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What Drives Saving in South Africa?

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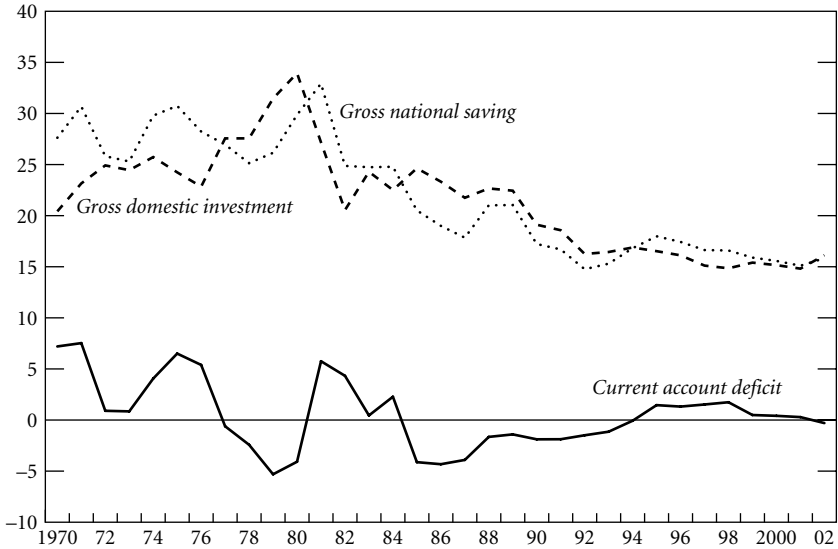
Investment in physical or human capital is one of the major sources of economic growth. Empirically, investment and growth tend to be strongly correlated, and all growth models predict a positive response of growth to investment, at least temporarily. Investment requires savings, from either domestic or foreign sources. Foreign saving can be an important source of domestic investment, particularly in the form of foreign direct investment. However, in the long run, an economy typically cannot rely entirely on foreign investment and additional domestic saving may need to be mobilized to finance growth.

This chapter studies recent trends in the private saving rate of South Africa and its various components, and identifies their main determinants. The set of potential determinants includes measures for fiscal policy, commodity prices, inflation, interest rates, and income-related measures, all of which are commonly used in other country studies analyzing saving rates. In South Africa, however, the production and export of primary commodities, such as gold and platinum, play an important role. International price movements for these commodities affect profits in the mining and mineral processing sectors and may generate windfalls that can be saved. International prices for South African commodity exports can, therefore, be expected to constitute an important determinant of the private saving behavior in South Africa.

Recent Developments of National Saving

South Africa has experienced a steady decline in its national saving rate over the past several decades that has been accompanied by a fall in domes-

Figure 4.1. Gross Domestic Investment, National Saving, and the Current Account
(In percent of GDP)



Source: South African Reserve Bank.

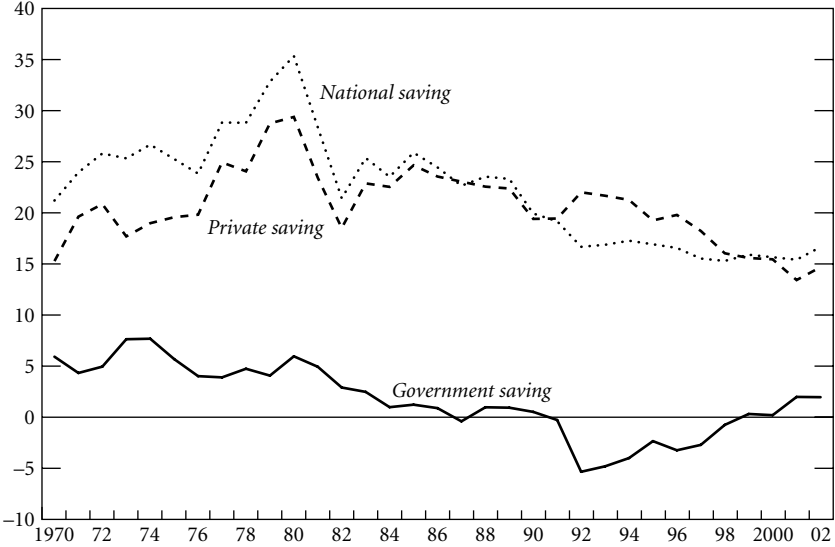
tic investment (Figure 4.1). The national saving rate—defined as the ratio of national saving to gross national disposable income (GNDI)—remained well above 20 percent in the 1970s and 1980s and even briefly exceeded 35 percent during 1979–80 (Figure 4.2). It subsequently fell however to about 15 percent in 2001. Government saving reached a trough in the early 1990s and has, since then, recovered significantly. Nevertheless, both corporate and personal saving fell throughout most of the 1990s and gross private saving reached its lowest point in 2001 at about 13 percent of GNDI (Figure 4.3). Such a low saving rate ranks poorly relative to those in other economies, particularly emerging market countries (Figure 4.4).

