


# Do fiscal deficits influence private savings in South Africa? An empirical note

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**Dates:**

Received: 25 July 2022

Accepted: 17 Feb. 2023

Published: 28 Apr. 2023

**How to cite this article:**

Marire, J., 2023, 'Do fiscal deficits influence private savings in South Africa? An empirical note', *Journal of Economic and Financial Sciences* 16(1), a809. <https://doi.org/10.4102/jef.v16i1.809>

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**Orientation:** The neoclassical loanable funds theory predicts that fiscal deficits reduce the pool of available savings in the economy, but heterodox scholarship disputes the claim.

**Research purpose:** The paper sets out to test the relationship between fiscal deficits and private savings.

**Motivation for the study:** Scholars are divided on whether corporate South Africa is building up excess savings, with some arguing that it is not and others arguing that it is because of mistrust of government and uncertainty largely. The trends of net private savings and fiscal deficits suggest that something contrary to the postulation of the neoclassical loanable funds theory could be happening in the South African context.

**Research approach/design and method:** The paper used data for the period 1960–2021 within the Toda-Yamamoto vector autoregressive modelling framework.

**Main findings:** The results show that fiscal deficits increase savings but reduce interest rates in line with the heterodox view that the financial asset creation effect of debt-financed deficits improves savings and reduces interests through the liquidity channel.

**Managerial/practical implications:** The lesson for policy is that fiscal deficits are healthy for the economy. However, the government must manage them at some reasonable level to maintain a constant flow of net financial assets to the private sector, thus bolstering savings. An unhealthy pursuit of fiscal surpluses can shift deficits to households and firms, and breed systemic financial instability.

**Contribution/value-added:** The paper contributed to a nuanced understanding of the role of fiscal deficits in expanding savings, which runs counter to the theoretical underpinnings of fiscal conduct that pursues budget surpluses.

**Keywords:** fiscal deficit; corporate savings; household savings; modern monetary theory; loanable funds theory.

## Introduction

Neoclassical economic theory postulates that fiscal deficits divert savings from private firms thereby crowding out private investment through the interest rate channel (Choi & Holmes 2014). For example, term structure theories of interest rates and the loanable funds theory converge in showing that fiscal deficits raise interest rates. In the case of South Africa, Akinboade (2004) found that fiscal deficits had no effect on interest rates contrary to the postulation of the theories. However, Bonga-Bonga (2012), employing a vector autoregressive (VAR) modelling framework and controlling for the Fisher effect, found that unanticipated and systematic fiscal deficits in South Africa had a positive influence on long-term interest rates in the long-run. Indeed, they showed that long-term interest rates were more elastic to systematic and unanticipated fiscal deficits than short-term interests. Even here, their analysis did not consider the effect of the adoption of the Medium Term Expenditure Framework (MTEF) in 1998, which certainly eliminates the possibility of fiscal surprises. Aron and Muellbauer (2000) empirically established that government dissaving undermined private savings since the 1980s. Further, financial liberalisation that began in the 1980s had the effect of increasing household access to credit and thus, debt, while reducing household savings (Aron & Muellbauer 2000). Moreover, they found that rising real interest rates positively influenced private savings. Interestingly, they found that corporations saved for households in the first few decades of financial liberalisation as households began to accumulate debt. The narrative so far has remained silent on the asset creation side of fiscal deficits, which is expected to increase private savings. As heterodox scholarship, reviewed below, maintains, government's deficits are private sector assets (savings). If the heterodox view holds,

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then it would imply that fiscal deficits reduce interest rates because of the build-up of savings through the financial asset creation channel.

Figure 1, viewed from the standpoint of Aron and Muellbauer (2000) and Bonga-Bonga (2012), presents somewhat of a puzzle about the relationship between net-private savings – corporate and household – and fiscal deficits. Table 1 also shows that 10-year averages tell a similar story of rising deficits being associated with rising total net-private savings. In effect, net corporate savings are the underlying force driving total net-private savings. They are almost a mirror image of the behaviour of fiscal deficits. Net household savings have a similar tendency, but it is not as pronounced as that of net corporate savings.

A few observations warrant empirical investigation because of their implications for the conduct of fiscal policy. Firstly, fiscal deficits seem to be private sector surpluses, especially corporate savings, and that falling fiscal deficits correlate with falling savings. The period of heightened fiscal consolidation (1998–2008), according to Figure 1, shows that an improving fiscal position (from  $-4.0\%$  of GDP [gross domestic product] to  $0.7\%$  of GDP) coexisted with falling savings (from  $5.5\%$  of GDP to  $3.2\%$  of GDP). In the 1998–2008 period, the MTEF was instituted as a mechanism for improving fiscal governance and stabilising public finances (Burger, Siebrits & Calitz 2016; Calitz & Siebrits 2003). As Burger (2004) noted, if the government chooses a path of

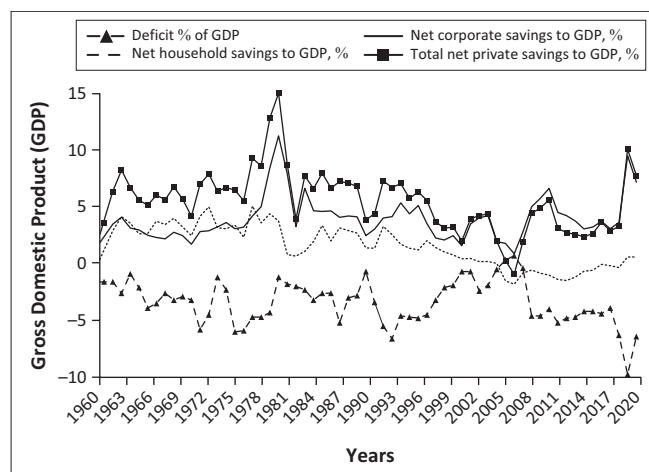
fiscal sustainability, thus running surpluses, it shifts the deficit to another sector of the economy. While from a national accounting perspective the fact that fiscal deficits mirror private savings might appear trivial because it is expected, could there be behavioural linkages?

Secondly, the inverse co-movement of fiscal deficits and private savings became more pronounced since the 1990s than during the pre-1990 period. Thirdly, the first two observations at least suggest a structural change in the relationship between the variables.

Fourthly, the coexistence of rising corporate savings and rising fiscal deficits might point to a general build-up of cash holdings in the private sector. Scholars such as Keeton (2018) maintain that there are no idle cash holdings in the corporate sector but rather a variable measurement problem that is mistaken for cash hoarding. However, Diaw (2020), for a group of countries including South Africa, empirically determined the build-up of excess cash holdings in the corporate sector. Dadam and Viegi (2018) showed empirically that rising levels of uncertainty result in corporate cash build-up for precautionary reasons in South Africa. The uncertainty issue ties in well with the narrative of distrust between the business sector and the ruling political party, the African National Congress. Reports by think tanks and popular media point towards a broken social contract between the business sector and government (Mantzaris & Swanepoel 2022; Spicer 2016), which has made the corporate sector to build-up idle cash reserves, especially before the Ramaphosa presidency in 2018. If this scenario holds, as it seems to be, then it is not surprising that fiscal deficits are inducing the private sector to save more so that the deficits do not eventually divert savings from the private sector as neoclassical theory postulates.

From the foregoing four observations, three questions arise, which the paper seeks to address. Firstly, do South African data confirm the neoclassical theoretical exposition that fiscal deficits undermine savings? Secondly, do fiscal deficits have the same effect on net corporate savings and net household savings? Thirdly, to the extent that the inverse co-movement of private savings and fiscal deficits became pronounced in the post-1990 era, did the relationship between these variables undergo a structural change? In addressing these questions, the paper differs from existing research that examined the South African case that takes as given the neoclassical view that fiscal deficits undermine savings. Subject to empirical investigation, the study, in contrast, gives the benefit of doubt to the heterodox view that deficits have a liquidity and asset creation effect.

The article's findings show that fiscal deficits have an inverse relationship with savings, both corporate and household. The finding seems to agree with the arguments by some Post-Keynesian and Kaleckian thinkers, such as Watts and Sharpe (2013) and Sawyer (2020), respectively, who argue that budget deficits have a positive income effect that tends to



Source: South African Reserve Bank, Online statistical query, viewed 5 March 2022, from <https://www.resbank.co.za/en/home/what-we-do/statistics/releases/online-statistical-query>. GDP, Gross domestic product.

FIGURE 1: Total net-private savings and current fiscal deficit, South Africa.

TABLE 1: Ten-year averages for savings and deficits, percentage of gross domestic product.

