

South African households - how to deleverage without saving

October 2015

Jean-François Mercier and Elriette Botes

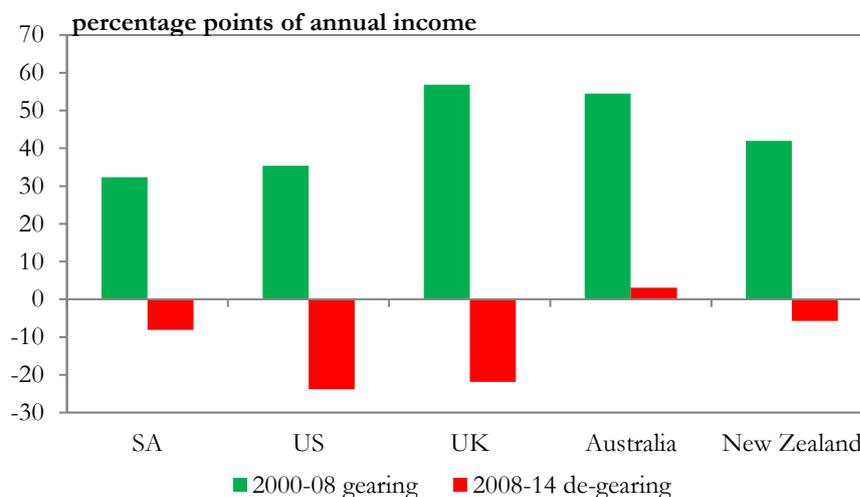
Abstract

This note briefly delves into the saving and deleveraging behaviour of SA households, looking in particular at reasons for the absence of an improvement in the saving rate since the Global Financial Crisis even as households reduced their debt ratio over the period. It further compares the South African case with other high household-debt economies and assesses whether a high debt ratio was a lesser constraint on household consumption in South Africa than in these countries. It finds that, unlike in other countries with elevated debt, deleveraging by South African households did not occur at the expense of their consumption expenditure. Rather, households curtailed their accumulation of residential and financial assets. Looking ahead, this suggests that the room for an acceleration in consumer spending is limited, unless income growth picks up significantly, and that consequently, policy measures should rather aim at restoring a ‘saving culture’ in the country to support stronger medium-term growth.

Introduction

South Africa’s household debt-to-income ratio followed a rather similar pattern to many developed economies in the past fifteen years or so: After a significant increase before the Global Financial Crisis (GFC), from 54,1 per cent in 2000 to a high of 86,4 per cent in 2008, it retreated moderately thereafter (see Figure 1). As of 2Q 2015, the latest data available, it stood at 77,8 per cent. However, and in contrast to other countries that experienced a similar pattern of household leveraging and deleveraging, South African national accounts data have not shown an improvement in the household saving ratio (net saving to net disposable income of households) since the GFC. Indeed, the ratio has remained in negative territory since 4Q 2005. The combination of these two trends thus raises the following two questions: Is there a “paradox” between the lack of improvement in household savings and deleveraging? And in turn, does it mean that elevated debt did not act as a “constraint” on household consumption in recent years, as some observers would believe?

Figure 1: Changes in household debt-to-income ratios in selected countries



To address these two questions, this note first highlights key elements of households' income, expenditure and financial accounts, and points out how – in the South African context – households were able to reduce their debt ratio without an increase in their saving rate. It then attempts to explain why the South African situation differs from that of other countries with elevated household debt, and ascertain whether a high debt ratio was a lesser constraint on household consumption in South Africa than in these other countries. In turn, it looks at domestic economic and policy implications of the SA situation, in particular the extent to which it may inform the need for continued monetary accommodation.¹

From saving and consumption to debt

Under national accounting of the household sector (see Annexure 1), household disposable income is split between household final consumption and saving. Several reasons may prompt a household to increase or reduce its consumption, such as its level of income, the realization of holding gains or losses on financial or real estate investments, and the way in which the household sees its immediate future. Net saving is the part of current income that is not consumed, and is calculated as a residual between disposable income – net of consumption of fixed capital – and final consumption; when expressing it as a share of net disposable income we obtain the household saving rate (or ratio) measure that is widely flagged in academic literature or media reports.²

The household capital account shows how gross saving and net capital transfers to households are available to finance net capital formation and capital consumption. Net acquisition of non-financial assets consists of changes in inventories and, for the most part, gross fixed capital formation, of which (in SA, on average over the past ten years) housing investment is about 60 per cent. The balancing item of the household's capital account is net lending(+)/net borrowing(-). This represents the amount available to acquire financial assets or to be used for repayment of debt; or, in the event of a negative balance, the required accumulation of new liabilities. In practice, the household sector as a whole both acquires financial assets and incurs new liabilities, because some households save while others borrow. The intake of new loans (minus repayment of old loans) will then add to the stock of outstanding household liabilities. Divided by household disposable income, this stock, recorded at any given time (usually the end of the year or of a quarter) provides a common measure of household leverage.