Literature Review

The classical growth model introduced by Solow (1956) predicts a positive relationship between the national saving rate and per capita income. An important conclusion from the Solow model is that higher saving leads to a temporary, but not permanent increase in growth. Several empirical

Figure 4.2. Gross National, Private, and Government Saving

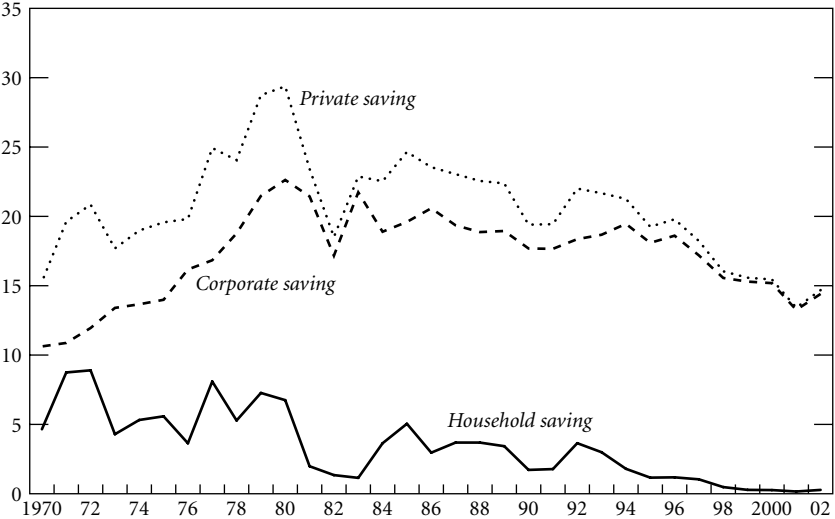
(In percent of gross national disposable income)



Source: South African Reserve Bank.

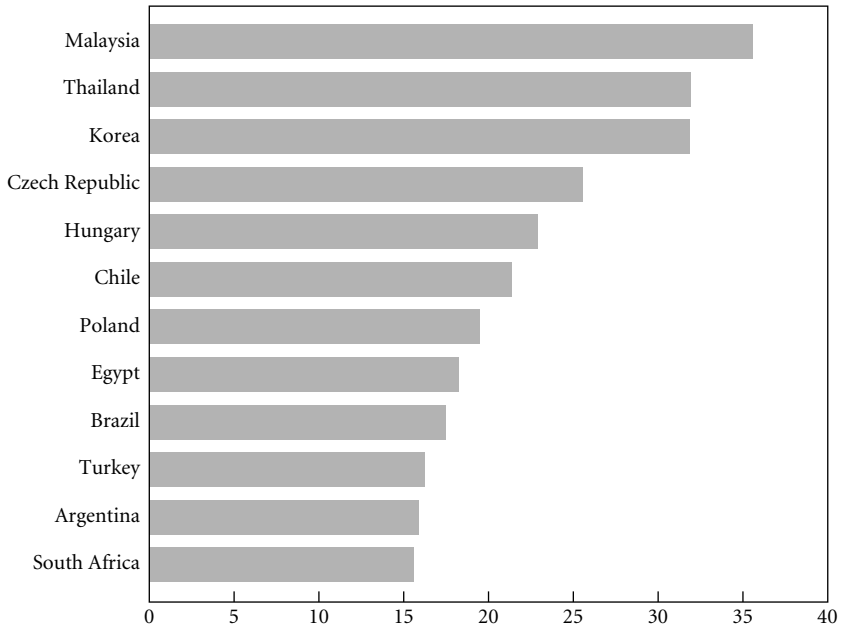
Figure 4.3. Private, Corporate, and Household Saving