Period in years	Total net-private savings	Net household savings	Net corporate savings	Fiscal deficits
1960–1969	6.0	3.1	2.8	-2.5
1970–1979	7.5	3.7	3.8	-4.3
1980–1989	7.8	2.2	5.5	-2.7
1990–1999	5.4	1.7	3.6	-4.0
2000–2009	2.5	-0.3	2.8	-1.2
2010–2019	3.4	0.8	4.2	-4.6
2020–2021	8.9	0.6	8.3	-8.1

raise both household incomes and savings. The COVID-19 pandemic also led to increased net corporate savings, thus confirming a change in the structure of the relationship between fiscal deficits and savings. However, the Dotcom bubble resulted in a decrease in corporate savings because profitability conditions required greater dissaving and investment.

The paper is organised as follows. It discusses literature first, followed by methods and data. Results and discussion follow after and the paper concludes.

## Literature

The neoclassical view is that fiscal deficits financed through domestic borrowing drain out private savings and raise domestic interests to the point of crowding out private sector investment (Bernheim 1989; Gale & Orszag 2004). The loanable funds theory makes this point clear. Further, fiscal deficits are inflationary, which means that they also undermine savings by reducing real interest.

Barro (1989) presented a more nuanced and contrary view to the neoclassical view through the Ricardian explanation of saving behaviour. He showed that most people in society save to bequeath wealth to their children in the future and to finance post-retirement lifestyles. Therefore, when they realise that government is deficit financing its spending today through borrowing, they save *more* in anticipation of future increases in taxation. Thus, their usual savings for bequests and post-retirement life and additional savings in anticipation of tax increase result in a surge in savings in spite of fiscal deficits.

Modern monetary theorists also have presented a contrary view to what the neoclassical theory predicts. For example, Kelton (2015, 2020) put forward several claims, the first of which warrants attention in the present paper's argument. She claimed that fiscal deficits, if financed by borrowing domestically, create financial assets for the private sector and increase total private savings. The newly created assets are interest-earning assets, and they add to the savings of households – households exchange non-interest earning currency for interest-earning debt instruments. As Kelton (2015) puts it, the liabilities of the government are the assets for the private sector, and the deficits help the private sector to deleverage their balance sheets while meeting their desired saving plans.

The private sector, as Stephanie Kelton maintains, cannot create its own net financial assets. It follows that fiscal deficits grow the savings base, the very opposite of the prediction of the neoclassical loanable funds model. As Kelton (2015) and Krugman (2009) claimed, the current paper observed in Figure 1 that government deficits are private-sector surpluses. According to Kelton (2020), fiscal surpluses create deficits – unsustainable deficits – in the corporate and household sectors. The deficits shifted to the private sector by running fiscal surpluses might result in financial instability and

trigger economic recessions as they have always done historically. The argument is that fiscal surpluses imply that government is taking more out of the economy through taxation than it puts in through spending.

Using Minsky's models of the financial economy, Keen (2011) similarly demonstrated that fiscal deficits increase financial assets created in the economy and thus savings. Wray (2015:81) concurred with Steve Keen stating, 'government deficits would boost profits and add safe treasury debt to private portfolios'. Aggarwal et al. (2022) found, in a general equilibrium analysis, that fiscal deficits create 'excess savings' in the short-run and private wealth in the long run. Thus, one would expect rising fiscal deficits to coexist with rising private savings and the converse to be true as well.

Sawyer (2020), from a Kaleckian perspective, and Watts and Sharpe (2013) from a post-Keynesian perspective have shown that fiscal deficits are self-financing essentially as they have large positive income effects that will generate savings that might more than offset the initial deficit. By raising aggregate demand and income levels, fiscal deficits increase savings. Neoclassical theory, however, points out that these effects are only short-run effects. The paper now turns to the methods that were used to answer the three questions raised about the relationship between fiscal deficits and net-private savings.

## Methods and data

### Definition of variables

The paper used net savings of corporations and households rather than their total deposits (Table 2). Dadam and Viegi (2018) used total deposits of the corporate sector as a measure of precautionary savings, but the paper argues that total deposits overestimate the level of savings as they do not take into account the liabilities of the sector. Thus, using net savings moves us closer to the underlying relationship that has to be examined. Further, existing literature that looks at the fiscal deficit-private savings nexus tends to use corporate savings data while excluding household savings data (Aggarwal et al. 2022; Dadam & Viegi 2018). Surely, household savings are a significant component in the savings story that has to be captured in the modelling. The paper accounts for these matters in attempting to model the relationship between fiscal deficits and private savings.

Table 2 describes some of the control variables used in the study. Fiscal deficit is the nominal overall fiscal deficit defined as total revenue minus total government spending including debt servicing costs expressed as a percentage of GDP. The paper also uses the nominal interest rate defined as the real interest rate plus the inflation rate. Thus, the nominal interest rate captures the effect of both the real interest rate and inflation. As South Africa is organised around a minerals-energy industrial complex, the exchange rate plays a crucial role in corporate incomes and thus, savings. Finally, the paper controls for household disposable income per capita that

TABLE 2: Variable definition.

Variable	Definition	Source
$cs_t$	Net corporate savings is business savings that include retained earnings and asset holdings of government debt. It is a percentage of GDP.	South African Reserve Bank
$hs_t$	Net household savings is household savings out of income and these include other portfolio assets such as government debt. It is a percentage of GDP.	South African Reserve Bank
$d_t$	Deficit is government overall deficit. It is a percentage of GDP.	South African Reserve Bank
$i_t$	Nominal interest rate was constructed as the real interest plus the inflation rate.	World Development Indicators
$y_t$	Log of the household disposable income per capita	South African Reserve Bank
$e_t$	Log of nominal rand-used exchange rate	South African Reserve Bank
D80s	Dummy for commodity price declines of the 1980s, = 1 for 1980–1989	-
D6787	Dummy for divestment campaigns against apartheid, = 1 for 1967–1987	-
D8593	Dummy for sanctions period, = 1 for 1985–1993	-
D1994	Dummy for democratic transition, = 1 for 1994–2021	-
D9798	Dummy for the Asian crisis, = 1 for 1997–1998	-
D9698	Dummy for the rand crisis, = 1 for 1996–1998	-
D9821	Dummy for Medium Term Expenditure Framework, = 1 for 1998–2021	-
D2001	Dummy for rand crisis, = 1 for 2001	-
D2000	Dummy for the Inflation Targeting Framework, = 1 for 2000–2021	-
D9500	Dummy for the Dotcom bubble, = 1 for 1995–2000	-
D0007	Dummy for commodity price boom, = 1 for 2000–2008	-
D0810	Dummy for global financial crisis, = 1 for 2008–2010	-
D2021	Dummy for COVID-19, = 1 for 2020–2021	-

GDP, Gross domestic product.

captures both the ability of households to save but also to express effective demand, which influences corporate incomes and savings.

## Econometric model

After unit root tests (Table 5) confirmed that the variables were integrated of different orders, a Toda-Yamamoto Vector Autoregressive (TY-VAR) model was developed so as to retain test statistics, ' $t$ ' and ' $F$ ', that follow standard distributions (Toda & Yamamoto 1995). Toda and Yamamoto (1995) have shown that when series in a system of equations are integrated of different orders, the ' $t$ ' and ' $F$ ' statistics follow non-standard distributions. To correct that problem, they devised an estimation procedure that essentially overfits the VAR. They proposed using the maximum order of integration in the system to augment the lag length in such a manner that the lag order of the VAR becomes  $q = p + d_{\max}$ ,  $p$  being the optimal lag order and  $d_{\max}$  being the maximum order of integration in the system. The non-causality test is still based on the optimal lag structure, but the estimated model has a lag order  $q$ . The choice of the VAR as a modelling framework arises from the observation that all the variables controlled for in the article potentially have reverse causal influences on each other theoretically.

The TY-VAR models that were estimated Equation 1 for net household savings and Equation 2 for the net corporate savings were:

$$H_t = [hs_t, d_t, i_t, e_t, y_t] \quad [\text{Eqn 1}]$$

$$C_t = [cs_t, d_t, i_t, e_t, y_t] \quad [\text{Eqn 2}]$$

In Equation 1,  $hs_t, d_t, i_t, e_t, y_t$  represent net household savings, deficit, nominal interest rate, the log of the nominal exchange rate and the log of household disposable income per capita, respectively. In Equation 2,  $cs_t, d_t, i_t, e_t, y_t$  represent net corporate savings, deficit, nominal interest, the log of nominal exchange rate and the log of household disposable income per capita.