The above sequencing of the different household accounts (income, capital, financial) shows how the accumulation of household debt can be reduced in three different ways, even if disposable income is held constant. Firstly, households can spend a smaller share of disposable income on final consumption expenditure, in which case they will require lesser borrowing to finance the same amount of asset accumulation. Secondly, they can lower fixed capital formation (such as investment in housing) as a share of their income and thirdly, they can reduce financial asset accumulation or even sell financial assets on a net basis.

In addition, the leverage ratio (household liabilities to income) compares a stock to a flow, and as such, can be influenced positively by stronger growth in nominal disposable income, even if the pace of liability accumulation remains fairly constant. This is known as “growing out of debt” or “inflating out of debt”, depending on whether the acceleration in nominal income is driven or not by inflation.³

¹ The authors would like to thank Karen Kuhn for her assistance in providing data.

² In many countries, however, it is common practice to express the household saving rate in gross terms (i.e. by including consumption of fixed capital in both the numerator and denominator). This has to be borne into account when making international comparisons of saving rates.

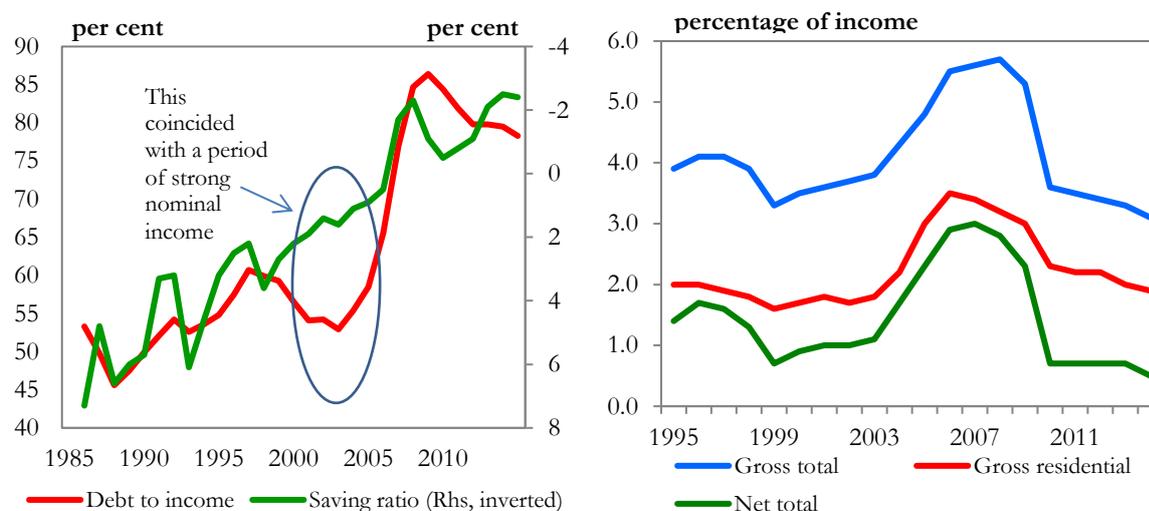
³ Inflating out of debt, however, is only possible if household debt is long-term in nature and mostly carries fixed interest. Otherwise, households will need to refinance themselves at less favourable terms.

What happened in the case of South Africa

The above accounting equivalences also highlight how increases in the credit commitments of households will lead to a decline in their saving, unless counteracted by similar or stronger increases in the assets of households. Generally speaking, therefore, an inverse relationship can be expected between increases in the utilisation of consumer credit and the saving of private households over time.

In South Africa, a clear inverse relationship could be discerned between the ratio of household debt to disposable income and the household saving ratio from the beginning of the 1980s, when the deterioration in the saving ratio of households coincided with the greater use of credit by households (see Figure 2). The abolition of banks' credit ceilings in 1980 probably exacerbated this trend. This inverse relationship, however, did not apply after the GFC. South Africa's household saving ratio came down from 1,9 per cent in 2000 to a dissaving ratio of -2,3 per cent in 2007, temporarily improved in 2008-09 but declined further to -2,4 per cent in 2014, and stood at -2,2 per cent in 2Q 2015. Prior to the GFC, this steady fall in the household saving ratio coincided with a rise in household fixed capital formation, which fueled the boom in the residential building sector over that period (see Figure 3). As a result, the net lending ratio of households showed a stronger deteriorating than their saving ratio – from 1,5 per cent of disposable income in 2000 to -4,5 per cent (effectively, net borrowing) in 2007. As acquisition of financial assets was also fairly strong throughout that period, it was therefore no surprise to see households leveraging strongly prior to the GFC.

