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South Africa: Macroeconomic Perspectives for the Medium-Term

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Summary. – This paper explores the macroeconomic situation and medium-term perspectives of the South African economy. Three fully quantified and internally consistent scenarios are presented. The projections demonstrate that there is, indeed, room to start addressing South Africa's pressing social needs in an effective manner, provided moderately optimistic assumptions about the future materialize. What is required is essentially an annual growth rate of at least 3% in combination with increasing imports, financed by access to foreign capital markets. Yet, if growth and real resource inflows falter, not even considerable moderation will be sufficient to maintain social and macroeconomic balance.

1. INTRODUCTION

The development agenda facing the new South Africa is intricate. While the South African economy was dynamic during the 1950s and 1960s, stagnation and decline became characteristic from around 1970 together with swiftly increasing unemployment and high inflation (Gelb, 1991). The downturn continued after 1990, and although the current account stayed positive due to international financial sanctions imposed from 1985, the public sector deficit grew rapidly. Inflation fell and growth recovered somewhat in 1993. Yet, the upturn cannot be taken for granted. Apartheid was a deeply entrenched social and economic order.

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Import-substituting policies were pursued for more than five decades to the benefit of the white minority, and human capital formation among African people was grossly neglected.

As a result, South Africa has one of the most unequal income distributions in the world (Eckert, 1991), and also wealth and access to public services is extremely skewed. Moreover, the high income group is relatively large as compared to that of other developing countries,ⁱ so much less is left in relative terms to the poorer groups, many of whom live in the large informal sector. Thus, absolute poverty is appalling (COSATU, 1992), and complex restructuring will be required to bring about sustainable social development. However, unless redistribution and the satisfaction of basic human needs go hand in hand with renewed growth, the necessary increase in the purchasing power of the black population cannot take place without a drastic reduction in the living standard of the whites.

The dual need for redistribution and growth is, in fact, no longer an issue in South Africa. Yet, perceptions regarding the respective roles of the private and public sector in development vary,ⁱⁱ and the same accounts in relation to issues such as the promotion of international competitiveness and the maintenance of private sector confidence. These differences highlight that much can still go wrong in managing the reform process in South Africa, and it follows from the experiences of other developing countries that appropriate attention to macroeconomic constraints will be essential.ⁱⁱⁱ Nevertheless, restraint cannot by itself restructure the economy and put South Africa on a higher, sustainable and socially just growth path.

The objective of this article is to assess the broad macroeconomic confines within which future policy choices will have to be made in South Africa, and to provide a fully quantified input into the ongoing policy dialogue. Three scenarios, which capture the essential differences among the many possible directions the South African economy may take over the next six years, form the core of the analysis. The theoretical modeling framework is described in Section 2.

Subsequently a moderately optimistic baserun is outlined in Section 3. This scenario is used as benchmark in Section 4, where two alternative scenarios are presented, before the paper is concluded in Section 5.

2. MODELING FRAMEWORK

During the past three decades, two widely used frameworks for macroeconomic analysis in developing countries have been the financial programming (FP) and the revised minimum standard model (RMSM), associated with respectively the International Monetary Fund (IMF) and the World Bank (WB). These two models focus on short-term economic and financial stabilization in the tradition of the monetary approach to the balance of payments (MABOP), on the one hand, and medium to long-term growth, investment, savings and foreign resource inflows along two-gap lines of thinking, on the other. Thus, the two models, which trace their origins back to respectively Polak (1957) and Chenery and Strout (1966), are very different. They have in common, however, that they are both based on a very simplistic view of macroeconomics (Addison, 1989, and Edwards, 1989). Hence, the FP and RMSM models can be criticised from a number of different analytical perspectives (Tarp, 1993a).

While the simplicity of the FP and RMSM models is a critical weakness, this characteristic is, at the same time, a strength. Policy debates are often clouded by unfamiliarity with fundamental macroeconomic questions and linkages. Accordingly, the application of rudimentary analytical frameworks can, if used judiciously, help policymakers and analysts gain a clearer understanding of key macroeconomic constraints and policy options. In this regard, the FP and RMSM frameworks can, first of all, serve as a practical organizing device. Moreover, the two models require few data to be run, and they are as demonstrated in Tarp and Brixen (1994) easy to apply and understand. In order to produce the macroeconomic scenarios presented in Section 3 and 4, it was therefore decided to use the formally merged version of the FP and

RMSM model presented in Khan *et al.* (1990),^{iv} including a few modifications, which are not of any substantive nature.