The TY-VAR system for net household savings was represented as:

$$H_t = \alpha + \sum_{i=1}^{n-1} \Pi_i H_{t-i} + \sum_{j=n}^{d_{\max}} \Pi_j H_{t-i} + \sum_{k=1}^m \beta_k Dum_{kt} + \varepsilon_t \quad [\text{Eqn 3}]$$

In Equation 3,  $\alpha$  is a constant,  $\Pi_i$  is an  $n \times n$  matrix of coefficients,  $\varepsilon_t \approx iid(0, \Omega)$ ,  $d_{\max}$  is the maximum order of integration and  $Dum_{kt}$  are dummy variables.

The TY-VAR system for net corporate savings was represented as:

$$C_t = \delta + \sum_{i=1}^{n-1} \Pi_i C_{t-i} + \sum_{j=n}^{d_{\max}} \Pi_j C_{t-i} + \sum_{k=1}^m \beta_k Dum_{kt} + \omega_t \quad [\text{Eqn 4}]$$

In Equation 3,  $\delta$  is a constant,  $\Pi_i$  is an  $n \times n$  matrix of coefficients,  $\omega_t \approx iid(0, \Omega)$ ,  $d_{\max}$  is the maximum order of integration and  $Dum_{kt}$  are dummy variables.

The article controlled for a number of dummy variables that potentially had effects on both corporate and household savings through economic growth and altering expectations and thus, saving behaviour. The base period was 1960–1966. The article controlled for the divestment dummy, which captures the protracted campaigns against investment in apartheid South Africa, which ran from 1967 to about 1987. By creating uncertainty, most likely this campaign caused corporate savings to increase as firms reduced their investment rate but reduced household savings through poor economic growth. Similarly, the sanctions of the period 1985–1993 would have resulted in rising corporate savings but perhaps undermined household savings as disposable incomes fell.

The article also controlled for periods of significant commodity price movements such as the falling commodity prices of the 1980s, rising commodity prices of the 2000s and the oil crisis of the 1973–1974 period. As the South African economy is built around a minerals-energy complex, one would expect a commodity price bust to result in job losses, decreasing household incomes and so, falling household savings, and the story would be more or less the same for corporations as their earnings shrink significantly. The converse is true for the times of commodity price booms.

The controlled for the democratic transition that is expected to have induced greater household participation in the economy. Increased access to credit because financial liberalisation that followed this transformation would have reduced household savings and increased reliance on debt. Firms would have saved less as they invested more in pursuit of new business opportunities that the demise of the apartheid signalled. A number of financial crisis dummies were controlled, which include the rand crises of 1996–1998 and 2001, the Asian financial crisis and the global financial (economic) recession. The rand crisis created uncertainty and probably reduced household savings, but increased net corporate savings as firms would have adopted a wait-and-see approach to investment. However, the effect of the exchange rate on corporate savings behaviour is often ambiguous because it tends to benefit exporters while penalising importers; the net effect depends on which of the two responds more to the depreciating rand. The Dotcom bubble was a period of good economic performance and is expected to have increased household savings because of rising incomes but reduced corporate savings as firms undertook more investment activities. The COVID-19 pandemic is expected to have increased corporate savings because of the postponement of investment decisions, while household savings would have declined because of household loss of incomes. Further, the article controlled for the inflation targeting framework dummy and the adoption of the MTEF to capture changes in both the monetary and fiscal regimes.

The Schwarz Information Criterion (SIC) and the Hannan-Quinn information criterion (HQC) determined an optimal lag order of one. The Akaike Information Criterion (AIC) determined three lags but given the size of the sample, the article chose to rely on the SIC and the HQC. The sample period was 1960–2021, and the data had annual frequency. This period was chosen simply for data availability reasons.

The article presents the analysis in terms of impulse response analysis and as well as Granger non-causality test. The Cholesky ordering for the impulse response analysis was informed by the heterodox postulation that government spends first before taxing (Cesaratto 2016). This implies that the deficit has an underlying causal effect on the other variables. The neoclassical view is that interest rates increase because of deficits (Bernheim 1989), but the heterodox view is that interest rates decrease in response (Kelton 2020). As South Africa is an open economy, the exchange rate responds to the movement in interest rates. The combination of these impulses influences household incomes via the performance of the economy through investment and economic growth:

$$d_t \Rightarrow i_t \Rightarrow e_t \Rightarrow y_t \Rightarrow hs_t \quad [\text{Eqn 5}]$$

$$d_t \Rightarrow i_t \Rightarrow e_t \Rightarrow y_t \Rightarrow cs_t \quad [\text{Eqn 6}]$$

## Ethical considerations

This article followed all ethical standards for research without direct contact with human or animal subjects.

## Results and analysis

This section presents and analyses the findings. It first confers the summary statistics and correlation analysis. Then it considers unit root tests and regression results.

### Summary statistics

In general, Table 3 shows that corporations saved more than households, but the variability of the savings was more or less the same for both firms and households. The statistical ranges were very large for the private sector and more or less matched the range for the fiscal deficit. Table 3 shows that net household savings were lower in the post-democracy period than the apartheid period – averaging 0% and 3% of GDP, respectively. The maximum levels of net household savings for the two sub-periods were different, averaging 5% (1960–1993) and 2% (1994–2021), suggesting the perennial problem of household indebtedness in the post-democracy period.

Net corporate savings behaved the same way across the two sub-periods, averaging 4%. The maximum net corporate savings were nearly the same – averaging 11% (1960–1993) and 10% (1994–2021). Even the median of the net corporate savings distributions was nearly the same – estimated at 3% (1960–1993) and 4% (1994–2021).

Table 3 also shows that the fiscal deficit was more or less equal – averaging –3% (1960–1993) and –4% (1994–2021). The behaviour of nominal interest rates was essentially the same for both sub-periods regardless of whether the mean, median or maximum is considered. However, the exchange rate became much more volatile in the 1994–2021 period than it was in the apartheid period – averaging R/USD1.00 (1960–1993) and R/USD9.00 (1994–2021) and the maximum for the post-democracy period was as high as R/USD16 relative to

**TABLE 3:** Summary statistics.

Variable	Mean	Median	Max	Min	Standard deviation	Observation
<b>1960–1993</b>						
$hs_t$	2.91	3.10	5.10	0.7	1.12	34
$cs_t$	3.98	3.40	11.2	1.7	1.95	34
$d_t$	-3.25	-2.95	-0.70	-6.6	1.59	34
$i_t$	12.17	11.00	22.30	5.50	5.21	34
$e_t$	1.27	0.81	3.27	0.68	0.82	34
$y_t$	1998.65	882.50	8455.00	225.00	2350.79	34
<b>1994–2021</b>						
$hs_t$	-0.02	-0.05	2.00	-1.80	1.05	28
$cs_t$	3.90	3.65	9.50	0.90	1.85	28
$d_t$	-3.51	-4.20	0.70	-9.70	2.32	28
$i_t$	12.69	11.25	21.8	7.00	4.04	28
$e_t$	8.85	7.89	16.46	3.55	3.67	28
$y_t$	33076.04	31054.50	64111.00	9354.00	17904.47	28
<b>1960–2021</b>						
$hs_t$	1.59	1.40	5.10	-1.80	1.83	62
$cs_t$	3.94	3.55	11.2	0.90	1.89	62
$d_t$	-3.37	-3.20	0.70	-9.70	1.94	62
$i_t$	12.41	11.25	22.30	5.50	4.69	62
$e_t$	4.69	2.69	16.5	0.68	4.56	62
$y_t$	16033.60	6420.00	64111.00	225.00	19697.52	62

R/USD3.00 for the apartheid period. The rand has experienced several crises in the 1990s and 2000s. Average household disposable incomes were much higher under the democratic dispensation than the apartheid era.

## Correlation analysis

Table 4 reveals important correlation patterns that deserve a comment. Whether the sample is broken into the pre- and post-democracy period, as well as considered in full, fiscal deficits have a negative correlation with net corporate savings – pre-democracy (insignificant), after democracy (–0.8) and full sample (–0.4). The strong negative post-democracy correlation seems to agree with Heterodox Economics literature that states that fiscal deficits are negatively correlated with net corporate savings. Net household savings are negatively correlated (–0.5) to fiscal deficits in the pre-democracy era but insignificant for the post-democracy era and the full sample. Thus, fiscal deficits have an inverse relationship to both household and corporate savings just as Figure 1 demonstrates. There is also a positive correlation (0.3) between household and corporate savings.

In a somewhat surprising outcome, the nominal interest rate had a statistically insignificant relationship with net corporate savings for both sub-samples and the full sample. The nominal interest rate had a weakly significant negative correlation (–0.4) with household savings (1960–1993). The nominal interest rate had a positive correlation with household savings, estimated at 0.7 (1994–2021) and 0.6 (1960–2021). The nominal exchange rate was negatively correlated with corporate savings in the pre-democracy sub-sample (–0.5) and in the full sample (–0.3).