Figures 2 and 3: SA household debt and net saving as a percentage of disposable income (left) and household fixed capital formation as a share of income (right)



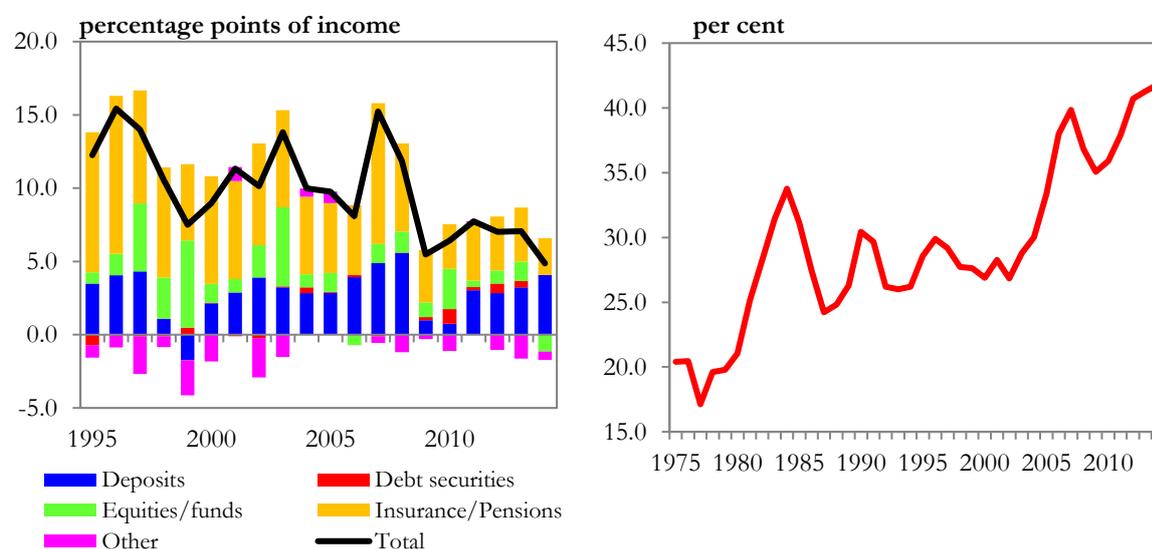
As mentioned in the introduction, households in South Africa slowly reduced their degree of leverage in the years following the GFC. However, they did it by lowering capital formation (both financial and non-financial) rather than by reducing their propensity to consume. Annual growth in final consumption slowed, but in line with real disposable income. By contrast, fixed capital formation, as a share of income, fell back to its lowest level of the past 20 years; and net acquisition of financial assets, which had averaged 11,0 per cent of income in 2000-08, only averaged 6,4 per cent in 2014 (see Figure 4). It was therefore not surprising that the deleveraging of households occurred on the back of slower growth in mortgage advances, whereas at the same time, non-mortgage debt kept rising on balance as a share of disposable income (see Figure 5). This was in part being facilitated by banks, which shifted from mortgages to other credit (mainly consisting of unsecured lending) amid a search for higher margins and to facilitate compliance with Basel III requirements. The introduction of the National Credit Act (NCA) in 2007 and

stricter lending criteria by banks also made it more difficult for households to use mortgage loans to finance current consumption.

Where SA differs from other “high household-debt” countries

As we argued above, the path of South Africa’s household debt/income ratio was not that different from that observed in developed economies such as the US, the UK, Australia or New Zealand. This is not a major surprise: While SA is the only emerging-market country out of this list, it shares with the other a large and sophisticated financial industry, with banks that have long played a big role in housing or vehicle finance. Home ownership rates are traditionally high in South Africa (even after accounting for the share of government-sponsored housing), like in the so-called “Anglo-Saxon” countries. Admittedly, SA’s household debt ratio is lower than the others in absolute terms, though we think it largely reflects the limited access to formal banking services of the lowest income groups. If we exclude the “unbanked”, household leveraging is high in SA, especially by emerging market standards.⁴

Figures 4 and 5: Net acquisition of financial assets by SA households, per category (left) and non-mortgage SA household debt as a share of disposable income (right)



