Conversely, the contribution of corporate savings exceeds that of almost all other countries in both panels.[13]

[TABLE 4, FIGURE 4 & FIGURE 5 ABOUT HERE]

4.1.3 Savings, revaluations and the portfolio composition

The discrepancy between South Africa and the advanced economies is likely also determined by differences in the asset composition. One of the main contributors of the growth of private wealth observed for Piketty's rich countries was the prolonged increases in house prices over the last four decades (Piketty 2014; Rognlie 2015). Rising house prices do result in real revaluations and could manifest themselves in higher household saving, although the relationship between house prices and the savings rate is not uncontroversial. Both of these two components of wealth accumulation are much less pronounced in South Africa than the advanced countries in Piketty's sample.

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[13] The composition of private savings is generally given little attention, as households are thought to "pierce the corporate veil" and prefer payouts of (household savings) over the retention of profits (corporate savings) only if dividends are associated with taxation or inflation advantages over capital gains (see section 2.4). In an analysis of personal and corporate saving in South Africa, however, Aron and Muellbauer (2000) suggest that 'the 'piercing of the veil" does not entirely explain the composition of private savings. Other drivers of the rising corporate saving share include the increase in household debt, which has its counterpart in the assets and savings of financial corporations.

In section 3.2, we saw that housing assets are much less important than financial assets in the composition of household portfolios, while equities play a disproportionately larger role. Owing in part to the long history of controls regarding capital and exchange outflows, the large majority of these equities are likely tied to domestic companies.[14] This suggests a reason why it is corporate savings rather than household savings or revaluations that explain the largest part of private wealth accumulation in South Africa.

4.2   Inter-temporal analysis

In a discussion of Piketty's *Capital*, Acemoglu and Robinson (2015) stress the importance of taking into account the institutions and politics prevalent in specific countries at specific points in time. For South Africa, the most important institutional and political shift over the period 1975-2014 is certainly the transition from the apartheid regime to a new democratic government in 1992-1996.

As shown in Figure 2, these transition years are indeed those with the lowest wealth-income ratios in the 40-year history: Between the mid-1980s and the late 1990s, β decreased from 260 to 190 percent, as private wealth grew significantly less than what would have been predicted from the relatively high level of savings (see Table 5). The negative valuation effects likely reflect the capital outflows and disinvestment associated with the economic and political struggles during the final years of the apartheid government (which included the imposition of economic sanctions in 1986-1991), as well as the political uncertainty over the transition of power and the course of economic policy and property rights in the mid-1990s.

But private wealth recovered from the late 1990s onwards, as asset price increases more than compensated for the falling savings rates. While South Africa thus still does not look like the advanced economies today, it currently seems to be on a trajectory to resemble them more closely.

Overall, it is also salient from Table 5 that savings explain the accumulation of wealth better over the 40-year horizon than over any of the four decades individually, confirming Piketty's finding that valuation effects only fade over the very long run, while being highly important determinants of wealth over shorter periods of time.

[TABLE 5 ABOUT HERE]

5   Wealth-income ratios and global capital flows

In a closed economy, the wealth of a country's (private) residents would be equivalent to the domestic (private) capital stock, i.e., the capital stock available for

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[14] Under the current prudential rules of the SARB the foreign exposure of pension funds is restricted to 25 percent of retail assets; in the case of collective investment funds, long-term insurance funds and other institutional investors, this share cannot exceed 35 percent of assets under management; although an additional allowance in the order of five percent of assets exists for African assets in both cases (see Section 0 - F.6 Capital transactions in the Exchange Control Manual, available online from the SARB).

(private) production within the country's boundaries. In South Africa—as in all major advanced economies—however, wealth is relatively mobile, with residents holding assets abroad and foreigners holding assets in South Africa. This raises the question whether the low South African wealth-income ratio can be explained by the fact that foreigners might own a significant proportion of the South African capital stock.