(In percent of gross national disposable income)



Source: South African Reserve Bank.

Figure 4.4. Gross National Saving in Selected Emerging Market Countries Averaged over 1994–2002
(In percent of GDP)



Source: IMF, *International Financial Statistics*.

applications of the Solow model, however, such as Barro and Sala-i-Martin (1992) and Mankiw, Romer, and Weil (1992), have shown that the transition period following a change in savings can be very long and that saving rates are capable of explaining a large fraction of the international variation in growth rates. Other studies have investigated more closely the direction of causality, as saving and growth affect each other. Carroll and Weil (1993) and Rodrik (2000) confirm a strong positive relationship between saving and growth, but find that income growth booms cause permanent increases in saving rates, while transitions to higher saving rates are associated with only temporary increases in economic growth. In an extensive survey of the literature, Deaton (1999) concludes that the empirical correlation between growth and saving emanates from the response of growth to investment, while saving responds passively to investment through mechanisms that are not yet well understood. He highlights the importance of the saving behavior of small firms that retain profits in order to finance investment.

The literature on the determinants of saving is equally extensive. Traditional Keynesian models imply that consumption and saving depend on the level of current income. Two subsequent theoretical contributions placed the individual consumption and saving behavior in an intertemporal optimization perspective: the permanent income hypothesis (PIH) and the life-cycle hypothesis (LCH). The PIH framework emphasizes that, under very general assumptions, individuals prefer to smooth consumption over time and set it equal to the annuity value of the sum of assets and the present value of expected future labor income net of taxes. The effect on consumption of any change in income (current or expected) will be distributed over time by changes in saving. The LCH is based on the aggregation of finitely lived overlapping generations, where individuals smooth consumption over their working and retirement periods, and arrives at similar conclusions as the PIH. In contrast with older Keynesian models, economic models of intertemporal choice distinguish between temporary and permanent changes in current income. Both the PIH and the LCH predict that most of a temporary increase in current income will be saved, while most of a permanent increase in current income will be spent. The main difference between the PIH and LCH framework lies in the role of demographic factors, which are explicitly modeled in the LCH and affect the dynamics of aggregate saving.

The relationship between saving and income predicted by both intertemporal models faces serious shortcomings at the empirical level. The simple PIH models suggest that people save because they expect their income to decline, implying that saving should be a good predictor of declines in income (see Campbell, 1987). However, Carroll and Summers (1991) point out that the productivity slowdown of the early 1970s in the United States was not preceded by an increase in saving, although the decline in the rate of income growth appeared to have been well anticipated. The authors also showed that, contrary to the predictions of the LCH model, the cross-sectional profile of consumption in many countries is much better explained by the cross-sectional profile of current earnings, not the cross-sectional profile of lifetime resources. In light of this, empirical studies on the determinants of saving have mainly focused on current income or growth.

Models based on intertemporal optimization also identify a role for real interest rates in determining saving with two possibly opposite effects on saving: an income effect and a substitution effect. An increase in real interest rates makes individuals richer and hence more prone to consume and reduce saving. However, higher interest rates also increase the return on saving and, therefore, provide an incentive to delay consumption and save

more. The net effect is theoretically ambiguous, a result which is often reflected in empirical studies.