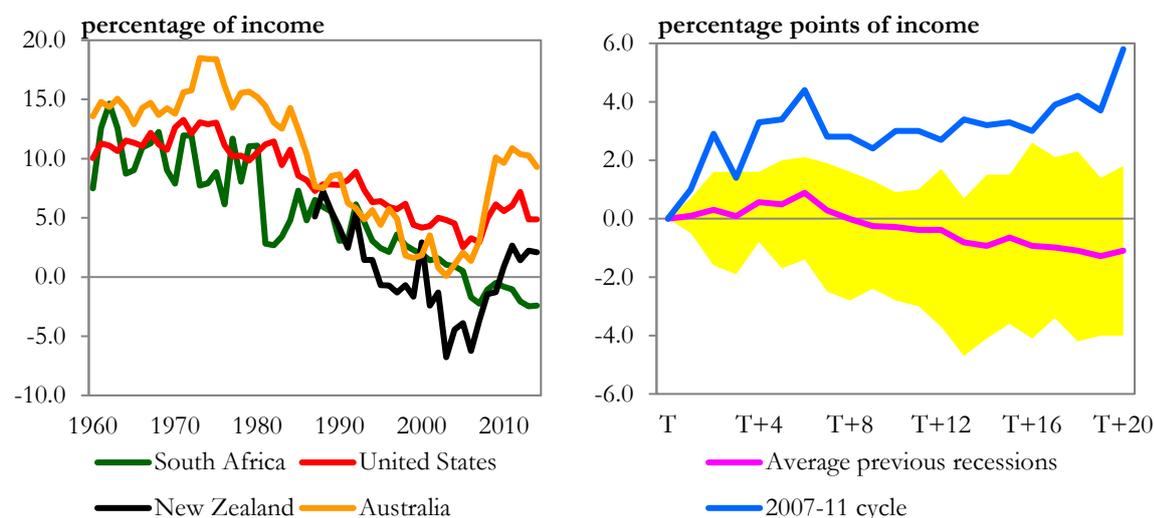
Further similarities occurred in the household saving ratio up to the GFC: From the 1980s up to the second half of the 2000s, all countries in our list saw a long-term declining trend in saving rates. However, this is where the similarities ended: In all cases bar SA, the GFC triggered a marked rebound in saving ratios (see Figure 6). Furthermore, in the US, Australia and New Zealand (although not in the UK), the saving rate remained higher, in the recovery years, than it had been before the GFC, suggesting a lasting structural break from earlier trends. In addition, if we compare the 2008-09 recession and subsequent recovery to earlier cycles, we observe a higher path of the saving ratio compared to historical norms (see, for example, Figure 7 for the US). This does not apply to SA, where the saving rate behaved in line with the pattern of earlier recessions.

Unlike in South Africa, it thus seems that a reduced propensity to consume (out of disposable income) was one of the “tools” households used to reduce their accumulation of liabilities and their debt/income ratio. Fixed capital formation by households also adjusted significantly downwards, as a share of income, in all countries, as it did in SA. By contrast, net acquisition of financial assets only declined temporarily in

⁴ According to the 2014 Finscope survey of the Finmark Trust, only about 75 per cent of the adult SA population has access to formal banking services.

the US and Australia – in the latter, it has actually exceeded pre-crisis levels in recent years. The country displaying the strongest similarity with SA has been the UK, where the saving rate only temporarily improved but acquisition of financial assets has shown a marked structural decline. This said, one must also remember that in all the “Anglo-Saxon” countries, nominal disposable income growth was much slower, during and after the GFC, than in SA – limiting their relative ability to grow/inflate out of household debt. All in all, the efforts of South African households at de-leveraging were less pronounced.

Figures 6 and 7: Household saving ratios in selected countries (left) and change in the US household saving ratio during recession and subsequent recoveries (right)



Note: The area shaded in yellow on Figure 7 indicates the range of ratio changes over previous recessions

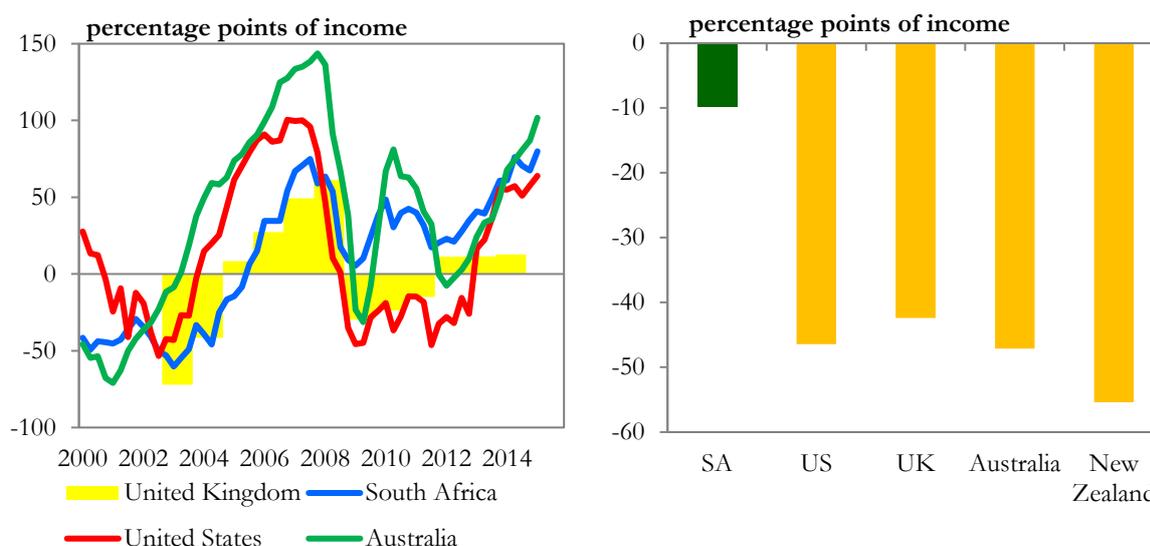
What may explain the South African “exception”

Why has this happened, when South Africa also experienced an unexpected and sharp recession? In theory, according to the life-cycle hypothesis, households save in order to build up a desired level of wealth; in consequence, their saving rate should be a function of expected future income growth, as well as existing wealth levels. Carroll, Slacalek and Sommer (2012), as well as Mody, Ohnsorge and Sandri (2012) argue that the Great Recession, by triggering a lasting increase in economic and job uncertainty and by reducing existing wealth as a share of income, pushed households to save a higher proportion of their income. In South Africa, however, the “destruction” in household wealth (relative to income) was less pronounced than in the other countries under consideration (see Figure 8). This lesser negative “wealth effect” might explain why household consumption was more sheltered in SA.