Over the last 60 years, South Africa has indeed consistently had a negative international investment position, meaning that the total value of foreign liabilities exceeded the total value of foreign assets held by South African residents abroad. However, the net debtor position is relatively small currently, amounting to −14 percent of national income in 2014 (up from −40 percent in the 1970s).[15] It implies a private capital-income ratio of β_k = 269 percent (compared with the private wealth-income ratio of β = 255 percent), which is still significantly lower than in the sample of advanced economies (where the international investment position ranges from approximately −70 to +70 percent).[16]

This is in contrast to the predictions of standard models in international macroeconomics, according to which capital tends to flow from capital-abundant rich countries to capital-scarcer poor countries, in which the marginal productivity of capital and hence the returns on capital are higher. The fact that international capital flows are insufficient to balance capital-income ratios and returns to capital are, however, a well-documented puzzle in economics (see Feldstein and Horioka 1980; Lucas 1990).

6 Wealth-income ratios and inequality

6.1 From wealth-income ratios to the factor distribution

The relative importance of wealth and incomes does not, by itself, determine which share of output goes to capital and labour. This is due to the decreasing marginal productivity of capital: as the capital intensity of an economy increases, the return on capital tends to decrease accordingly.

Under the assumption that all assets are real assets and that revaluation effects wash out in the long run (such that real capital gains or losses on the principal can

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[15] International studies often use the External Wealth of Nations (EWN, EWNII) database compiled by Lane and Milesi-Ferretti (2007) to ensure consistent valuation methodologies for foreign assets and liabilities. Since the EWNII entries for South Africa are very close to the official international investment position compiled by the SARB, however, we use only the national estimates.

[16] Since we include housing capital in private capital for consistency with Piketty's work, 'productive capital' includes includes capital used for the production of housing services. In 2014, fixed capital of private enterprises amounted to 190 percent of national income. Adding the fixed capital of households of 90 percent yields the private capital-income ratio of approximately 270 percent. It is interesting to note that the increase in the private wealth-income ratio since the late 1990s contrasts with a significant decline in the fixed capital of private corporations over the same time period, 215 percent at the end of the 1990s to 190 percent in 2014.

be ignored), the private wealth-income ratio and the capital share of output α can be related through the formula

$$\alpha = r\beta_{(-)}) \times \beta \quad , \tag{7}$$

where the rate of return on capital r is a decreasing function of the wealth-income ratio β (Piketty 2014). The distributional effect of an increase in the wealth-income ratio thus depends on the responsiveness of the rate of return, which in turn depends on the elasticity of substitution σ between capital and labour in the aggregate production function. If $\sigma < 1$, capital cannot effectively be substituted for labour (the two factors of production are complements), such that the marginal productivity of additional capital falls disproportionately. With $\sigma > 1$, additional capital can be employed more productively, allowing its owners to capture a larger share of total output. Only in the case that $\sigma = 1$ does an increase in the wealth-income ratio have no impact on the factor distribution (Arrow et al. 1961; Bronfenbrenner 1960; Piketty 2014).[17]

Most economic models assume a unitary elasticity of substitution; many empirical papers even suggest that the elasticity is lower (Rognlie 2015). In *Capital*, Piketty contests both views by observing that capital shares across countries followed a similar—albeit less pronounced—trend as the wealth-income ratio, which indicates that the returns on capital have not fallen as much as the increase in capital intensity would have suggested. Since 1970, capital owners in the major advanced economies have thus been able to expand their incomes (net of depreciation) from 15-25 to 25-30 percent of total output. For Piketty, this points to an increasingly high elasticity of substitution.[18]

One reason for the disagreement on the elasticity of substitution between capital and labour and the factor shares of income is that these concepts are hard to measure. The most common methodology to measure the latter is to calculate the labour share by dividing the aggregate compensation of employees through GDP at factor cost, and to derive the capital share as the residual (Gollin 2002). The SARB provides such estimates for South Africa, which put the gross capital share just below 50 percent. Netting out depreciation yields a net capital share just below 40 percent – significantly higher than the 25-30 percent reported in Piketty's sample of advanced economies.[19]

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[17] While the explanation for the responsiveness of r to changes in β assumes that capital is remunerated according to its marginal productivity, the same result can be obtained in models in which the remuneration of capital is instead determined by the bargaining power of capital owners relative to workers.