More recent models have modified the very general set of assumptions under which the PIH and LCH models operate, thus paving the way for the investigation of other determinants of saving (see Deaton (1999) for an overview). Some newer models highlight precautionary saving motives, suggesting that if households are very risk averse, they will increase their savings when uncertainty rises, to protect themselves against large possible swings in their income. Other contributions include the possibility that some households may face borrowing constraints, suggesting that financial liberalization may drive savings down. However, despite the progress in understanding consumption and saving behavior, no model has successfully encompassed the complexity of factors that influence saving. Hence, most empirical studies on saving include as determinants the variables appearing in the reduced-forms of the various theoretical contributions, rather than choosing one specific model of saving as a benchmark.

A related strand of literature focuses on the impact of the fiscal deficit and financial operations on private and national saving and, in particular, the empirical validity of Ricardian equivalence.¹ The notion of Ricardian equivalence implies that private spending is affected by changes in government spending but not changes in the way the spending is financed, since individuals anticipate changes in taxes by adjusting savings. For the equivalence to hold, individuals must fully discount the future stream of taxes over future generations.

This framework has inspired a body of empirical studies aiming at measuring the extent to which private saving offsets public saving. In its simplest formulation, with given income and no public investment (among other assumptions), the Ricardian equivalence framework suggests that the offset will be complete if the change in public saving arises from changes in taxes or from a change in spending that is perceived to be permanent. However, the offset will be less than full if the change in public saving is due to a change in spending that is perceived to be temporary, as it would be desirable to spread its effect on consumption over time.²

A large body of empirical research examines the determinants of saving, with the use of panel data for a broad set of countries (Giovannini, 1985;

¹For an overview, see Lopez, Schmidt-Hebbel, and Servén (2000).

²Under more general assumptions, the extent of the offset would also depend on the effect of fiscal policy on output, the role of distortionary taxation, credit constraints, and so on. Also, to the extent public investment is not perceived as different from public consumption, the fiscal deficit and not public saving would be the appropriate measure to use.

Masson, Bayoumi, and Samiei, 1995; Edwards, 1996; and Loyaza, Schmidt-Hebbel, and Servén, 2000). Loyaza, Schmidt-Hebbel, and Servén (2000) report in their survey that only a limited number of saving determinants appear to be consistently significant; these include the terms of trade, domestic and foreign borrowing constraints, fiscal policy variables, and pension system variables. These empirical studies differ widely regarding other determinants for which consumption theories would predict a significant influence on saving, such as income growth, demographic factors, interest rates, and inflation.

Other empirical studies focus on individual countries. Of particular interest for this chapter are those that analyze the saving behavior in South Africa, such as Tsikata (1998), Aron and Muellbauer (2000), and Jonsson and Teferra (2001). Prinsloo (2000) provides a detailed description of recent savings developments in South Africa.

Tsikata (1998) and Jonsson and Teferra (2001) arrive at the important conclusion that private saving only partially offsets changes in public saving. Hence, the fall in public saving in the 1970s and 1980s is likely to have played a significant role in the reduction of aggregate savings. This would suggest that policies directed toward increasing the national saving rate should aim at raising public saving.

Aron and Muellbauer (2000) and Jonsson and Teferra (2001) argue that financial liberalization has had a negative effect on private saving, by encouraging bank borrowing. However, the second study notices that financial liberalization does not seem to have reduced the share of liquidity constrained households, suggesting that liquidity constraints may have eased for households that already had some access to credit markets. Hence, while policies aimed at tightening prudential controls for personal borrowing could increase saving, the effect of financial liberalization is likely to further dampen household saving.

For private saving, Tsikata (1998) and Jonsson and Teferra (2001) find that compositional changes reflect households “piercing the corporate veil.” Households, as the ultimate owners of corporations, may view corporate saving as a full substitute for their own saving. Thus the argument goes, by “piercing the corporate veil,” they tend to offset changes in corporate saving with changes in their own saving. The authors support the view that policies targeted at corporate saving would be of limited use, as they would only affect the composition of private saving but not the level. Hence, policies aimed at improving the national saving rate should focus on raising public saving.