Still, it would not explain the absence of any significant and/or sustained rise in the saving rate, considering that South Africa’s wealth/income ratio declined during the GFC and that trend income growth slowed. Possibly, the distribution of wealth in SA should be taken into consideration. Orthofer (2015) points out that SA wealth is much more concentrated – relative to OECD countries – among the higher-income groups, whose propensity to consume is typically less sensitive to changes in income growth or asset prices than that of lower-income households. This high concentration is particularly relevant for financial wealth – in fact, non-financial wealth, which is probably more evenly spread in SA given the high level of home ownership, declined much less as a share of income than in the other countries (see Figure 9). At the same time, the inequality not just of wealth but also of income distribution may make it harder for low-income households to save even when faced with (on top of an income shock) an uncertainty shock like that created by a strong recession.

The relative “inertia” in the SA saving ratio may also reflect a lesser debt constraint compared to the other countries under consideration. In the case of the US, Glick and Lansing (2011) estimated that regressing the saving ratio on credit availability, as well as net worth, improved the predictability of the model. Separately, Dynan (2012) found that the most highly-leveraged US households were those who cut their consumption most after the GFC, even when their wealth losses were proportionally less than those of other households. Bunn and Rostom (2014) found similar evidence in the UK. Such studies would seem to confirm what anecdotal evidence has long suggested: Highly-indebted households did not save more just because of wealth losses or higher fears of unemployment, but because access to credit became limited – or in some cases was cut off.⁵

Figures 8 and 9: Variations in household wealth/income ratios (from 20-year averages, left) and changes in non-financial wealth/income ratios since 2007 (right) in selected countries



Note: UK data on Figure 8 are only available on an annual basis

We suspect this did not happen to the same extent in South Africa. Admittedly, both anecdotal evidence and surveys indicated a tightening of lending conditions after the GFC and the introduction of the NCA: At equal creditworthiness, borrowers pay more relative to prime than ten years ago. But SA banks experienced lesser financial stress than their US/UK counterparts (as evidenced, among others, by lower credit spreads on bank debt at the time), and the lack of major property price declines in SA reduced the “negative collateral” effect.⁶ At the same time, solid wage and employment gains in the public sector (as much as 25 per cent of formal non-farm employment in SA) – where the risk of the borrower losing his or her job is lower – probably encouraged banks to target these employees for new loans. Finally, as we mentioned above, the mix of new regulations and low margins in banks’ traditional mortgage business led them, from 2009 to 2013, to boost unsecured loans at the expense of asset-backed credit – effectively, encouraging household consumption at the expense of fixed capital formation.

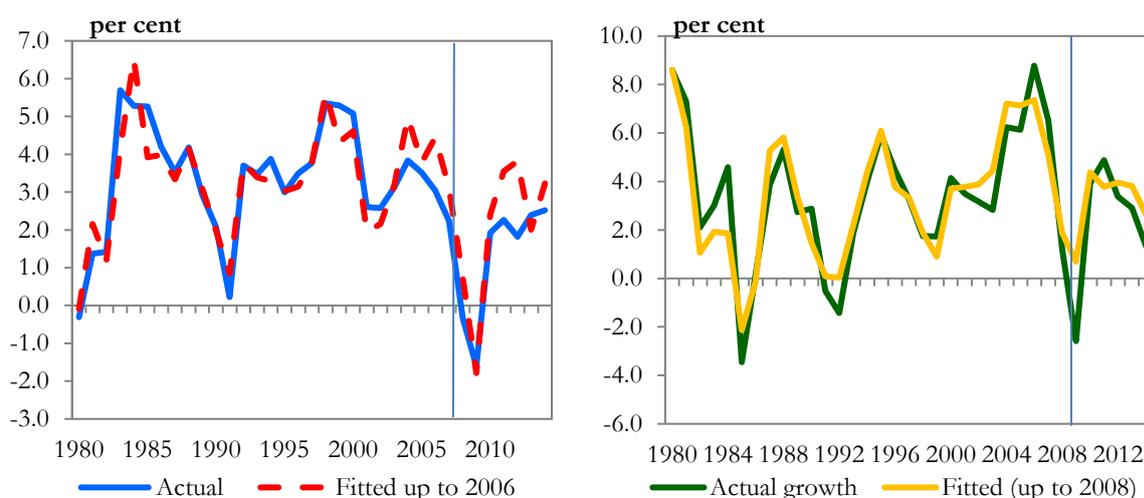
⁵ Interestingly, Andersen, Duus and Laerkholm Jensen (2014) also found that in the case of Denmark, highly-indebted households experienced a sharper adjustment in consumption during the crisis, irrespective of income and wealth developments. They, however, attribute it to a sudden rise in these households’ financial uncertainty rather than to actual limits on their ability to borrow.