[18] Piketty's view has been supported by Karabarbounis and Neiman (2014), who estimate that $\sigma = 1.25$. It has been contested by Rognlie (2015), who argues that the increase in the capital share was driven primarily by housing capital, and thus allows no inference on the shape of the aggregate production function. Instead of being a consequence of a high elasticity of substitution, the parallel increase in α and β were driven by a third factor, notably the increase in house prices.

[19] The methodology of dividing the aggregate compensation of employees through GDP tends to understate the labour share, since incomes of those *not* formally employed in the corporate sector are

According to Piketty (2014) a combination of a relatively low wealth-income ratio and a high capital share points to a disproportionately high return on capital. The implied average annual pre-tax return on private capital has been 15 percent on average over the last four decades – significantly higher than the 4-8 percent Piketty and Zucman estimate for the eight advanced economies, and also significantly higher than the real rate of income growth of two percent per year on average.[20]

Figure 6 shows α, β and r since 1975. As in the case of Piketty's sample, the capital share increased over the last decades. Yet unlike in Piketty's sample of advanced economies, this increase did not correlate with an increase in the wealth income ratio. If anything, α and β seem to have moved inversely. The capital share of output grew substantially while the wealth-income ratio decreased in the 1980s and 1990s, peaking shortly after β reached its low. Conversely, the recent increase in the wealth-income ratio was not accompanied by a further expansion of the capital share, but rather by a small contraction. While it would be imprudent to conclude from this alone that $\sigma < 1$ in South Africa, these series do suggest that an increase in the wealth-income ratio does not automatically increase capital's share in the factor distribution. An elasticity of substitution less than unity is also consistent with the industry-level work of Kreuser, Burger and Rankin (2015), who estimate the elasticity of substitution for South Africa between 0.6 and 0.9. Both the absence of a correlation between α and β, and the evidence that in SA it may be the case that σ < 1, supports Rognlie's (2015) hesitation in accepting the 'accumulation view'.

[FIGURE 6 ABOUT HERE]

6.2   From wealth-income ratios to the structure of inequality

The reason we would worry about an increasing capital share of output is that wealth tends to be more concentrated than labour incomes, such that a higher

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included in the denominator but not the numerator (Gollin 2002). An alternative methodology is to divide the *corporate* compensation of employees through *corporate* value added only (**Karabarbounis2014b**). For South Africa, the corporate sector shares are very similar to the total economy estimates. Using SARB data, the corporate and total capital shares for 2010 are 51 and 50 percent; in Karabarbounis and Neiman' database they are 48 and 46 percent. To obtain net shares, depreciation is subtracted from the denominator (**Karabarbounis2014b**).

[20] Based on Piketty and Zucman (2014), we derive r as follows: the net capital share α is defined as the ratio between capital incomes and net domestic product at factor cost, $\alpha \equiv Y_K/(NDP - T)$, where T denotes production taxes. β is defined as the ratio between private wealth and national income, $\beta \equiv W/Y$. With r defined as the ratio between capital incomes and private wealth, we can write $r \equiv Y_K/W = \alpha/\beta \times (NDP - T)/Y$, where all figures are net of depreciation. For South Africa, the results for the period spanning 1975-2014 are α = 37 percent, β = 228 percent, $(NDP - T)/Y$ = 92 percent, yielding r = 15 percent on average. Note that Piketty and Zucman (2014) do not multiply α/β by $(NDP - T)/Y$. Note also that the rate of return is derived under the assumption that all assets are real assets and that valuation effects even out in the long run. For Piketty, these assumptions provide a reasonably good approximation, as real assets constitute the majority of household assets in the advanced economies. For us, however, the calculated return might be overstated, as about 30 percent of assets are nominal (while the inflation rate averaged 10 percent).

capital share tends to be associated with higher overall inequality (Piketty and Zucman 2014).