It is highlighted, however, that the merged model suffers from exactly the same shortcomings as the underlying FP and RMSM frameworks. Merging them adds nothing new in terms of theoretical insight, and to be meaningful in practice, the analysis must include additional qualitative and quantitative judgement from outside the model. This is so, in particular, since neither supply-side nor distributional issues are addressed explicitly. Consequently, due to the simple structure and extreme assumptions, on which the FP and RMSM are built, policy analysis based on marginal changes in the exogenous variables and parameters often end up being *beside the point* in the merged framework as pointed out by (Taylor, 1988, p. 154). Similar warnings against applying the merged model in a mechanistic manner have been made by Polak (1990). Yet, the two Bretton Woods institutions are set to play an important role in the policy dialogue in South Africa, and the merged model does contain the central monetary and material national accounting identities, which any macroeconomic projection model must include.

A condensed version of the merged framework consisting of 18 equations is set out in the Appendix, which also contains a list of the 33 variables and 10 parameters. The model is divided into four sets of equations for respectively (i) the real sector, (ii) income effects from terms-of-trade adjustments, (iii) the balance of payments, and (iv) prices together with the monetary sector and government accounts.

Growth in real GDP and aggregate exports are determined by exogenously given growth parameters, whereas total gross investments follow from a standard specification where the ratio of investments to GDP depend upon a constant and the GDP growth rate in the current period.^v An aggregate import function makes import volume dependent on real output and the real rate of exchange. Nominal private sector consumption is specified as a fixed proportion of nominal disposable income,^{vi} and the last equation of the real block is the material balance national

accounting identity. Gross national income is calculated by adding a terms-of-trade adjustment to gross domestic product. This adjustment is arrived at by deducting export quantity from the foreign currency value of exports deflated by the import price index.

Turning to the balance of payments block, the current account balance identity implies that the surplus on this account is equal to the sum of the trade balance, net factor income and net transfers received by the public and private sectors from abroad. An additional equation relates interest payments on external government debt explicitly to its size. Imposing the overall balance of payments identity on the system implies that the change in foreign reserves equal the sum of the current account surplus and net new foreign borrowing by the government and the private sector.

The price level is determined as a weighted average of the domestic price level and the domestic currency price of imported goods. Subsequently the money market is described by four equations. Money demand is specified, first, as a fixed proportion of nominal GDP, where the proportionality factor is the velocity of money circulation. Since money is the only liability of the financial sector, it is by definition equal to the value of the assets of this sector, i.e., domestic credit and international reserves. It follows that the change in money supply equals the change in international reserves, valued at the current period exchange rate, and the change in credit extended to domestic sectors. An additional term accounts for valuation changes in the international reserves, resulting from exchange rate changes. A simple identity, which states that total domestic credit consists of credit granted to the private and the government sectors, comes third, and an equilibrium condition ensures, finally, that money demand always equals money supply.

Considering the government sector next, its borrowing requirement is defined as the difference between expenditure and income. This constraint must be satisfied through foreign borrowing, by issuing bonds on the domestic market and/or by an increase in government

domestic credit.^{vii} Accordingly, the budget constraint of the government can be rewritten as the sum of these three stock changes to complete the model, and it becomes evident that the merged framework is, indeed, a very simple applied economic model. Only three behavioural equations are specified, namely import, private consumption and money demand, in addition to equations linking output with investment and government foreign interest payments with external debt.

3. BASERUN

To construct the moderately optimistic baserun and the two alternative scenarios presented in this paper, a complete 1992 macroeconomic base year data set, compiled from the 1992 national accounts, published by the South African Reserve Bank.^{viii} Subsequently, the modeling framework was programmed and implemented using the software GAMS (Brooke, Kendrick, and Meeraus, 1988). The 1992 data set made it possible to calibrate the parameters, so the model reproduces the South African economy in the base year and guarantees that specification errors are avoided. To obtain a unique model solution, 18 variables were defined as endogenous, before the model was solved for initial forecasts of the remaining variables and values of the parameters. In a next step, the values of the endogenous variables were reviewed. To the extent they did not appear reasonable, new forecasts of the exogenous variables and/or parameter values were made, and this process was repeated until acceptable values were obtained for all variables and parameters in every year of the forecasting horizon.