⁶ In an environment of falling property prices, banks will be less willing to provide property-backed loans (or at least, impose a lower loan-to-value ratio) for fear of a net capital loss in the event of the borrower defaulting. This constraint on additional borrowing would be most likely to apply on the more highly-indebted households.

Has the consumer's reaction function changed?

To try and ascertain whether the “debt constraint” was in fact lower in SA than in other countries, we run a simple regression of real household consumption in both SA and the US, up to the beginning of the crisis (2007 in the US, which was hit first, and 2008 in SA). In both cases, we combine a long-term equation – regressing the log of real consumption on real disposable income (plus real wealth in the case of the US)⁷ – with a shorter-term error correction model incorporating changes in income, wealth and the real interest rate (see Appendix 2).⁸ We then use these equations to test whether they accurately predict (or not) the behavior of real consumer demand in the aftermath of the crisis.

Figures 10 and 11: Actual and fitted year-on-year growth in real household consumption in the United States (left) and South Africa (right)



Unsurprisingly, the results are somewhat different between the US and South Africa. In the case of the US, we find that our model over-estimates annual household consumption growth by 0,7-0,8 percentage point, on average, per year in the aftermath of the GFC (see Figure 10). By contrast, in South Africa, our model over-predicts consumption growth by a smaller amount, on balance, after the crisis, with the exception of 2009, when spending fell by less than our equation suggested (see Figure 11). Disposable income, wealth and real interest rates were key drivers of consumer spending before the GFC and remained afterwards. Thus, while there may have been a “debt constraint” on households in SA, it seemed less stringent than in the US or other countries with high household leverage.⁹ This, together with the relative stability in property wealth relative to income, the distribution of financial wealth, the expansion of public-sector jobs and the changing lending practices of banks, probably explain why the household saving rate did not rise in SA.

Implications for South Africa's economy and policy

This apparent South African “exception” – the absence of a rebound in the household saving rate – may have important implications for the economic outlook going forward, and the subsequent policy response. First, there is no “pent-up” consumer demand as might be the case in countries where

⁷ We did not include a real wealth variable in the long-term SA equation as it did not improve the specification of the equation.

⁸ In the US error correction equation, we also include the change in the unemployment rate to account for the “economic uncertainty” factor. However, unemployment series in SA are not available before 1994.

⁹ We also ran a simple regression for Australian household consumption from 1990 to 2006, which similarly over-predicts actual spending in the post-GFC years.

households markedly increased their precautionary savings during and after the GFC. Therefore, at least in the near future and barring an unlikely employment recovery that would boost income, one cannot expect much of a pickup in consumer spending even if the debt ratio falls further to levels deemed more sustainable in the longer run. Second, the outlook for a recovery in housing investment is also uncertain. A lower leverage ratio may eventually encourage households to invest again in property; but at the same time, there are limited savings available to finance such investments, and banks may keep imposing lower loan-to-value ratios than in the past. Finally, as long as net financial asset formation remains muted, growth in the financial industry will continue to fall well short of the pace seen prior to the GFC.

At the household level, the low saving rate implies that households will face challenges to maintain their living standards during retirement. At an economy-wide level, the failure of the household sector to contribute to the aggregate savings pool increases the reliance on foreign capital inflows to finance domestic investments. These risks indicate a need for policies and initiatives that enhance the country's saving culture and lengthen the "time preference" of agents, which is still short.

By contrast, reflationary policies could be counter-productive at this stage, unless the country faces a new negative income shock. Households are already spending as much out of their disposable income as appears sustainable medium-term, and there is a risk that in an environment of prolonged low real interest rates, they will continue to privilege consumption at the expense of asset formation (both financial and residential). Rather, the policy mix should aim at boosting confidence levels in and outside South Africa, in order to augment fixed capital investment, which remains the key to higher growth conditions in the country.

Conclusion

We can conclude that there is no "paradox" to be found in having a mix of a lower household debt ratio and a lack of improvement in savings. Households in South Africa have gradually deleveraged after the GFC, but not at the expense of their consumption expenditure. Rather, they have curtailed their accumulation of residential and financial assets, which has resulted in slower growth in both the housing and financial industries compared with the pre-GFC years. But unlike in other high household-debt economies, we find no real evidence of a "debt constraint" on consumption. Possibly, the distribution of wealth across income groups, the fact that property prices were more resilient in SA than in other countries studied, and the lower degree of credit rationing domestically account for this "South African exception". Looking ahead, though, our analysis suggests that the room for a consumer-led recovery in coming years is limited, and that policy should instead focus on improving the country's "saving culture", to both reduce household financial vulnerability and improve medium-term growth prospects.