The role of other factors, such as inflation, interest rates, and commodity prices is documented by Aron and Muellbauer (2000). In particular, the

two authors find that the 1980 peak in corporate saving could be explained by the gold price boom.

Long-Run Determinants of the Private Saving Rate

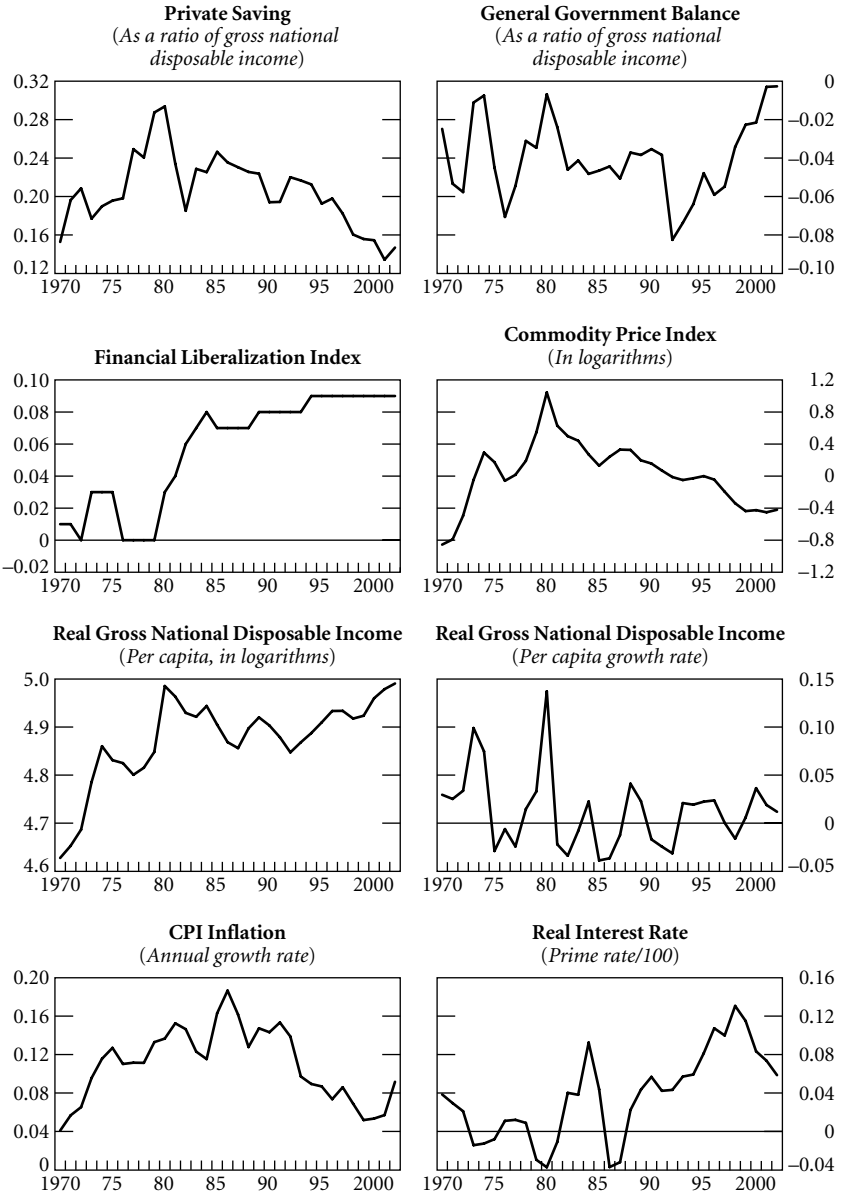
The econometric analysis presented in this chapter investigates the determinants of the ratio of private saving to GNDI. It focuses on several factors highlighted in the previous section, such as commodity prices, fiscal variables, a measure of financial liberalization, interest rates, inflation, and income-related measures. Figure 4.5 graphs the time series for each of these.