While there is little reliable data on the distribution of wealth in South Africa, it is likely that the degree of inequality is indeed extreme. According to the National Income Dynamics Survey of 2012, 10 percent of South African households earn half of all incomes but own 80-90 percent of all wealth (see also Daniels, Finn and Musundwa 2012).[21] The equivalent numbers for the OECD are 'only' about 30 and 50 percent (OECD 2015). Even within the wealthiest decile, the distribution tends to be highly uneven. Data from the Forbes billionaires list suggest that the wealthiest 10 individuals own about four percent of the country's private wealth, while New World Wealth estimates that 46,800 high-net-worth individuals own 26 percent of the combined wealth of all 54 million South Africans.[22]

Together with the high capital share, these figures suggest that wealth inequality should play an important role in shaping overall inequality in South Africa. This contrasts with the emphasis that South African researchers and policymakers currently place on labour market inequality: according to Leibbrandt et al. (2010), for instance, wage inequality explains up to 85 percent of overall income inequality.[23] One potential explanation is that wealth is too concentrated to shape the distribution anywhere but at the very top: most South Africans have no income-generating assets at all, such that their position in the income distribution is determined by their wages alone.[24]

While such a particular shape of the wealth distribution would justify the emphasis on labour market inequality for the purpose of poverty reduction, it does not mean that wealth inequality is of little importance in South Africa. As pointed out by Angus Deaton, political economy concerns provide a strong rationale to worry about an extreme concentration of wealth in the hands of a few:

> The political equality that is required by democracy is always under threat from economic inequality, and the more extreme the economic inequality, the greater the threat to democracy. Rules are set not in the public interest but in the interest of the rich, who use those rules to become yet richer and more influential. (...)

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[21] Estimates on the basis of regressions between income and wealth inequality put the wealth share of the top decile at 72 percent (Stierli et al. 2014).

[22] The 10 wealthiest South Africans in 2015 were Johann Rupert (luxury goods), Nicky Oppenheimer (diamonds), Christoffel Wiese (retailing), Patrice Motsepe (mining), Koos Bekker (media), Stephen Saad (pharmaceuticals), Laurie Dippenaar (financial services), Desmond Sacco (mining), Gus Attridge (pharmaceuticals) and Jannie Mouton (financial services). Of these, only two individuals inherited their fortunes (Johann Rupert and Nicky Oppenheimer), the remaining eight are self-made billionaires.0

[23] In the advanced economies, this share is between two thirds and three quarters (Piketty 2015).

[24] Note that the findings of Leibbrandt et al. are based on the National Income Dynamics Survey, which—being a survey with focus on incomes, expenditures, living conditions and poverty—tends to under-sample the wealthiest households and under-report assets (particularly pension assets). It might therefore understate the importance of capital incomes significantly.

> To worry about these consequences of extreme inequality has nothing to do with being envious of the rich and everything to do with the fear that rapidly growing top incomes are a threat to the wellbeing of everyone else. (Deaton 2013, pp. 213-214)

If wealth is really as concentrated as our stylized evidence indicates, these concerns could be all the more relevant in South Africa.

7   Concluding remarks

The intention of this paper was to test the applicability of Piketty's analysis of developed economies in the context of a developing country. Consistent with Rognlie's (2015) critique of Piketty (2014) based on US data, we argue that there is evidence that in South Africa the elasticity of substitution may be less than 1 and the wealth income ratio has been U-shaped over the past few decades so the capital share was not correlated with the wealth income ratio. These characteristics reflect structural differences between developing and advanced economies (lower savings and higher growth rates) as well as specific factors surrounding South Africa's political transition in the 1980s and 1990s. This supports the argument by Acemoglu and Robinson (2015) that political and economic instructions, as well as the endogenous evolution of technology are crucial to understanding the evaluation of inequality over time.

It is important to note that this paper does not replicate all aspects of Piketty's research. First, it focuses on private wealth only, as the sectoral balance sheets for the public sector are still under construction. Once these data become available, they will allow comparing *national* wealth- and capital-income ratios, an aspect of particular relevance from the perspective of economic growth. The public balance sheets will also help explain the development of the private wealth-income ratio. Second, and perhaps more important, this paper does not allow for drawing definitive conclusions about the distribution of wealth in the population. Reliable distributional data is extremely scarce, as existing studies tended to focus on incomes rather than wealth. The survey data that does exist are subject to severe sampling and response biases in the upper end of the distribution, while information from 'rich lists' in turn excludes the middle classes. Our future work will focus on combining different data sources for a more reliable view on the wealth distribution, which we expect to be even more unequal than the income distribution.