The above procedure implies that all variables and parameters were, in fact, treated as endogenous in the final version of the scenarios presented here. Thus, the only strict constraints imposed were the different national accounting identities and definitions, which appear in the modeling framework, so the distinction between endogenous and exogenous variables is ignored in the following. Instead, focus is on the underlying assumptions, which result in the summary outcomes presented in Table 1, where the base year appears as *year 0*. These data are therefore actual historical data, whereas *year 1* to *year 6* covers the medium-term six-year forecasting

horizon.

(a) Demand and Supply

Projecting real output growth is complex in the South African case, for political and economic reasons. Some improvement due to efficiency gains and a return to a more stable political environment can be expected. However, sustainable growth presupposes not only an increase in existing physical capital, but also investments in human resource development. By their very nature, such investments have a long gestation period. Moreover, while private sector confidence and investment can be expected to recuperate provided political stability prevails, recovery will undoubtedly be hesitant. In sum, to expect annual output growth in GDP around 5% during the forecast period would be overoptimistic. Consequently, a more reasonable overall annual real growth rate of 3.0% was relied on. It was, in addition, assumed that this GDP growth level is reached after a two-year transition period, where GDP initially stays constant and subsequently grows by 1.5% in the second year.

The GDP elasticity of imports is assumed to be 1.5 based on estimates in Kahn *et al.* (1992). Moreover, imports were increased during the first three years of the transition period to take account of existing involuntary import compression due to the financial sanctions. Real imports are, in sum, projected to grow with around 10% in the first year falling gradually to an annual level of 4.5%. As a share of GDP, imports increase from 19.5% in the base year to 25.4% at the end of the forecasting period. It cannot be expected that South Africa will be able to replicate the export performance of the Newly Industrializing Countries in the immediate future. It is unlikely that international markets will be buoyant in the short run, and South African trade policies are in need of a major overhaul. Rapid and substantial liberalization does not appear an attractive option given the stagnating nature of the economy and the high rate of unemployment. In other words, the process is bound to take time, so total export quantity was assumed to grow in parallel with real GDP. In the baserun, real exports therefore remain at 23.3% of GDP for the

whole of the period considered.

Total investments need to be consistent with the annual growth forecast of 3%, so it was decided to put the incremental capital-output ratio at 1.5 for the whole of the projection period. This implies a stable aggregate investment level of 22.3% of GDP from the fourth year onwards, given the value of the constant term.^{ix} Based on the path of government investments, to be further reviewed below, the above choices imply that private investments grow quickly from around 11.8% of GDP in the base year to 17.3% in the fourth year of the forecast period, staying at this level for the remaining three years.

Real private consumption was determined on a residual basis. This is possible from the material balance equation since GDP, real imports and exports as well as investment (private and government) follow from the assumptions already made, and since government consumption will be determined based on the need to balance government finances. Consequently, the marginal propensity to save (consume) was set in such a way that consistency is ensured. This implies that private consumption is expected to fall in the first year by 1.8% in real terms, recovering, however, already from the second year and reaching a level of 2.5% annual real increase in the final two years. The resulting movements in the private sector saving propensity, including an increase in the initial years from 0.252 in the base year to 0.280 in the fourth year appears justified by the moderately optimistic assumptions underpinning the base run. Optimism is, in other words, reflected in a restoration of private sector confidence and increased willingness to save and invest.

[Table 1 about here]

(b) Prices and Exchange Rates

In constructing the baserun scenario, it was assumed that the Reserve Bank will manage its foreign reserves in such a way that the real exchange rate remains constant during the period under consideration. This seems a good reference point since it would appear that the rand is

neither seriously overvalued nor significantly undervalued. In addition, the domestic price level was set to grow by 10% on an annual basis. This is approximately the domestic inflation realized in the base year, and trying to opt for a lower rate of inflation does not seem warranted as this could affect the real economy adversely.

Both import and export prices were assumed to grow by 5% on an annual basis, implying that terms of trade remain constant. It is certainly likely that some variation will appear in practice over the coming years, but constant terms of trade do appear a useful starting point for the analysis because of the inherent complexities of projecting the relevant price series. A constant real exchange rate and the assumed rates of inflation imply (i) an annual depreciation of the nominal exchange rate of 4.8%, and (ii) an annual rate of growth of 10% in the general price level.