South Africa is particularly exposed to changes in world commodity prices, including gold and platinum, given the large number of commodity producers in South Africa and their relative weight in domestic production. Changes in these prices result in windfall gains and losses and could have a strong impact on savings, as commodity producers disproportionately contribute to private saving. To capture this effect, the commodity price index for South Africa's main export commodities is included in the model (see Chapter 9 for derivation of the index). A positive coefficient is expected.

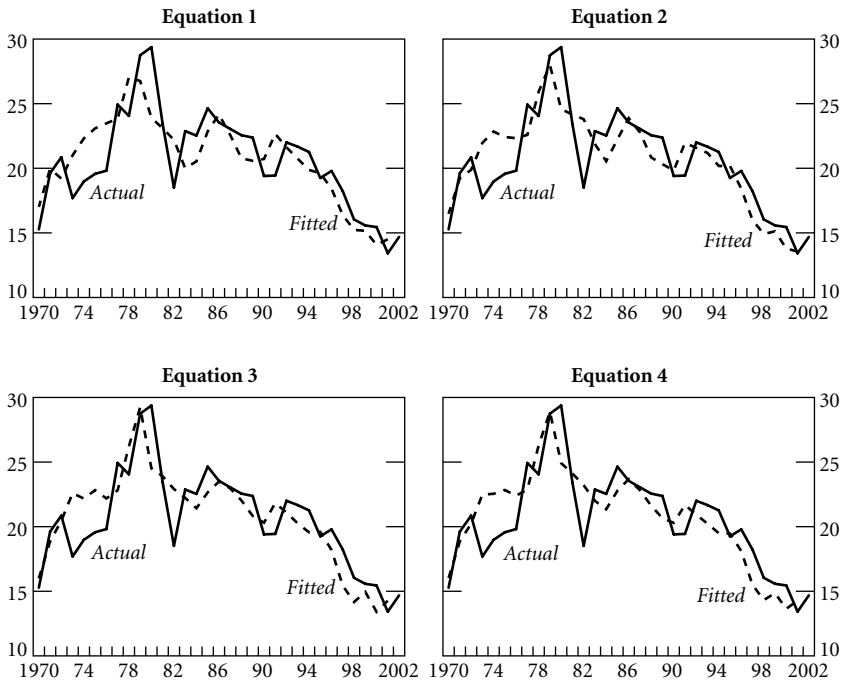
A particularly important issue for South Africa is the extent to which fiscal policy affects overall saving. Government consumption, investment, transfers, taxes, and so on, may all have different effects on economic activity and thus private saving. Empirically, however, it is very difficult to distinguish between the effects of different fiscal policy variables, especially in a single country case study with a very limited amount of data over time. Following the most common approach in the literature, therefore, the empirical model employed tests the extent to which the general government balance is offset by private saving. A negative coefficient between 0 and 1 is expected.

South Africa has liberalized its financial sector to a large extent over the past decade. Banks and building societies have considerably expanded their credit to households for housing finance and consumer credit. As noted above, financial liberalization seems to have played an important role in explaining the decline of household savings in the 1990s. A simple measure of financial liberalization, developed by Jonsson and Teferra (2001), is therefore included in the empirical model. This measure is the sum of several dummy variables that account for a number of elements of financial liberalization over the past two decades, including the removal of interest rate ceilings, reductions in reserve requirements, elimination of credit controls, security market improvements, and international financial liberalization. A negative coefficient is expected.

Figure 4.5. Determinants of the Private Saving Rate



Sources: South African Reserve Bank; and IMF staff estimates.

Figure 4.6. Fitted and Actual Values for Private Saving

Source: IMF staff calculations.

Finally, the empirical model includes inflation, the real interest rate, and income measures. Inflation is often used as a proxy for price uncertainty and macroeconomic stability and may capture the effects of the precautionary savings motive. Hence, inflation should have a positive coefficient. The effect of real interest rates is theoretically ambiguous, depending on the relative size of the wealth and substitution effects. Finally, the analysis tests for any effects of income, population, and their growth rates on private saving.