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A   Tables and Figures

Table 1: Private wealth-income ratios, 1975, 1996, 2006 and 2010

	β in 1975	β in 1996	β in 2006	β in 2010	Δ 1975-2010
South Africa	240	207	252	231	−9
United States	320	389	488	410	90
Canada	242	363	388	416	174
Japan	386	586	583	601	215
Australia	349	401	532	518	169
Germany	229	321	378	412	183
United Kingdom	301	410	519	522	221
France	317	336	534	575	258
Italy	321	514	637	676	355

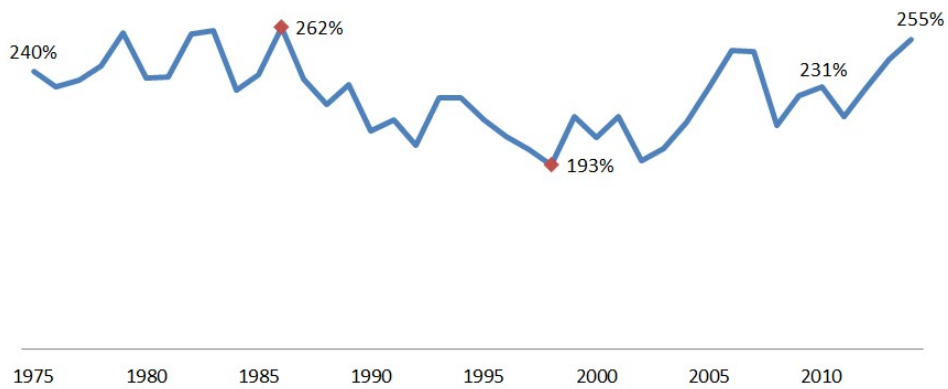*Note*: Household sector wealth in percent of national income, 1975, 1996, 2006 and 2010.

Source: author's calculations from SARB database and Piketty & Zucman's online database

Figure 1: Private wealth-income ratios, 1900-2010
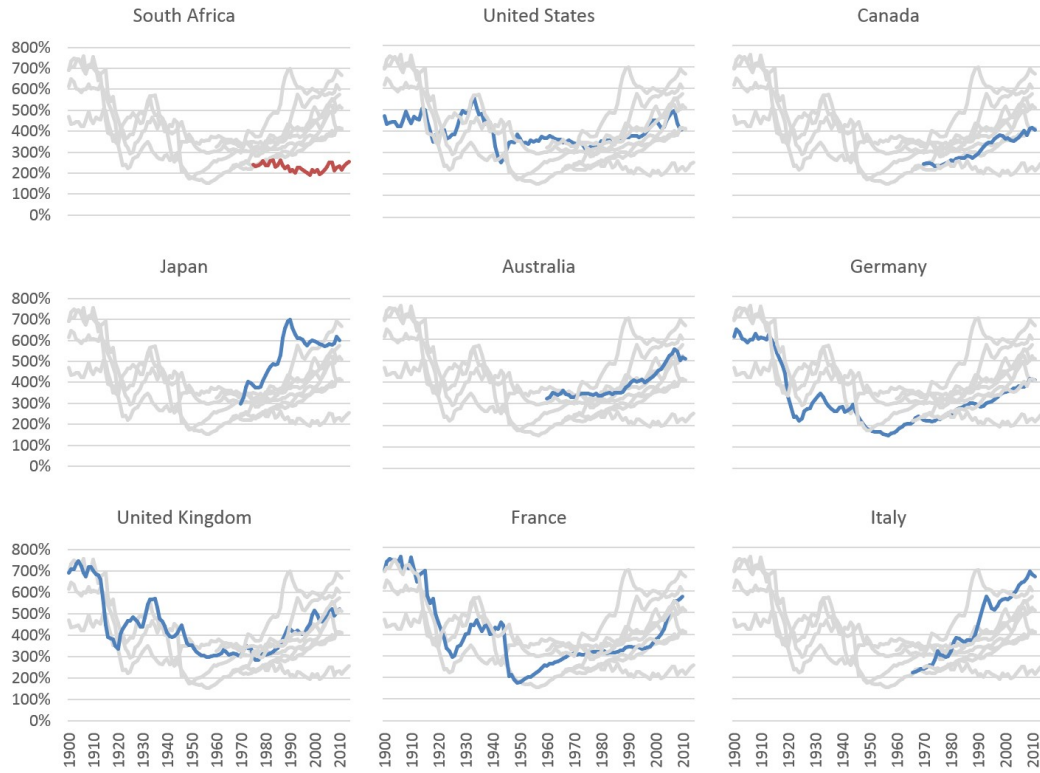
Note: Household sector wealth in percent of national income, 1900-2010. author's calculations from SARB database and Piketty & Zucman's online database