Bibliography

Andersen, Asger L., Charlotte Duus and Thais Laerkholm Jensen. "Household Debt and Consumption During the Financial Crisis: Evidence from Danish Micro Data", Danmarks Nationalbank Working Paper 89, 2014

Australian Bureau of Statistics. 2012. "Australian System of National Accounts: Concepts, sources and Methods", Edition 3

Bunn, Philip and May Rostom. "Household Debt and Spending", Bank of England Quarterly Bulletin, 2014 Q3

Carroll, Christopher, Jiri Slacalek and Martin Sommer. "Dissecting Saving Dynamics: Measuring Wealth, Precautionary, and Credit Effects", International Monetary Fund, Working Paper 219, 2012

Dynan, Karen. "Is a Household Debt Overhang Holding Back Consumption?", Brookings Papers on Economic Activity, The Brookings Institution, Spring 2012

Eggertsson, Gauti B. and Paul Krugman. "Debt, Deleveraging and the Liquidity Trap: A Fisher-Minsky-Koo Approach", presented at the NBER Summer Institute, 2011

Glick, Reuven, and Kevin J. Lansing. "Consumers and the Economy, Part I: Household Credit and Personal Saving", Federal Reserve Bank of San Francisco Economic Letter, January 10, 2011

Lequiller, Francois and Blades, Derek. "Understanding National Accounts", Second edition, OECD Publishing, 2014.

Mody, Ashoka, Franziska Ohnsorge and Damiano Sandri. "Precautionary Savings in the Great Recession", International Monetary Fund, Working Paper 42, 2012

Orthofer, Anna. "What we talk about when we talk about saving: Concepts and measures of household saving and their application to South Africa", ERSA Working Paper 530, July 2015

Prinsloo, J W. November 2000. "The saving behaviour of the South African economy". Occasional Paper No 14, South African Reserve Bank.

Prinsloo, J W. 2002. "Household debt, wealth and saving". *Quarterly Bulletin*, December. Pretoria: South African Reserve Bank.

Smith, H. 2004. "The integrated economic accounts of South Africa". *Quarterly Bulletin*, September. Pretoria: South African Reserve Bank.

South African Reserve Bank. 2015. "South Africa's national accounts, 1946-2014: An overview of sources and methods". *Supplement to the Quarterly Bulletin*, March. Pretoria: South African Reserve Bank.

United Nations. 2014. "Financial Production, Flows and Stocks in the System of National Accounts". New York: United Nations Publication.

Appendix 1. A summarized view of the household sector accounts

In a set of national accounts statistics, receipts are known as resources, expenditure is known as uses and the balancing item is the amount needed to bring uses and resources into balance. The balancing items of the various accounts are particularly interesting aggregates for the purpose of analysis. To fully understand what is confined to any given balancing item is important to examine the sequence of accounts leading up to that item. The latter are summarized in the following, simplified table.

<u>Resources</u>	<u>Uses</u>
<i>Income Account</i>	
Compensation of employees	Property income paid (interest, rent)
Operating surplus/Mixed income ¹⁰	Current taxes on income and wealth
Property income received	Social contributions paid
Social benefits received	Other current transfers paid
Other current transfers received	Gross disposable income
<i>Use of Disposable Income Account</i>	
Gross disposable income	Final consumption expenditure
Adjustment for change in pension reserves ¹¹	Consumption of fixed capital
	Net saving
<i>Capital Account</i>	
Net saving	Gross fixed capital formation
Consumption of fixed capital	Change in inventories
Net capital transfers received	Net lending (+)/Net borrowing (-)
<i>Financial Account</i>	
Net lending	Net increase in cash and bank deposits
Net mortgage borrowing	Net purchases of securities
Net incurrence of other liabilities	Net accumulation of insurance and pension assets
Net increase in other payables	Net increase in loans/other receivables

Note: The items highlighted in green reflect the net incurrence of debt.

¹⁰ Operating surplus is the activity imputed to homeowner-occupiers consisting of providing housing services to themselves as occupiers of the accommodation concerned. Mixed income refers to that income where the remuneration of capital and labour which cannot be distinguished (the case, for instance, of family-owned businesses).

¹¹ This adjustment is necessary because contributions paid to pension funds, as well as the pensions paid out by these funds, are treated as contributions to, and benefits from, the social security system, even though they should be treated in the same way as transactions with the life insurance companies. However, transactions with pension funds are also recorded in the financial accounts. Therefore, it is necessary to make an adjustment in the non-financial account so that the value of the balancing item (saving) carried forward into the financial account is correct. The adjustment equals the change in pension entitlements, thus the name.