**TABLE 4:** Correlation matrix.

Prob	Hs	cs	i	e	Y	d
1960–1993						
<i>hs</i>	1.0	-	-	-	-	-
<i>cs</i>	0.2	1.0	-	-	-	-
<i>i</i>	-0.4*	-0.2	1.0	-	-	-
<i>e</i>	-0.2	-0.5**	0.9***	1.0	-	-
<i>y</i>	-0.3	-0.3	0.9***	1.0***	1.0	-
<i>d</i>	-0.5**	0.3	0.4	0.0	0.1	1.0
1994–2021						
<i>hs</i>	1.0	-	-	-	-	-
<i>cs</i>	0.1	1.0	-	-	-	-
<i>i</i>	0.7***	-0.2	1.0	-	-	-
<i>e</i>	-0.4**	0.2	-0.9***	1.0	-	-
<i>y</i>	-0.7***	0.3	-1.0***	0.9***	1.0	-
<i>d</i>	-0.2	-0.8***	0.2	-0.3*	-0.4**	1.0
1960–2021						
<i>hs</i>	1.0	-	-	-	-	-
<i>cs</i>	0.3**	1.0	-	-	-	-
<i>i</i>	0.6***	-0.0	1.0	-	-	-
<i>e</i>	-0.8***	-0.3*	-0.5***	1.0	-	-
<i>y</i>	-0.8***	-0.2	-0.5***	1.0***	1.0	-
<i>d</i>	-0.2	-0.4**	0.2	-0.1	-0.1	1.0

\*,  $p < 0.10$ ; \*\*,  $p < 0.05$ ; and \*\*\*,  $p < 0.01$ .

The correlation between household disposable income per capita and net household savings is statistically significant and negative in the post-democracy sub-sample (–0.7) and in the full sample (–0.8). Theoretically, one would expect a growing household disposable income per capita to result in higher household savings but rising incomes could be an entry visa into credit markets so that household debt rises at the expense of savings. Literature suggests that South Africa is affected by a Veblenian conspicuous consumption problem, which should result in rising incomes being associated with falling household savings (Chipp, Kleyn & Manzi 2011; Van Wyk & Posel 2019).

Table 4 also shows that the nominal exchange rate and household income per capita were positively correlated to nominal interest rates, estimated at 0.9 (1960–1993) for both. However, in the post-democracy the correlation became negative but with the same absolute sizes, estimated at –0.9 (exchange rate) and –1.0 (disposable income per capita). The full sample shows that the both correlations remain negative and fall to –0.5. As income and the exchange rate have almost perfect linear correlations, the empirical model dropped them to avoid the problem of severe multicollinearity (Gujarati & Porter 2009).

## Unit root analysis

Table 5 shows that the variables are integrated of mixed orders. The combination of integrated processes of order zero and one paved way for a Toda-Yamamoto VAR modelling framework as presented already. However, for the household savings regression, a standard VAR was estimated as all variables were integrated of order zero.

## Regression results

The estimated regression results are presented in Table 1-A1 (household savings VAR system without dummies), Figure 1-A1 (stability diagnostics for results in Table 1-A1), Table 2-A1 (household savings VAR system with dummies) and Figure 2-A1 (stability diagnostics for results in

**TABLE 5:** Unit root tests.

Variable	Levels	First difference	Second difference	Order of integration
Dickey-Fuller (DF) breakpoint test				
<i>Hs</i>	-5.778***	-	-	Zero
<i>cs</i>	-4.669	-9.611***	-	One
<i>d</i>	-5.536**	-	-	Zero
<i>i</i>	-7.037***	-	-	Zero
Log( <i>y</i> )	-4.259	-13.125***	-	One
Log( <i>e</i> )	-4.230	-7.730***	-	One
Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test				
<i>hs</i>	0.134***	-	-	Zero
<i>cs</i>	0.125***	-	-	Zero
<i>d</i>	0.104***	-	-	Zero
<i>i</i>	0.272***	-	-	Zero
Log( <i>y</i> )	0.192***	-	-	Zero
Log( <i>e</i> )	0.127***	-	-	Zero

KPSS, Kwiatkowski-Phillips-Schmidt-Shin.

\*\*,  $p < 0.05$ ; \*\*\*,  $p < 0.01$ .

Table 2-A1). Table 3-A1 presents the corporate savings VAR system without dummies and Table 4-A1 the corporate savings VAR system with dummies. Figure 3-A1 is the stability diagnostics for the results in Table 4-A1. The analysis that follows is based on Granger non-causality analysis and impulse response analysis. The article pays greater attention to the key variables for the analysis. The other relationships are analysed in passing. The article set out to test two contending claims – one from the heterodox thought which says fiscal deficits increase savings through their income effect and another from the neoclassical thought which says fiscal deficits reduce savings. Heterodox scholars have shown using advanced economies that years of fiscal surpluses have been associated with rising household and corporate indebtedness and falling private savings the result of which has been financial instability (Kelton 2020).

In Table 2-A1, none of the dummies had any statistically significant effect on household savings except the commodity price busts of the 1980s and the democratic transition. The coefficient signs for both dummies suggest that household savings were much lower during the commodity price busts of the 1980s and the post-apartheid period. For a mineral-based economy, falling commodity prices always trigger household income losses through job losses, resulting in dissaving. The democratic transition came with greater access to financial credit, and this resulted in households dissaving as household debt accumulated. Thus, it appears that the household savings-deficit relationship experienced a structural change following the democratic transition.

Table 4-A1 shows that during the sanctions period and the Dotcom bubble, corporate savings were lower relative to the 1960–1966 base period. This implies that as long as profitable opportunities existed (Dotcom bubble), firms invested and did not accumulate savings. Lower savings during the sanctions period might be a reflection of the negative income effect of the sanctions. Table 4-A1 also shows that corporate savings were higher during the COVID-19 period relative to the 1960–1966 base period. Recent literature has shown that corporate savings have been rising since the global financial crisis and continued to do so during the pandemic (Dadam & Viegi 2018).

### Granger non-causality analysis

Table 6 reports Granger non-causality test results for the corporate and household savings VAR systems. In the household savings VAR system, fiscal deficits granger cause household savings, which is expected from both the heterodox and neoclassical systems of thought, although they differ in the nature of the effect. Fiscal deficits also unidirectionally Granger-cause nominal interests.

With respect to the corporate savings VAR system, as is expected in both heterodox and neoclassical thought, fiscal deficits Granger-cause the nominal interest rate. The difference between these schools of thought is that the heterodox view says deficits reduce interest rates, while the neoclassical thought says deficits increase interest rates.

**TABLE 6:** Granger non-causality tests for both the household and corporate savings vector autoregressive systems.

Hypothesis	<i>P</i> for $\chi^2$	Conclusion
<b>Household savings</b>		
$d \rightarrow hs$	0.067*	Deficits cause household savings
$hs \rightarrow d$	0.586	Household savings do not cause deficits
$i \rightarrow hs$	0.736	Interest rate does not cause household savings
$hs \rightarrow i$	0.049**	Household savings cause interest rate
$i \rightarrow d$	0.225	Interest rates do not cause deficits
$d \rightarrow i$	0.043**	Deficits cause interest rate
<b>Corporate savings</b>		
$d \rightarrow cs$	0.560	Deficits cause corporate savings
$cs \rightarrow d$	0.847	Corporate savings do not cause deficits
$i \rightarrow cs$	0.100	Interest rate does not cause corporate savings
$cs \rightarrow i$	0.160	Corporate savings cause interest rate
$i \rightarrow d$	0.526	Interest rates do not cause deficits
$d \rightarrow i$	0.002***	Deficits cause interest rate