Figure 2: Private wealth-income ratio, 1975-2014

Note: Household sector wealth in percent of national income, 1975-2014. Maximum, minimum, 1975, 2010 and 2014 marked. Source: author's calculations from SARB database
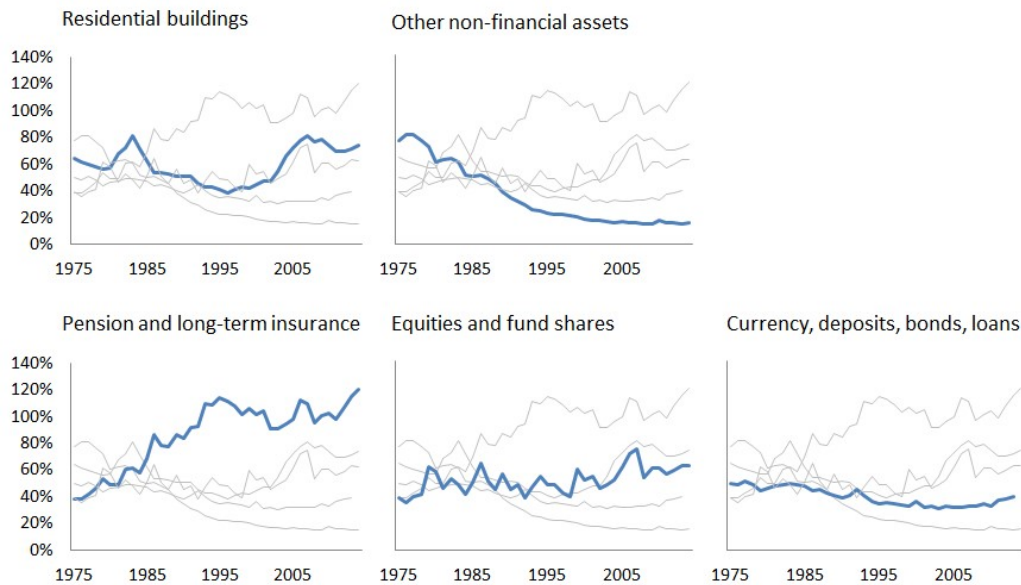
Table 2: Portfolio composition, 2010

	South Africa		Piketty-8	
Residential buildings	74	(26)	235	(40)

Other non-financial assets	18	(6)	31	(5)
Total non-financial assets	91	(32)	267	(45)
Pension funds and life insurance	103	(36)	107	(19)
Equities and fund shares	61	(21)	91	(16)
Currency, deposits, bonds and loans	34	(12)	119	(20)
Total financial assets	198	(68)	316	(55)
Total assets	289	(100)	583	(100)
Mortgage advances	33			
Other liabilities	25			
Total liabilities	58		109	
Wealth	231		474	

Note: Portfolio composition of the household sector, 2010, in percent of national income (in percent of total assets). Piketty-8 denotes national-income weighted averages for Piketty's sample of eight advanced economies. Source: author's calculations from SARB database and Piketty & Zucman's online database

Figure 3: Portfolio composition, 1975-2014

Note: Portfolio composition, 1975-2014, in percent of national income. Source: author's calculations from SARB database