(c) Asset Stocks

With the assumed constant velocity of money circulation, the growth rate of nominal GDP translates directly into money demand. Thus, money demand and supply grows by 10.0 % and 11.6% in the first two years and by 13.3% on an annual basis from the third year onwards. It follows that the money stock as a share of GDP remains constant at the base year level of 58.8%. Developments in the stock of international reserves reflect that they are adjusted so as to be consistent with a constant real exchange rate. This implies that foreign reserves as a share of GDP grow from 3.3% in the base year to 6.4% in the last year, corresponding to respectively two and three months of imports. As such, the reserve level should be no cause for concern.

With regard to domestic credit, it is assumed that credit extended to the private sector grows at approximately the same rate as nominal GDP in the medium term, but that its growth rate will lie below that of nominal GDP until the last year of the projection. The result is, on the one hand, that private credit as a percentage of GDP falls from 53.4% in the base year to a medium term level of 48.8%. On the other hand, private credit growth rates are larger than price

inflation already from the third year onwards, so a real increase in private credit is foreseen at an early stage. Government credit was determined on a residual basis. Accordingly, the assumptions made about international reserves and private sector credit result in a situation, where the stock of domestic credit extended to the government as a share of GDP reaches a maximum of 3.9% in the fourth and fifth year. This would seem an appropriate assumption given the recognition in South Africa of the undesirable inflationary consequences of too much monetization of fiscal deficits and the extraordinary large deficits during the last few years.

As far as the stock of foreign debt is concerned, it was assumed that net government foreign debt will increase significantly in the whole period. Overall, the stock of government foreign debt increases its share of GDP from a level of 5.1% in the base year to 13.5% in the final year. South Africa is underborrowed, and the removal of sanctions will allow the government to borrow again in international financial markets. Hence, it would be sensible for the new government to make use of this avenue to relieve the foreign exchange constraint, provided the twin targets of growth and redistribution are kept in focus. In the construction of the baserun, it was, in addition, assumed that the stock of private sector foreign debt will increase from a level of 4.4% in the base year to 14.2% in the final year. The corresponding annual rate of growth in the stock of private foreign debt lies slightly above that of the public sector, but the profiles of the growth rates are assumed to be much the same, i.e., reflecting a moderately optimistic view, which can be expected to influence private as well as public capital flows in a decisive manner.

Finally, the stock of government borrowing in domestic financial markets is assumed to grow at a rate of around 12.6% in all years. Consequently, the stock of government bonds remains between 37% and 38% of GDP in all years, as the economy grows and inflation decreases the real value of existing government domestic debt. The underlying behavioural assumption is that it is sensible to assume that the private sector will increase its government

bond stock more or less in line with real growth in the economy.

(d) Balance of Payments

The surplus on the trade balance in the baserun is projected to disappear in the middle of the forecast period. Moreover, interest payments on foreign debt of the private sector and government increase from a level of 1.6% of GDP in the base year to 1.8% at the end of the period under study. It was moreover assumed that other factor payments and net transfers from abroad remain almost constant as a share of GDP at the base year level throughout the period. There is, based on for example the experience of Zimbabwe, good reason to be cautious in the assessment of the likely future developments in official aid flows to South Africa, and given South Africa's high per capita GDP most aid flows will be on loan terms anyway. As such they are included in government net foreign borrowing. Consequently, the current account is projected to deteriorate steadily from a surplus of 1.2% of GDP in the base year to a deficit of slightly less than 5% of GDP at the end of the period. This should not give rise to particular concern, however, provided a sustainable growth path is established in the process.

(e) Government Accounts

To address the economic and social legacies left behind by apartheid, fiscal policy is going to play a crucial role. Government will have to aim at implementing social reconstruction programmes, which imply a tangible social and economic up-lift of the African population. The centrality of fiscal policy is further highlighted by the fact that public debt grew significantly over the past few years of apartheid. Whereas the government borrowing requirement to GDP ratio was in the order of 1.5% at the beginning of the decade, the ratio had risen to 5.3% of GDP in the base year.