Empirical Results

The fully modified least squares (FMOLS) regression results are reported in Table 4.1 and actual and fitted values are presented in Figure 4.6. The estimation methodology is described in Box 4.1. One interesting finding relates to commodity prices, which appear to be very important in explaining

Table 4.1. Estimated Equations for the Private Saving Rate

	Cointegration tests			
Trace statistic	351.3**	160.1**	184.3**	155.3**
Critical value (95 percent level)	165.6	131.7	165.6	131.7
Max-eigenvalue test	175.9**	55.8**	51.8	51.3**
Critical value (95 percent level)	52.0	46.5	52.0	46.5
	Fully modified OLS estimates			
General government balance (In percent of GNDI)	-0.460 (0.193) [0.025]	-0.551 (0.227) [0.023]	-0.536 (0.158) [0.002]	-0.501 (0.160) [0.004]
Commodity price index (In logarithms)	0.083 (0.017) [0.000]	0.092 (0.019) [0.000]	0.068 (0.014) [0.000]	0.072 (0.014) [0.000]
Financial liberalization (Index)	-0.488 (0.202) [0.024]	-0.062 (0.245) [0.762]	-0.268 (0.145) [0.077]	-0.250 (0.147) [0.102]
Real interest rate	-0.089 (1.134) [0.513]	-0.125 (0.165) [0.456]	-0.001 (0.149) [0.995]	-0.055 (0.150) [0.718]
Inflation rate	0.019 (0.143) [0.895]	-0.181 (0.179) [0.322]	0.227 (0.231) [0.335]	0.117 (0.219) [0.598]
Real income	-0.142 (0.102) [0.176]	—	—	—
Real income (Per capita)	—	-0.060 (0.101) [0.560]	—	—
Real income growth	—	—	0.182 (0.116) [0.130]	—
Real income growth (Per capita)	—	—	—	0.102 (0.118) [0.397]
Population (Level)	0.223 (0.129) [0.095]	—	—	—
Population growth	—	—	-0.429 (1.477) [0.774]	—

Note: Estimates are for the period 1970A–2002A and are based on the Phillips and Hansen (1990) fully modified OLS procedure. Standard errors are reported in parentheses and probability values in brackets. Cointegration tests are based on the Johansen procedure and test the null of no cointegration.

* denotes rejection at the 5 percent level and ** at the 1 percent level.

Box 4.1. Empirical Methodology

Empirical case studies that analyze saving usually involve nonstationary time series. However, even if individual series are nonstationary, there may still exist stationary relationships among these variables in which case they are said to be cointegrated. Standard unit root tests cannot reject the null of nonstationarity for all variables discussed above but the growth rate of income. The system-based Johansen test is employed to test for the presence of cointegration. Table 4.1 includes the test results assuming no deterministic trend in the cointegrating vector and no lags in differences. For most specifications, the Johansen tests reject the null of no cointegration in favor of a single cointegrating vector. However, given the limited number of observations and the relatively large number of potential explanatory variables, the power of these tests is low. The test results should, therefore, be treated cautiously.

The long-run relationship between the various saving rates and the fundamental factors is estimated using Phillips and Hansen's (1990) fully modified OLS (FMOLS) procedure. FMOLS regression was originally designed in work by Phillips and Hansen (1990) to provide optimal estimates of cointegrating regressions. The method modifies least squares to account for serial correlation effects and for the endogeneity in the regressors that results from the existence of a cointegrating relationship. It requires all regressors to be integrated of order one, which is the case for all variables but for the per capita growth rate of real income. However, the inclusion of this variable in one of our estimating equations does not seem to affect the overall results.

movements in the private saving rate over the past 30 years.³ The estimated coefficient is highly significant and robust, and ranges from 0.07 to 0.09. This implies that an increase in real commodity prices by 10 percent raises the ratio of saving to gross national disposable income by slightly more than two-thirds of 1 percentage point. Since the present ratio of commodity exports to GDP is approximately 10 percent of GDP, about two-thirds of the windfall gain from a commodity price increase is saved.