Table 3: Savings and growth rates, 1975-2010

	Real income growth	Productivity	Population	Net savings rate	Households	Corporates

South Africa	2.5	0.5	2.0	7.7	2.2	5.5
United States	2.8	1.8	1.0	8.0	4.7	3.3
Canada	2.6	1.5	1.1	12.5	7.4	5.1
Australia	3.1	1.7	1.3	9.2	5.3	3.9
Japan	2.3	1.9	0.4	16.1	7.2	8.9
Germany	2.2	1.4	0.8	12.8	9.8	3.0
France	2.0	1.5	0.5	11.4	9.2	2.2
United Kingdom	2.3	2.0	0.3	7.5	2.8	4.8
Italy	1.8	1.5	0.2	16.7	16.4	0.3

Note: Private savings rate (households and corporations, net of depreciation) and growth rate of real national income, 1975-2010, uniform-growth-weighted averages, in percent. author's calculations from SARB database and Piketty & Zucman's online database

Figure 4: Decomposition of the private wealth-income ratio, 2014
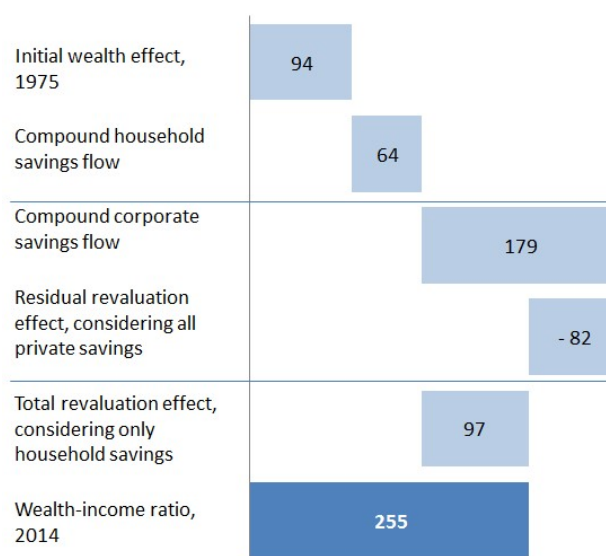
Note: Decomposition of the wealth-income ratio of 2014, on the basis of 1975, in percent of national income. Source: author's calculations using SARB data

Table 4: Decomposition of β, Cross-section, 1975-2010

Decomposition using the private savings rate

	Growth rate of income	Growth rate of wealth	Private savings rate $\dfrac{s^{priv}}{7.7}$	Savinginduced component	Revaluationinduced component
United States	2.9	3.6	8.0	2.2	1.4

Australia	3.1	4.2	9.2	2.8	1.5
United Kingdom	2.3	4.0	7.5	2.0	2.0
Canada	2.6	4.2	12.5	4.3	−0.1
France	2.0	3.7	11.4	3.0	0.7
Japan	2.3	3.6	16.1	2.8	0.8
Germany	2.2	3.9	12.8	4.0	−0.2
Italy	1.8	4.0	16.7	3.8	0.2

Decomposition using the household savings rate

	Growth rate of income	Growth rate of wealth	Household savings rate	Savinginduced component	Revaluationinduced component
	g_y	g_w	s_{hh}	$g_{w,s}$	$g_{w,r}$
South Africa	2.5	2.4	2.2	1.2	1.2
United States	2.9	3.6	4.7	1.5	2.1
Australia	3.1	4.2	5.3	1.8	2.4
United Kingdom	2.3	4.0	2.8	0.9	3.0
Canada	2.6	4.2	7.4	2.8	1.3
France	2.0	3.7	9.2	2.5	1.2
Japan	2.3	3.6	7.2	1.4	2.2
Germany	2.2	3.9	9.8	3.2	0.7
Italy	1.8	4.0	16.4	3.8	0.2

Note: Decomposition of the drivers of the wealth-income ratio between 1975 and 2010; multiplicative methodology (Piketty 2014). β_t and β_{t+n} are given in percent of nominal income, growth rates and savings rates in percent per year. Source: author's calculations from SARB database and Piketty & Zucman's online database