The finance of the government deficit from the rest of the world through foreign debt accumulation was discussed above, and it is reiterated that the easing up of the external constraint is a most encouraging aspect of the future development outlook. Government deficit

finance from this source is therefore expected to increase from almost nothing in the base year to 2.5% of GDP in the last year of the scenario. On the other hand, domestic credit is expected to contribute with a decreasing share of government deficit finance amounting to less than 0.2% of GDP in the last year. Finally, it is expected that the new government will be able to increase its borrowing in domestic financial markets corresponding to 4.2% of GDP in each year in the projection. In sum, total available credit from the three sources identified above would make it possible for the government to increase its budget deficit from 5.3% in the base year to above 7% in the middle of the time horizon from which it drops to 6.9% in the last year of the scenario.^x

As far as government revenue and expenditures are concerned, it was assumed that there is some - although limited - scope for increasing taxation as a share of GDP. This is, first, based on the view that measures to combat tax evasion can be introduced. Secondly, a capital gains tax is a possibility, and with regard to indirect taxes it should be feasible to implement a system of higher taxes for non-essentials and luxury consumer durables. Thus, tax revenue is estimated to increase from 26.7% in the base year to 30.0% in the final year, implying an annual growth rate of around 6.5% in real terms. Hence, given that the base run is built around a growing economy, the increases in the tax rate and government revenue do not undermine real private consumption.

Given the need to revive investment in physical and social infrastructure, it was decided to increase its share of GDP significantly. Accordingly, government investment grows rapidly from a level of 2.9% of GDP in the base year to 5.0% from the third year onwards. For the second half of the projection period, it was assumed that the growth rate of government investment follows the growth rate of GDP. Hence, government investment as a share of GDP remains constant. As far as other government expenditures and transfers to government from the rest of the world are concerned, they were fixed as percentages of GDP, and interest payments on foreign public debt were assumed to follow changes in the government foreign debt, as already

discussed.

The only remaining variable is government consumption, which was calculated on the basis of the given total government revenue (including transfers from abroad) in combination with the assumptions made about developments in investment and other government expenditures (including interest payment). The result of the baserun is that with the public investment programme expanding rapidly the room for enlarging recurrent government expenditures is rather constrained in the first three years of the scenario. In this period, real growth is only slightly above real growth in GDP. However, from the middle of the period, the annual real growth rate of government consumption reaches a level of 6.0%. Overall, the share of GDP increases from 20.8% in the base year to 23.0% in the final year.

4. ALTERNATIVE SCENARIOS

The baserun established in Section 3 demonstrates that the new South African government may well succeed in promoting growth as well as greater equity, if appropriate policy measures are taken. Even substantial increases in government social investments to the benefit of the disadvantaged group of the population do not appear in contradiction with the need to attain macrobalance. Yet, government expansion can certainly be pushed too far, and future prospects depend in a critical manner on how trade, aid and other international capital flows develop. This section therefore presents both an optimistic and a more pessimistic assessment of medium term perspectives. The two additional projections are asymmetrical in the sense that the changes in the relevant exogenous variables, parameters and policy instruments, which are summarized in Table 2, are not mirror images of each other. Thus, they tell two analytically different *stories*, with features which, as summarized in Table 3 and 4, are distinct from those of the baserun.

[Table 2 about here]

(a) Optimistic scenario

In the construction of the optimistic scenario, it was decided to add an extra percentage point to the level of growth in GDP, and such a growth performance is, indeed, feasible. If the new government manages to clarify remaining uncertainties regarding future economic policy and investment incentives in a convincing manner, the expectations of domestic and foreign investors can be influenced favourably. Hence, it is possible that direct foreign equity investments may speed up, while the risk of capital flight is at the same time minimized. It can, in this context, be noted that South Africa is well placed to benefit from the recent surge in international liquidity in search of profitable emerging markets. Such inflows, which can be substantial, could provide a welcome additional injection of foreign resources in the short to medium term. These capital account items are in the modeling framework used here captured through changes in the net foreign borrowing by the private sector, so this variable was adjusted upwards in the optimistic scenario, corresponding to an extra annual inflow of 1.4 billion US\$.

In parallel with the more favourable developments regarding private capital inflows, it was decided to increase export growth rates by half a percentage point a year and the level of government real investment and other government expenditures in nominal terms by an additional 1% per year. It was, moreover, assumed that government will increase taxes by 2.5% above the baserun in the first year of the optimistic projection, and that taxes in subsequent years follow a path which is around 1% above the baserun rates of growth.