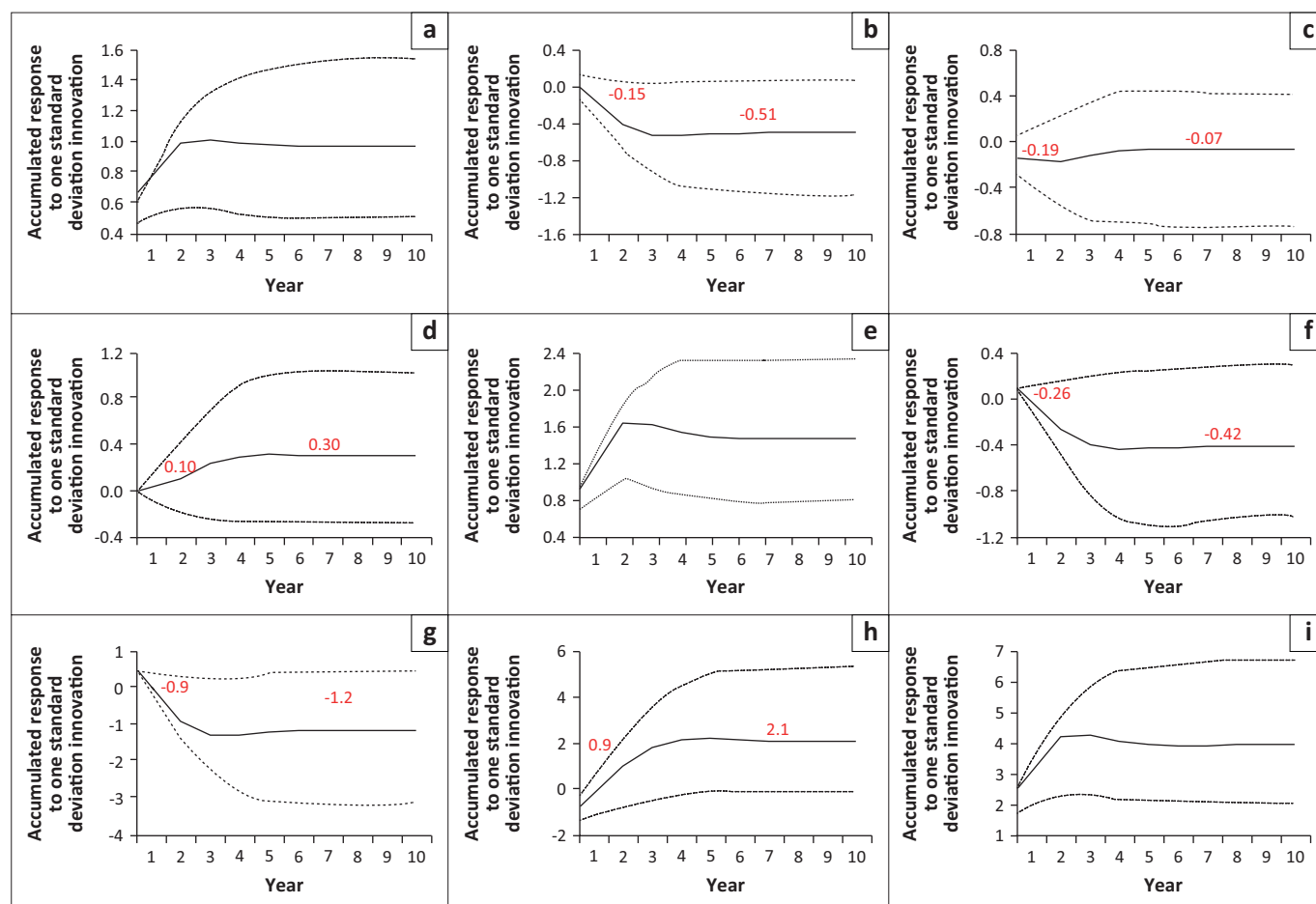
\*,  $p < 0.10$ ; \*\*,  $p < 0.05$ ; and \*\*\*,  $p < 0.01$ .

### Impulse response analysis

Figure 2 reports the impulse response functions for the household savings VAR system based on Kilian's unbiased bootstrapping procedure. In conformance to heterodox economic theory, a one standard deviation decrease in fiscal deficits (i.e. positive shock, moving towards surplus) is associated with decreasing household savings (Figure 2b). The size of the short-run multiplier is about  $-0.15$ , and the long run multiplier is about  $-0.51$ . To put it differently, a 1% point decrease in fiscal deficits reduces household savings by 0.15% in the short run and 0.51% points in the long run. Conversely, a 1% point increase in household savings increases fiscal deficits by between 0.1% points in the short run and 0.3% points in the long run (Figure 2d). This conforms to the prediction of the two-gap model: private savings build-up are associated with increasing public sector deficits.

A one standard deviation positive shock to nominal interest rates induces a decrease in household savings (Figure 2c). This result seems atheoretical, but the household savings measure is adjusted for both debt and interest payments. As such, net household savings in a society with highly indebted households would experience a decline in savings as interest rates increase. In the short run, a 1% point increase in the nominal interest rate reduces household savings by 0.19 percentage points, but the effect declines to 0.07 percentage points in the long run. On the other hand, a 1% point increase in household savings reduces the nominal interest rate by  $-0.9$  percentage points in the short run and 1.2 percentage points in the long run (Figure 2g). According to the loanable funds theory, as the supply of loanable funds increases, interests decrease.

Figure 2h also reveals that a one standard deviation positive shock in fiscal deficits (moving towards surplus) increases interest rates. A 1% point reduction in fiscal deficits increases nominal interest rates by 0.9 percentage points in the short run and 2.1 percentage points in the long run. While this finding seems theoretically problematic from a neoclassical perspective, it conforms to the prediction of heterodox thought, such as Modern



Note: Accumulated Response to Cholesky One S.D. (d.f. adjusted) Innovaons 95% CI using Kilian's unbiased bootstrap with 999 bootstrap repetitions and 499 double bootstrap reps  
 NHSAV, net household savings; DEF GDP, fiscal deficit; NOMINT, nominal interest rate; SD, Standard Deviation.

(a) Accumulated response of NHSAV to NHSAV; (b) NHSAV to DEF GDP; (c) NHSAV to NOMINT; (d) DEF GDP to NHSAV; (e) DEF GDP to DEF GDP; (f) DEF GDP to NOMINT; (g) NOMINT to NHSAV; (h) NOMINT to DEF GDP; (i) NOMINT to NOMINT innovation.

**FIGURE 2:** Impulse response analysis for the household savings vector autoregressive system (a-i).

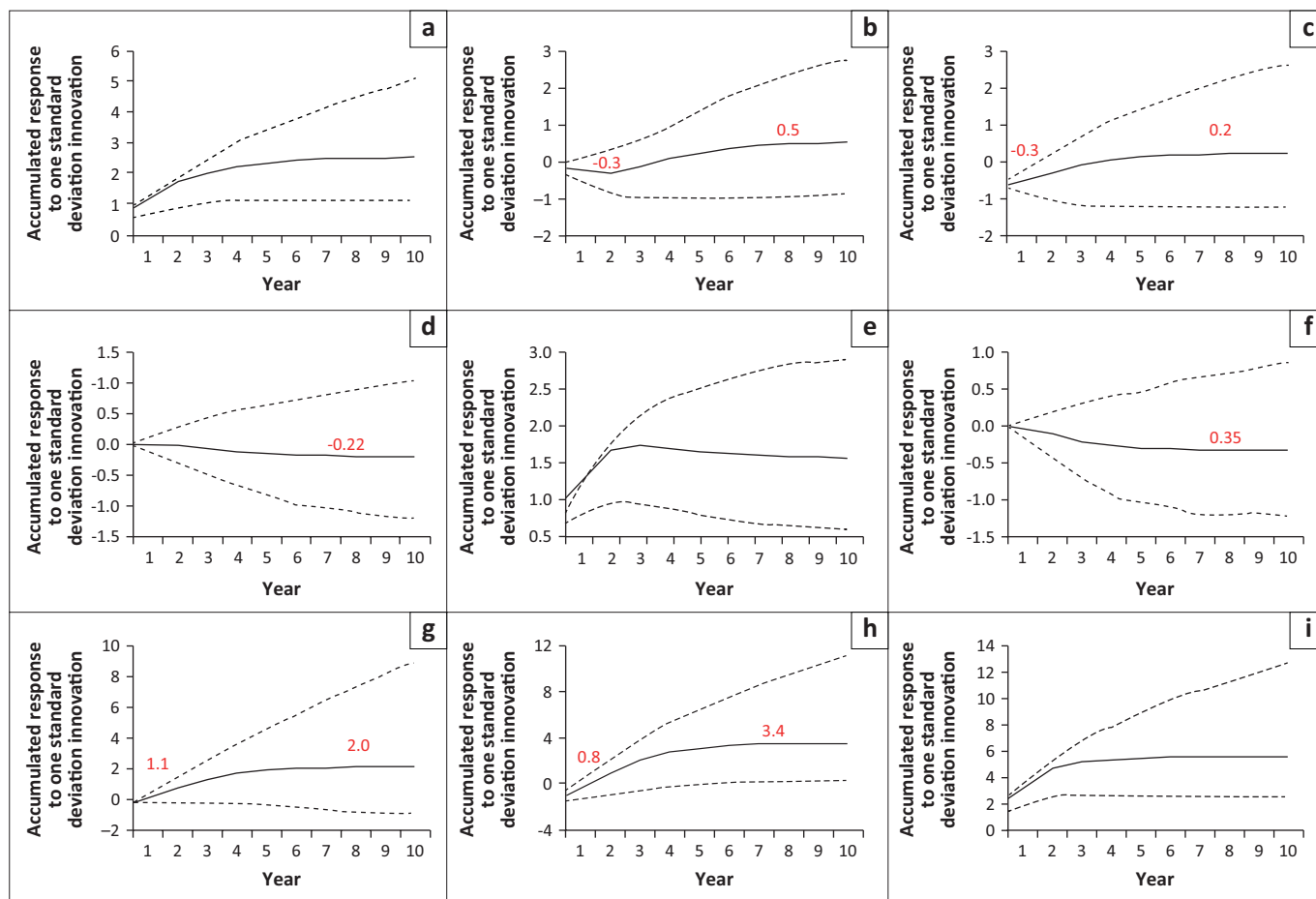
Monetary Theory, which shows that deficits create financial assets that increase savings (and so liquidity) and the effect is to reduce interest rates. These views are advanced by thinkers such as Kelton (2015, 2020) and Sawyer (2020). However, an increase in the nominal interest rate increases fiscal deficits by between 0.26% in the short run points and 0.42% points in the long run, and most likely the effect works via the income effect and investment effect such that the tax base shrinks (Figure 2f).