Appendix 2. Estimation equations for US real private consumption

The long-term equation: $LRCONS = C(1)*LRDI + C(2)*LRWEALTH + C(3)$

Where LRCONS is the log of real private consumption, LRDI the log of real disposable income, and LRWEALTH the log of real household wealth

Estimation results:

Dependent Variable: LRCONS

Method: Least Squares

Date: 07/14/15 Time: 10:19

Sample: 1960 2007

Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRDI	0.873259	0.022062	39.58183	0.0000
LRWEALTH	0.154799	0.019312	8.015603	0.0000
C	-0.641369	0.031112	-20.61484	0.0000
R-squared	0.999554	Mean dependent var	8.415277	
Adjusted R-squared	0.999535	S.D. dependent var	0.485459	
S.E. of regression	0.010472	Akaike info criterion	-6.219688	
Sum squared resid	0.004935	Schwarz criterion	-6.102738	
Log likelihood	152.2725	Hannan-Quinn criter.	-6.175493	
F-statistic	50476.35	Durbin-Watson stat	0.845779	
Prob(F-statistic)	0.000000			

The error correction equation: $DLRCON = C(1)*RES_CONS2(-1) + C(2)*DLRDI + C(3)*DUNEMP + C(4)*DWEALTH + C(5)*RRATE + C(6)$

Where DLRCON is the (annual) change in the log of real private consumption, RES_CONS2 is the residual of the long-term equation, DLRDI the change in the log of real disposable income, DUNEMP the change in the unemployment rate, DWEALTH the change in the household wealth-to-income ratio and RRATE the real Fed funds rate

Estimation results:

Dependent Variable: DLRCON

Method: Least Squares

Date: 07/14/15 Time: 10:27

Sample (adjusted): 1961 2007

Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RES_CONS2(-1)	-0.445778	0.099534	-4.478667	0.0001
DLRDI	0.706721	0.074388	9.500427	0.0000
DUNEMP	-0.007028	0.001427	-4.924665	0.0000
DWEALTH	0.017987	0.005868	3.065246	0.0038
RRATE	-0.000956	0.000520	-1.839668	0.0731
C	0.012808	0.003179	4.028454	0.0002
R-squared	0.846695	Mean dependent var	0.035545	
Adjusted R-squared	0.828000	S.D. dependent var	0.016143	
S.E. of regression	0.006695	Akaike info criterion	-7.056179	
Sum squared resid	0.001838	Schwarz criterion	-6.819990	
Log likelihood	171.8202	Hannan-Quinn criter.	-6.967300	
F-statistic	45.28829	Durbin-Watson stat	1.917886	
Prob(F-statistic)	0.000000			

Appendix 3. Estimation equations for South African real private consumption

The long-term equation: $LRCONS = C(1)*LRDI + C(2)$

Where LRCONS is the log of real private consumption and LRDI is the log of real disposable income

Estimation results:

Dependent Variable: LRCONS

Method: Least Squares

Date: 07/29/15 Time: 13:54

Sample: 1975 2008

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRDI	1.116571	0.013570	82.28160	0.0000
C	-1.644323	0.186571	-8.813415	0.0000
R-squared	0.995296	Mean dependent var		13.70426
Adjusted R-squared	0.995149	S.D. dependent var		0.295039
S.E. of regression	0.020550	Akaike info criterion		-4.874900
Sum squared resid	0.013514	Schwarz criterion		-4.785114
Log likelihood	84.87330	Hannan-Quinn criter.		-4.844280
F-statistic	6770.262	Durbin-Watson stat		1.734470
Prob(F-statistic)	0.000000			

The error correction equation: $DLRCONS = C(1)*RES_CONS2(-1) + C(2)*DLRDI + C(3)*DLRPROP + C(4)*RRATE(-1) + C(5)*DUM_TRANS + C(6)*DUM_CEILINGS + C(7)$

Where DLRCONS is the (annual) change in the log of real private consumption, RES_CONS2 is the residual of the long-term equation, DLRDI is the change in the log of real disposable income, DLRPROP is the change in the log of real property (non-financial) wealth, RRATE the real prime rate, DUM_TRANS a dummy variable reflecting the mid-1990s political transition (with values of 0,5 in 1994 and 1996 and 1,0 in 1995) and DUM_CEILINGS another dummy variable reflecting bank credit ceilings that were in force until 3Q 1980 (with values of 1,0 from 1977 to 1979, 0,75 for 1980 and zero thereafter).

Estimation results:

Dependent Variable: DLRCONS

Method: Least Squares

Date: 10/23/15 Time: 15:11

Sample (adjusted): 1977 2008

Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RES_CONS2(-1)	-0.563838	0.122122	-4.617004	0.0001
DLRDI	0.535202	0.097559	5.485915	0.0000
DLRPROP	0.143309	0.033871	4.230951	0.0003
RRATE(-1)	-0.001280	0.000433	-2.954863	0.0067
DUM_TRANS	0.025519	0.009964	2.561173	0.0168
DUM_CEILINGS	-0.025996	0.007218	-3.601802	0.0014
C	0.021111	0.003916	5.390942	0.0000
R-squared	0.862171	Mean dependent var		0.031604
Adjusted R-squared	0.829092	S.D. dependent var		0.027190
S.E. of regression	0.011241	Akaike info criterion		-5.947900
Sum squared resid	0.003159	Schwarz criterion		-5.627270
Log likelihood	102.1664	Hannan-Quinn criter.		-5.841620
F-statistic	26.06407	Durbin-Watson stat		1.733919
Prob(F-statistic)	0.000000			