Widespread optimism and social stability is likely to have many other effects on the South Africa economy and the behaviour of economic agents. To capture some of these effects and smoothen out developments in the investment-consumption balances, the following three additional assumptions were made: (i) money velocity decreases by 1% a year as people are confident about the future and therefore willing to hold more monetary assets; (ii) the existing degree of under-utilization of installed capacity is brought down during the initial phase of the

forecast horizon, so the constant in the investment function can be decreased in the first three years; and (iii) the private sector saving propensity stabilizes at a slightly lower level towards the end of the forecast.

Regarding nominal credit to the private sector, it was assumed that the South African government will find annual increases, which expand gradually from 1.5% to 4.0% above the corresponding levels in the baserun, acceptable. In this way, and taking account of the increase in the money stock due to the additions to the real growth of GDP and the slow down in the velocity of money circulation, the outcome as far as prices are concerned would be an annual inflation rate of 10%. Foreign reserves reflect as before that the real exchange rate is kept constant, so a substantial build-up of reserves is required in the beginning to sterilize the additional capital inflow. However, the annual additions to the reserve level gradually drop to 1.2 billion rand in the last year of the optimistic scenario, where the foreign reserve stock amounts to slightly more than three months of imports as was the case in the baserun.

(b) Pessimistic scenario

The social fabric of South Africa has been threatened for decades. Large groups of the population have felt they had a better chance of survival in conditions of anarchy than in conditions of stability, so violence can easily erupt. This would delay badly needed investment and economic restructuring, paralyse the inflow of foreign investment and intensify capital flight. This, in turn, would further economic decline and lead to a collapse of import capacity, impairing economic recovery. Under such circumstances it will become difficult for the new government to picture the existing high expectations as being in a process of fulfilment. A more pessimistic scenario should not, therefore, be discarded *a priori*.

Such a scenario would from a macroeconomic point of view undoubtedly involve a continuation or worsening of past economic trends in terms of growth. Consequently, a shift in the growth path amounting to a decrease in annual GDP real growth of one percentage point as

compared to the baserun was introduced. It was, moreover, decided to let government investment decrease by 1% a year as compared to the baserun, in line with the bleaker economic performance in terms of growth. Thus, the accumulated shortfall in the last year of the pessimistic scenario grows to no less than 1.7% of GDP in constant prices. An annual drop in the export price index of 1% was added to illustrate the risk of deteriorating terms of trade. The potential negative influence from developments in the world economy might also include that South Africa would capture a diminished share of international capital liquidity. A decrease in net foreign borrowing by the government of 5% per year was, therefore, included.

With economic performance below the level projected in the baserun, government will find it increasingly difficult to finance its activities. Issuance of government bonds is likely to be unattractive due to the detrimental effects this may have on the interest rate, as the willingness to hold bonds is likely to decrease in such a scenario. Thus, a 1% decrease a year in the stock of government bonds was included. On the other side, nominal taxes would have to be raised to counteract the higher annual rate of inflation of around 16%, which the pessimistic scenario implies. Hence, it was assumed that the government will choose to increase the level of taxes by 1% a year.

[Table 3 and 4 about here]

(c) Results

Total real investment is projected to increase in all of the scenarios presented in this paper, and the differences among them are largely explained by the deviations in terms of growth performance. Thus, investment expansion is particularly pronounced in the first three years, where the economy is shifted to a higher growth path, after which investment settles at a higher level with more limited annual increases. However, while the optimistic scenario involves a considerable additional expansion of real investment, reaching a level 12.7% above the baserun value in the last year of the projection, the pessimistic scenario is 11.9% below the baserun in the

same year. Real import growth rates are also positive in all the scenarios, but they naturally lie at relatively low levels in the pessimistic scenario. More constrained capital inflows in combination with the assumed export performance put, on the one side, a limit on available external finance, while the less satisfactory growth performance, on the other side, provokes a relative drop in import demand.

Despite the increased need for investment to underpin the better growth performance of the optimistic scenario, there is in this case room for a further expansion of both private and government consumption. In fact, real private and government consumption in constant base year prices reach levels in the final year, which are 2.7% and 5.2% above their baserun values. Also in the pessimistic scenario, there is initially room for an expansion of government consumption. This initial boost is caused, however, by the more limited absolute expansion of investment due to the lower growth performance, in combination with a limited fall in imports as discussed below. Thus, already from the second year, real government consumption drops below both the levels of the baserun and the optimistic scenario, and in the final year is only 5.7% higher than in the base year. This is, indeed, not very much over a six-year period considering a population increase of around 2.6% a year.