Figure 3b shows that a one standard deviation positive shock in the fiscal deficit (a move towards surplus) reduces corporate savings. A 1% point decrease in fiscal deficits induces a 0.3% point decrease in corporate savings in the short run, but the effect becomes positive in the long run (0.5% points). This prediction entirely agrees with the heterodox view that fiscal surpluses reduce the stock of financial assets in the economy and so, savings. This is evident also in that a positive shock to the fiscal deficit (moving towards surplus) increases interest rates. Conversely, a 1% point increase in corporate savings has no effect on fiscal deficits in the short run but increases fiscal deficits in the long run by 0.22% points (Figure 3d). The corporate savings model shows, as did the household savings model,

that as fiscal deficits move towards surplus, the nominal interest rate increase – the short run multiplier estimated at 0.8 and the long run multiplier reaching 3.4 (Figure 3h). This confirms the heterodox claim.

The article posed three questions. Firstly, do South African private savings-fiscal deficits nexus conform to the neoclassical hypothesis? Secondly, do fiscal deficits have the same effect on both household and corporate savings? Thirdly, has the savings-fiscal deficit relationship undergone structural change since the 1990s. With respect to the first question, evidence suggest that the net household savings-fiscal deficits nexus conforms to the heterodox view that increasing fiscal deficits increase household savings through the income channel. The neoclassical view finds no support. In response to the second question, the Granger causality analysis showed that fiscal deficits do not have a causal effect on corporate savings, but they have a causal effect on household savings. As to the third question, various dummies relating to the period of the 1990s were insignificant except the democratic transition dummy and the Dotcom bubble dummy. The effects of both dummies suggest that corporate savings and household savings declined in the 1990s.





NCORPSAV, net corporate savings; DEFGDP, fiscal deficit; NOMINT, nominal interest rate; SD, Standard Deviation.

**FIGURE 3:** Impulse response analysis for the corporate savings vector autoregressive system (a – i).

## Conclusion

The article set out to test whether South African data conformed to the neoclassical prediction that deficits undermine savings. In the alternative, the article sought to test whether the claims of emerging heterodox economic theoretical explanations that state that fiscal deficits increase savings through the financial asset creation channel. The findings confirmed that the neoclassical prediction under the loanable funds theory is inconsistent with South African data to the extent that decreases in fiscal deficits reduce net corporate savings and net household savings. The loanable funds theory builds on a rigid assumption that the pool of savings is fixed. However, as fiscal deficits create net financial assets for the private sector, they serve to expand the pool of loanable funds rather than diminish it. Kelton (2020), Wray (2018) and Keen (2011) emphatically made this point in their arguments and by way of empirical findings. Recent empirical evidence also supports this finding and claim. For example, Aggarwal et al. (2022) and Dadam and Viegli (2018) empirically demonstrated that in the short-run fiscal deficits improve private savings and increase net wealth in the long term for the private sector.

Consistent with recent findings in literature, for example Aggarwal et al. (2022) and Dadam and Viegli (2018), the article has confirmed that the COVID-19 pandemic both

caused corporations to increase their net savings significantly. In that sense, there was structural change. Corporate savings were much lower during the Dotcom bubble as it was more profitable to invest during that time.

The implications of these findings are that, while fiscal deficits are like a double-edged sword, fiscal authorities can deploy them to develop a balanced economy that works for all. An unhealthy pursuit of fiscal surpluses can be counterproductive to the extent that fiscal surpluses tend to shift deficits to households and firms. In general, government indebtedness creates less systemic financial instability compared to the indebtedness of households and firms. Thus, a healthy level of fiscal deficits will guarantee a constant flow of net financial assets to private hands and expand the financial wealth portfolio of both firms and households. To base policy on theoretical postulations of the loanable funds theory alone can be misleading in discharging fiscal policy. As Arestis and Sawyer (2010) and Arestis and Resende (2015) have convincingly shown, debt and deficits become problematic when they change the structure of relative prices in the economy, a situation that only happens as an economy approaches high levels of inflation and hyperinflation.

Lastly, the insight from the findings is that what is often thought of as a build-up of cash holdings in the corporate

sector probably is a reflection of a build-up of financial assets created by fiscal deficits in the economy. It is easy to misinterpret the financial asset build-up as a hoarding of cash by firms.

The sample size used in the study was small and that limited the possibility of controlling for many variables that have a bearing on savings. For the future, research can control for corporate and household debt to assess how they interact with fiscal deficits to determine their savings outcomes. Further expanding the study to a cross-country level can also improve the quality of the emergent story.

## Acknowledgements

### Competing interests

The author has declared that no competing interest exists.

### Author's contributions

J.M. is the sole author of this article.

### Funding information

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

### Data availability

Data sources are available from the sources indicated in the reference list. More information is available from the author upon reasonable request.

### Disclaimer

The views and opinions expressed in this article are those of the author and do not necessarily reflect the official policy or position of any affiliated agency of the author, and the publisher.