The general government balance has a significant negative impact on private saving. The estimated coefficients are all robustly close to negative $\frac{1}{2}$. This confirms the findings of other studies that there is a partial offsetting effect of private saving to a change in the fiscal balance in South Africa. The use of public saving, rather than the overall balance, led to very similar results. There may, therefore, be scope for fiscal policy to increase overall saving in the economy.

³Previous studies, including Aron and Muellbauer (2000), attribute only the peaks in the corporate saving rate in the early 1980s to a surge in commodity prices.

The estimation results indicate that financial liberalization had a negative impact on private saving. This result is also consistent with previous studies. The extensive process of financial liberalization that has occurred over the past three decades has improved the access to credit and led to a reduction in overall saving.

All other variables tested turned out to be insignificant in explanatory power. Thus, with regard to income, this could suggest that income and saving are linearly related. In alternative specifications, the same regressions were run for the two components of private saving: corporate and household saving. The results were not as stable as for aggregate private saving, but broadly pointed to some interesting aspects, which are intuitively appealing: the effect of commodity prices occurs mainly via corporate saving, the effect of financial liberalization works primarily through household saving, and both corporate and household saving act to offset changes in the fiscal deficit.

Summary and Conclusions

This chapter looks at recent trends in private saving rates in South Africa and finds that commodity prices, fiscal policy, and financial liberalization have been the main determinants of private saving over the past 20 years. Changes in the fiscal balance do affect private saving significantly, but only around 50 percent is estimated to be offset; this leaves the government with some room for influencing overall saving. The price of South Africa's commodity exports declined from 1980 until the end of the millennium, thereby contributing to the secular decline in overall saving. Commodity prices have since recovered and this could provide a boost to saving and investment. Financial liberalization also appears to have had a significant negative impact on private saving, providing households with greater access to bank credit. A large segment of the population, however, still has only limited access to banking services in terms of both loans and making deposits. As financial development progresses and banking services become widespread, the impact on saving is unclear since the opportunities for both borrowing and saving will increase.

Appendix. Definitions of Variables

All data series are from the South African Reserve Bank, *Quarterly Bulletin*.

P: General consumer price index.

POP: Total population.

GNDI: Gross national disposable income.

General government balance: General government saving – general government investment.

Private saving: Household saving plus corporate saving.

Private saving rate: Private saving/GNDI.

Real income: GNDI/CPI.

Real income per capita: Real income/POP.

Real interest rate: Defined as $\ln[(1+i)/(1+\pi)]$, where i is the prime rate and π is consumer price inflation.

Financial liberalization index: The index consists of the sum of 9 dummy variables that account for the following dimensions of financial liberalization during the past two decades: interest rate liberalization, reductions in reserve requirements, reduction in credit controls, security market developments, and international financial liberalization. This index was constructed by Jonsson and Teferra (2001) and is based on the work of Falkena, Fourier, and Kok (1995). The specific dummy values are:

Dummy1 = 1 for statutory limits in 1970–71 and 1981–2002.

Dummy2 = 1 for minimum and prime rate control in 1982–2002.

Dummy3 = 1 for quantitative restrictions on bank lending to the private sector in 1973–75 and 1980–2002.

Dummy4 = 1 for quantitative restrictions on monetary banks' lending to private sector in 1973–75 and 1980–2002.

Dummy5 = 1 for quantitative restrictions on nonmonetary banks' lending to the private sector in 1973–75 and 1980–2002.

Dummy6 = 1 for capital market developments in 1984–2002.

Dummy7 = 1 for liberalization of the venture capital market sector of the Johannesburg Stock Exchange in 1989–2002.

Dummy8 = 1 for exchange controls on nonresidents in 1983–84 and 1994–2002.

Dummy9 = 1 for exchange controls on domestic residents in 1997–2002.

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