The overall implication for the resource balance is that South Africa will import less than what is exported for the whole of the time horizon studied here in the pessimistic scenario. However, the surplus gradually diminishes. In the baserun, the balance turns negative already in the third year, so the relatively more positive resource balance in the pessimistic scenario is in reality an imposed condition, which could ignite inherent social difficulties and conflict in South Africa. Hence, this indicator must be interpreted with great care. In the optimistic scenario, the resource balance turns negative already in the second year in response to the greater import demand and more favourable financing conditions.

Turning to prices and the exchange rate, the real exchange rate remains as noted

constant, and the annual inflation rate is at 10% in both the baserun and the optimistic scenario. As far as the pessimistic scenario is concerned, it is assumed that the new government will have to finance a growing deficit by domestic credit expansion. If the government, in addition, wishes to maintain the extension of nominal credit to the private sector at the baserun level in nominal terms, the implication is that annual inflation will quickly increase to around 16%. Moreover, with the assumed rates of inflation in domestic and world prices and a relatively stable real exchange rate, the pessimistic scenario requires annual nominal devaluations above 10%.

With the decrease of the velocity of money circulation, the growth in nominal GDP translates in the optimistic scenario into a money supply that increases from 58.8% of GDP in the base year to 62.5% in the final year, whereas it remains stable in the baserun. The real increase in the money supply in the pessimistic scenario amounts to only 7.7%, i.e., around half of the increase in the baserun and one-fourth the increase in the optimistic scenario. Taking account of the rates of inflation already referred to, real private credit expands from 179 billion rand in the base year to 187 billion in the final year of the baserun. In the optimistic scenario real private credit expands to 221 billion, whereas it contracts to 134 billion in the pessimistic scenario. As far as government credit is concerned, the public sector ends up with domestic credit constituting 1.3% of GDP in the optimistic scenario, whereas it needs 15% of GDP in the last year of the pessimistic scenario. Together with the developments in the issuance of government bonds and net foreign borrowing by the government, this implies that total government debt as share of GDP grows from 44.1% in the base year to 54.3% in the final year of the baserun. The corresponding debt/GDP ratios in the final year of the optimistic and pessimistic scenarios are 49.3% and 52.1%, respectively.

Despite the rather limited differences in the government debt/GDP indicator, the composition of the debt among the three available sources of finance is markedly different in the three scenarios. This reflects, *inter alia*, that the government is able to diminish its reliance on

domestic credit in the optimistic scenario, whereas the pessimistic scenario presumes that government will find itself forced to absorb a greater share of total domestic credit. Moreover, whereas government deficit finance increases from 5.3% to 6.9% of GDP in the baserun, the optimistic scenario provides the possibility of bringing the deficit down to 6.1% of GDP in the last year. In these two projections, the annual rates of growth of the nominal fiscal deficit also follow a distinct falling trend. In contrast, government deficit finance as a share of GDP quickly increases to around 8% in the pessimistic scenario.

Finally, the initial surplus on the current account in the base year turns into a deficit already in the first year of the projections in all of the three scenarios. The relative easy access to foreign borrowing in the optimistic scenario is reflected in current account deficits, which reach a level of 5.9% of GDP in the last year of the optimistic scenario, while the baserun and pessimistic levels are projected to be around 4.9% and 4.1% of GDP, respectively.

5. CONCLUSIONS

The debate on future economic policy and development strategy in South Africa has so far proven both controversial and complex. Nevertheless, the immediate economic issues to be addressed by the new government revolve around the possibilities for making the two objectives of growth and redistribution compatible. Fortunately, the economy is potentially very rich with a considerable human and physical infrastructure as well as a significant natural resource base, although gold might be a wasting asset. In addition, installed capacity is not fully utilised, and South Africa is, by any standard, under-borrowed.

The medium-term baserun scenario, developed in Section 3, illustrates that under moderately optimistic assumptions it will be possible to implement a public investment programme amounting to 100 billion rands in 1992 prices over six years without disturbing macroeconomic balances excessively. This is on average equal to two-thirds more than the public

investment programme in the base year. Thus, there is certainly room to start addressing the needs of poor South African people directly. Furthermore, in the baserun scenario, private investment in constant prices is expected to increase from an annual 40 billion rand in the base year to more than 66 billion at the end of the six-year forecast horizon. This will provide additional job opportunities and possibilities for redistribution.