## References

- Aggarwal, R., Auclert, A., Rognlie, M. & Straub, L., 2022, *Excess savings and twin deficits: The transmission of fiscal stimulus in open economies*, National Bureau of Economic Research, viewed 12 June 2022, from [http://mattrognlie.com/excess\\_savings\\_twin\\_deficits.pdf](http://mattrognlie.com/excess_savings_twin_deficits.pdf).
- Akinboade, O.A., 2004, 'The relationship between budget deficit and interest rates in South Africa: Some econometric results', *Development Southern Africa* 21(2), 289–302. <https://doi.org/10.1080/0376835042000219550>
- Arestis, P. & Resende, M.F.C., 2015, 'Fiscal policy and the substitution between national and foreign savings', *Journal of Post Keynesian Economics* 37(3), 436–458. <https://doi.org/10.1080/01603477.2015.1000168>
- Arestis, P. & Sawyer, M., 2010, 'The return of fiscal policy', *Journal of Post Keynesian Economics* 32(3), 327–346. <https://doi.org/10.2753/PKE0160-3477320301>
- Aron, J. & Muellbauer, J., 2000, 'Personal and corporate saving in South Africa', *The World Bank Economic Review* 14(3), 509–544. <https://doi.org/10.1093/wber/14.3.509>
- Barro, R.J., 1989, 'The Ricardian approach to budget deficits', *Journal of Economic Perspectives* 3(2), 37–54. <https://doi.org/10.1257/jep.3.2.37>
- Bernheim, B.D., 1989, 'A neoclassical perspective on budget deficits', *Journal of Economic Perspectives* 3(2), 55–72. <https://doi.org/10.1257/jep.3.2.55>
- Bonga-Bonga, L., 2012, 'Budget deficit and long-term interest rates in South Africa', *African Journal of Business Management* 6(11), 3954–3961. <https://doi.org/10.5897/AJBM11.713>
- Burger, P., 2004, 'Surplus, surplus, who's got the (twin) deficits?', *South African Journal of Economics* 72(1), 1–24. <https://doi.org/10.1111/j.1813-6982.2004.tb00101.x>
- Burger, P., Siebrits, K. & Calitz, E., 2016, 'Fiscal consolidation and the public sector balance sheet in South Africa', *South African Journal of Economics* 84(4), 501–519. <https://doi.org/10.1111/saje.12126>
- Calitz, E. & Siebrits, K., 2003, 'Fiscal policy in the 1990s', *South African Journal of Economic History* 18(1–2), 50–75. <https://doi.org/10.1080/10113430309511154>
- Cesaratto, S., 2016, 'The state spends first: Logic, facts, fictions, open questions', *Journal of Post Keynesian Economics* 39(1), 44–71. <https://doi.org/10.1080/01603477.2016.1147333>
- Chipp, K., Kleyn, N. & Manzi, T., 2011, 'Catch up and keep up: Relative deprivation and conspicuous consumption in an emerging market', *Journal of International Consumer Marketing* 23(2), 117–134. <https://doi.org/10.1080/08961530.2011.543053>
- Choi, D.F. & Holmes, M.J., 2014, 'Budget deficits and real interest rates: A regime-switching reflection on Ricardian equivalence', *Journal of Economics and Finance* 38(1), 71–83. <https://doi.org/10.1007/s12197-011-9212-9>
- Dadam, V. & Viegli, N., 2018, *Systemic, sectoral risk and the myth of a corporate savings glut*. World Bank, Washington DC. viewed 10 August 2021, from <http://hdl.handle.net/10986/30195>.
- Diaw, A., 2020, 'Corporate cash holdings in emerging markets', *Borsa Istanbul Review* 21(2), 139–148. <https://doi.org/10.1016/j.bir.2020.09.005>
- Gale, W.G. & Orszag, P.R., 2004, 'Budget deficits, national saving, and interest rates', *Brookings Papers on Economic Activity* 2004(2), 101–210. <https://doi.org/10.1353/eca.2005.0007>
- Gujarati, D.N. & Porter, D.C., 2009, *Basic econometrics*, 5th edn., McGraw-Hill, New York, NY.
- Keen, S., 2011, *Debunking economics-revised and expanded edition*, Zed Books, London.
- Keeton, G., 2018, "'Post-truth," "alternative facts" and "fakenomics"', *South African Journal of Economics* 86(1), 113–124. <https://doi.org/10.1111/saje.12181>
- Kelton, S., 2015, 'The failure of austerity: Rethinking fiscal policy', *The Political Quarterly* 86, 28–46. <https://doi.org/10.1111/1467-923X.12231>
- Kelton, S., 2020, *The deficit myth: Modern monetary theory and how to build a better economy*, Public Affairs, New York, NY.
- Krugman, P., 2009, *The return of depression economics and the crisis of 2008*, W.W. Norton, New York, NY.
- Mantzaris, E. & Swanepoel, D., 2022, *Government needs to regain trust of the people of South Africa – And that means acting against corruption*, viewed 20 October 2022, from <https://www.dailymaverick.co.za/article/2022-07-04-government-needs-to-regain-trust-of-the-people-of-south-africa-and-that-means-acting-against-corruption/>.
- Sawyer, M., 2020, 'Kalecki on budget deficits and the possibilities for full employment', *Review of Political Economy* 32(4), 548–562. <https://doi.org/10.1080/09538259.2020.1831203>
- South African Reserve Bank, *Online statistical query*, viewed 5 March 2022, from <https://www.resbank.co.za/en/home/what-we-do/statistics/releases/online-statistical-query>.
- Spicer, M., 2016, 'The business government relationship: What has gone wrong?', *Focus* 78, 3–19.
- Toda, H.Y. & Yamamoto, T., 1995, 'Statistical inference in vector autoregressions with possibly integrated processes', *Journal of Econometrics* 66(1–2), 225–250. [https://doi.org/10.1016/0304-4076\(94\)01616-8](https://doi.org/10.1016/0304-4076(94)01616-8)
- Van Wyk, I. & Posel, D., 2019, *Conspicuous consumption in Africa*, Wits University Press, Johannesburg.
- Watts, M.J. & Sharpe, T.P., 2013, 'Immutable laws of debt dynamics', *Journal of Post Keynesian Economics* 36(1), 59–84. <https://doi.org/10.2753/PKE0160-3477360104>
- Wray, L.R., 2015, *Why Minsky matters: An introduction to the work of a maverick economist*, Princeton University Press, Princeton.
- Wray, L.R., 2018, *Functional finance: A comparison of the evolution of the positions of Hyman Minsky and Abba Lerner*, Working Papers Series, Levy Economics Institute, viewed 28 May 2020, from <http://hdl.handle.net/10419/209143>.

## Appendix 1

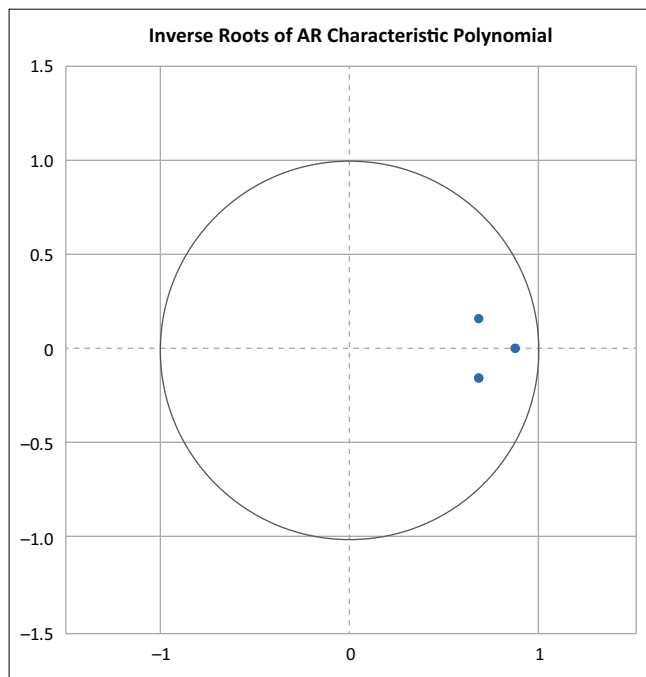
**TABLE 1-A1:** Vector autoregressive results for household savings without dummies.

Variable	H_save <sup>†</sup>		Deficit <sup>‡</sup>		Interest rate <sup>§</sup>	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
H_save <sub>t-1</sub>	0.864****	(0.067)	0.168	(0.103)	-0.032	(0.256)
Deficit <sub>t-1</sub>	-0.041	(0.064)	0.686***	(0.099)	0.511**	(0.246)
Interest rate <sub>t-1</sub>	0.027	(0.025)	-0.032	(0.038)	0.698***	(0.094)
Constant	-0.228	(0.372)	-0.988	(0.574)	5.097***	(1.428)

Note: \*\*\* means  $p < 0.01$ ; \*\* means  $p < 0.05$ .

The stability of H\_save, deficit and interest rate were all stable.

†,  $R^2 = 0.752$ ; ‡,  $R^2 = 0.467$ ; §,  $R^2 = 0.506$ .



AR, Autoregressive.

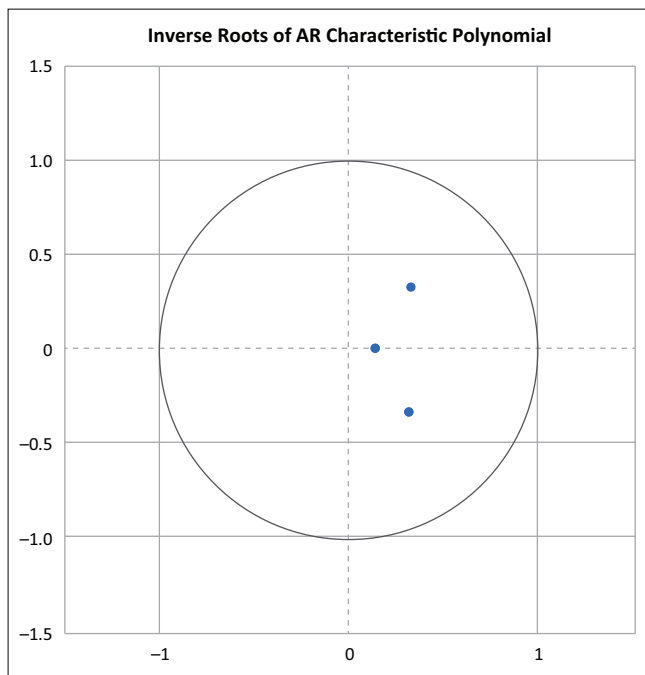
**FIGURE 1-A1:** Stability test for the household savings system vector autoregressive without dummies.