Figure 5: Decomposition of the private wealth-income ratio, 2010

Note: Comparison of the drivers of the wealth-income ratios of 2010, on the basis of 1975, in percent of national income (top panel) and in percent of total (bottom panel). Source: author's calculations from SARB database and Piketty & Zucman's online database

Table 5: Decomposition of β, Decade split, 1975-2014

Decomposition using the private savings rate

	Initital β income	End β	Growth rate of wealth rate	Growth rate of rate	Private savings comp.	Savings-induced	Reval.induced comp.
	β_t	β_{t+n}	g^y	g^w	s^{priv}	$g^{w,s}$	
1975-1985	240	238	1.6	1.6	13.6	5.7	
1985-1995	238	216	1.6	0.6	10.5	4.6	
1995-2005	216	231	3.6	4.4	6.8	3.3	
2005-2014	231	255	2.9	4.1	4.5	1.9	
1975-2010	240	231	2.5	2.4	7.7	4.1	
1975-2014	240	255	2.4	2.6	7.5	3.9	

Decomposition using the household savings rate

	Initital β income	End β	Growth rate of wealth rate	Growth rate of rate	Household savings comp.	Savings-induced	Reval.induced comp.

	β_t	β_{t+n}	g^y	g^w	s^{hh}	$g^{w,s}$	$g^{w,r}$
1975-1985	240	238	1.6	1.6	5.3	2.2	−0.7
1985-1995	238	216	1.6	0.6	3.9	1.6	−1.0
1995-2005	216	231	3.6	4.4	1.4	0.7	3.7
2005-2014	231	255	2.9	4.1	−1.0	−0.5	4.6
1975-2010	240	231	2.5	2.4	2.2	1.2	1.2
1975-2014	240	255	2.4	2.6	1.7	1.0	1.6

Note: Decomposition of the drivers of the wealth-income ratio between 1975 and 2014. Multiplicative methodology (Piketty 2014). β_t and β_{t+n} are given in percent of nominal income, growth rates and savings rates in percent per year. Source: author's calculations using SARB data

Figure 6: Capital-income ratios, capital shares and implied returns
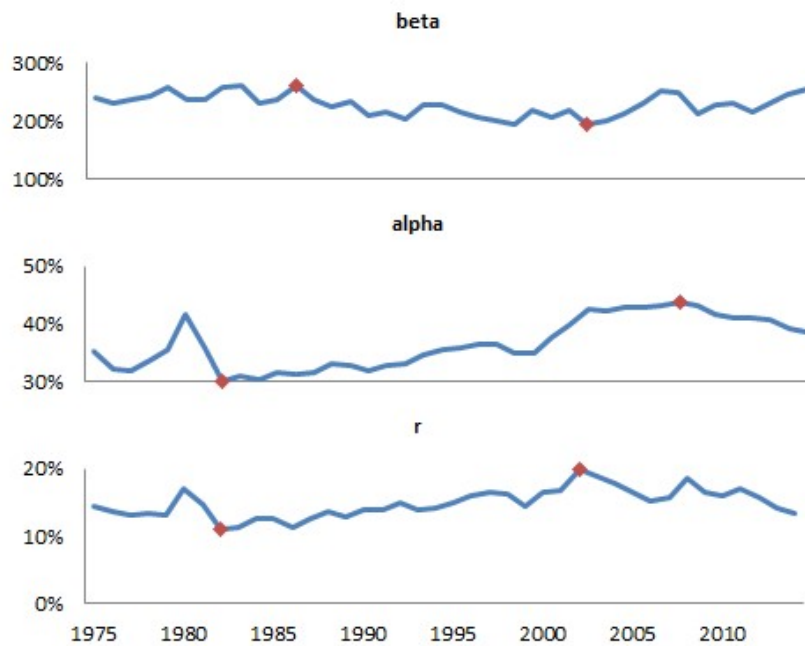
Note: Capital-income ratios β_k, capital shares α and implied rates of return $r = \frac{\alpha}{\beta_k}$, 1975-2014. Separate scales; minimum and maximum marked. Source: author's calculations from SARB database