**TABLE 2-A1:** Vector autoregressive results for household savings with dummies.

Variable	H_save	Deficit	Interest rate
H_save <sub>t-1</sub>	0.253 (0.152)	0.129 (0.236)	-1.165* (0.594)
Deficit <sub>t-1</sub>	-0.179* (0.098)	0.278* (0.151)	0.771** (0.380)
Interest rate <sub>t-1</sub>	0.014 (0.040)	-0.075 (0.062)	0.240 (0.156)
Constant	1.764*** (0.602)	-1.764* (0.933)	11.185*** (2.344)
Divestment 1967–87	0.149 (0.398)	-1.088* (0.618)	2.871* (1.551)
Oil crisis 1973–74	-0.392 (0.680)	1.610 (1.054)	-3.248 (2.649)
Commodity price bust 1980s	-0.838** (0.389)	1.837*** (0.602)	0.812 (1.513)
Sanctions 1985–93	-0.253 (0.539)	-0.584 (0.835)	5.145** (2.098)
Democracy 1994–21	-2.195*** (0.829)	-0.382 (1.284)	7.027** (3.226)
Dotcom bubble 1995–2000	0.509 (0.738)	-0.463 (1.144)	0.087 (2.874)
Rand crisis 1996–98	-0.103 (1.489)	-1.169 (2.308)	3.980 (5.799)
Asian crisis 1997–98	0.119 (0.906)	0.353 (1.405)	1.720 (3.529)
MTEF 1998–2021	-0.271 (1.103)	2.693 (1.709)	-3.301 (4.293)
Rand crisis 2001	0.393 (0.893)	0.264 (1.385)	3.172 (3.478)
Inflation targeting 2000–2021	-0.781 (1.228)	-3.153 (1.903)	-5.356 (4.781)
Commodity price boom 2000–2007	0.808 (0.595)	2.835*** (0.922)	-1.576 (2.317)
Global financial crisis 2008–2010	0.560 (0.645)	0.883 (0.999)	-1.222 (2.511)
COVID-19 2020–2021	0.510 (0.719)	-2.676** (1.115)	-0.012 (2.800)
R <sup>2</sup>	0.857	0.690	0.707
VAR Stability	Stable	Stable	Stable
Serial correlation LM test, LR [P]	13.464 [0.765]	13.464 [0.765]	13.464 [0.765]
Portmanteau serial correlation test, Adj Q [P]	10.281 [0.328]	10.281 [0.328]	10.281 [0.328]
Normality test $\chi^2$ [P]	2.041 [0.916]	2.041	2.041
Heteroscedasticity test, $\chi^2$ [P]	122.006 [0.432]	122.006 [0.432]	122.006 [0.432]

MTEF, Medium Term Expenditure Framework; VAR, Vector Autoregressive; LM, Lagrange Multiplier; LR, Likelihood Ratio.

\*Means  $P < 0.10$ ; \*\*Means  $P < 0.05$ ; \*\*\*Means  $P < 0.01$ ; [...] means  $P$ ; (...) standard errors.



AR, Autoregressive.

**FIGURE 2-A1:** Stability test for the household savings vector autoregressive with dummies.**TABLE 3-A1:** Vector autoregressive results for corporate savings without dummies.

Variable	Corp_save <sup>†</sup>		Deficits <sup>‡</sup>		Interest rate <sup>§</sup>	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Corp_save <sub>t-1</sub>	0.678***	(0.154)	-0.078	(0.152)	0.569	(0.355)
Deficits <sub>t-1</sub>	-0.177	(0.141)	0.760***	(0.140)	1.116***	(0.326)
Interest rate <sub>t-1</sub>	0.004	(0.064)	-0.109*	(0.063)	0.757***	(0.147)
Constant	0.789	(0.702)	-1.581	(0.696)	2.120	(1.620)
Corp_save <sub>t-2</sub>	-0.123	(0.170)	0.205	(0.168)	0.082	(0.392)
Deficits <sub>t-2</sub>	0.052	(0.157)	-0.123	(0.156)	-0.705*	(0.364)
Interest rate <sub>t-2</sub>	0.047	(0.059)	0.094	(0.059)	-0.044	(0.137)

\*means  $P < 0.10$ ; \*\*means  $P < 0.05$ ; \*\*\*means  $P < 0.01$

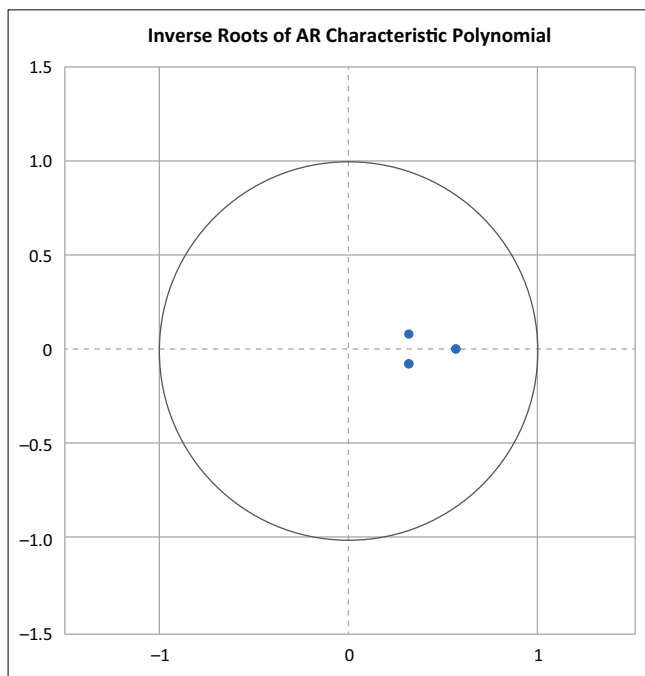
†,  $R^2 = 0.471$ ; ‡,  $R^2 = 0.497$ ; §,  $R^2 = 0.593$ .

**TABLE 4-A1:** Vector autoregressive results for corporate savings with dummies.

Variable	Corp_save	Deficits	Interest rate
Corp_save <sub>t-1</sub>	0.441** (0.156)	-0.029 (0.148)	0.561 (0.399)
Deficits <sub>t-1</sub>	0.096 (0.165)	0.299 (0.156)	1.336*** (0.420)
Interest rate <sub>t-1</sub>	0.123 (0.074)	-0.044 (0.070)	0.456** (0.189)
Constant	0.092 (0.976)	-2.596** (0.924)	5.757** (2.490)
Corp_save <sub>t-2</sub>	-0.090 (0.184)	0.149 (0.174)	-0.006 (0.469)
Deficits <sub>t-2</sub>	-0.293 (0.210)	-0.404** (0.199)	-0.332 (0.537)
Interest rate <sub>t-2</sub>	0.121* (0.065)	-0.052 (0.061)	-0.066 (0.165)
Divestment 1967–87	-0.453 (0.694)	-1.322** (0.656)	2.078 (1.770)
Oil crisis 1973–74	0.242 (1.133)	1.090 (1.072)	-3.772 (2.891)
Commodity price bust 1980s	0.858 (0.881)	1.533* (0.833)	-0.630 (2.249)
Sanctions 1985–93	-2.622** (0.946)	-0.460 (0.895)	4.753* (2.413)
Democracy 1994–21	-0.568 (1.385)	-1.474 (1.311)	7.441** (3.535)
Dotcom bubble 1995–2000	-2.039* (1.247)	-0.924 (1.181)	-1.541 (3.184)
Rand crisis 1996–98	-0.432 (2.403)	-1.910 (2.274)	2.112 (6.132)
Asian crisis 1997–98	0.477 (1.493)	0.789 (1.413)	2.757 (3.810)
MTEF 1998–2021	-1.850 (1.809)	3.466** (1.712)	-2.182 (4.617)
Rand crisis 2001	-1.940 (1.446)	0.446 (1.369)	2.842 (3.691)
Inflation targeting 2000–2021	1.738 (1.886)	-4.195** (1.785)	-3.164 (4.813)
Commodity price boom 2000–2007	-0.344 (1.005)	4.394*** (0.951)	-2.660 (2.564)
Global financial crisis 2008–2010	1.250 (1.357)	3.089** (1.285)	-0.931 (3.464)
COVID-19 2020–2021	3.510*** (1.208)	-2.383** (1.144)	-0.270 (3.084)
R <sup>2</sup>	0.686	0.728	0.704
VAR stability	Stable	Stable	Stable
Serial correlation LM test, LR [probability]	24.629 [0.136]		
Portmanteau serial correlation test, Adj Q [probability]	10.896 [0.283]		
Normality test $\chi^2$ [probability]	23.383 [0.001]		
Heteroscedasticity test, $\chi^2$ [probability]	175.479 [0.136]		

MTEF, Medium Term Expenditure Framework; VAR, Vector Autoregressive; LM, Lagrange Multiplier; LR, Likelihood Ratio.

\*Means  $P < 0.10$ ; \*\*Means  $P < 0.05$ ; \*\*\*Means  $P < 0.01$ ; (...) standard errors.



AR, Autoregressive.

**FIGURE 3-A1:** Stability test for the corporate savings vector autoregressive system with dummies.