Yet, the alternative scenarios established in Section 4 demonstrate that the medium term future can easily turn out differently. The optimistic and pessimistic scenarios represent, moreover, two analytically different perspectives. Whereas the difference between the optimistic scenario and the baserun can be characterized in an almost one-dimensional way, the comparison between the pessimistic scenario and the baserun is somewhat more complex. The optimistic scenario involves a higher growth path as well as an increased inflow of foreign resources. This inflow makes it, together with the increased domestic production, possible to expand both government and private consumption, and this expansion does not impair domestic macrobalances, including the budget position of the government and the rate of inflation. The good news, in addition, include that credit extended to the private sector grows in real terms. Hence, not only government, but also private investment can increase to a total, which in the final year in real terms lies more than 10 billion rand higher than in the baserun, implying a much desired additional boost to growth and development.

The pessimistic scenario, on the other hand, illustrates that if growth and real resource inflows falter, not even very considerable moderation will be sufficient to maintain domestic macrobalances. On the contrary, the government budget can easily reach an unsustainable level of well above 8% of GDP. Total government debt as share of GDP may fall below the baserun level, as the country is blocked from expanding its use of foreign capital; but this will, in turn, make government more dependent on domestic credit. Without growth, inflation bounces upwards, and this will squeeze real private credit, so not only government, but also private

investment fall. Even stricter fiscal and monetary restraint may quickly become necessary, and this could lead to a further critical worsening of the state of the economy. Hence, while there is reason to be optimistic, nothing can be taken for granted. South Africa will have to be on the outlook to avoid the dangers of the pessimistic scenario, while searching at the same time for a way to the baserun, or even better, the optimistic scenario.

NOTES

REFERENCES

- Addison, D., "The World Bank Revised Minimum Standard Model - Concepts and Issues," Policy, Planning and Research Paper WPS 231 (Washington, DC: World Bank, 1989).
- African National Congress (ANC), "Ready to Govern: ANC Policy Guidelines for a Democratic South Africa," Mimeo (Adopted at the National Conference 28-31 May, 1992).
- Bacha, E.L., "A Three-Gap Model of Foreign Transfers and the GDP Growth Rate in Developing Countries," *Journal of Development Economics*, Vol. 32, No. 2 (1990), pp. 279-296.
- Brooke, D.A., D. Kendrick, and A. Meeraus, *GAMS - A User's Guide* (San Francisco: The Scientific Press, 1988).
- Central Economic Advisory Service, "The Restructuring of the South African Economy: A Normative Model Approach," Mimeo (Pretoria, 1993).
- Chenery, H.B., and A.M. Strout, "Foreign Assistance and Economic Development," *American Economic Review*, Vol. 56, No. 4 (1966), pp. 679-733.
- COSATU, *Our Political Economy: Understanding the Problems* (Johannesburg: COSATU, 1992).
- Dornbusch, R., and S. Edwards (Eds.), *The Macroeconomics of Populism in Latin America* (Chicago: The University of Chicago Press, 1991).
- Easterly, W., *et al.*, "Modeling the Macroeconomic Requirements of Policy Reforms," Policy, Research, and External Affairs Working Paper WPS 417 (Washington, DC: World Bank, 1990).
- Eckert, G., "An Evolving Crisis: Income Inequalities in South Africa," Mimeo (Johannesburg, 1991).
- Edwards, S., "The International Monetary Fund and the Developing Countries: A Critical Evaluation," *Carnegie Rochester Conference Series on Public Policy*, Vol. 31 (1989), pp. 7-68.
- Everaert, L., F. Garcia-Pinto, and J. Ventura, "A RMSM-X Model for Turkey," Policy, Research, and External Affairs Working Paper WPS 486 (Washington, DC: World Bank, 1990).
- Gelb, S. (Ed.), *South Africa's Economic Crisis*, (Cape Town: David Phillip, 1991).
- International Monetary Fund, "Theoretical Aspects of the Design of Fund Supported Adjustment Programs," Occasional Paper No. 55 (Washington, D.C: IMF, 1987)
- Khan, M.S., P. Montiel, and N.U. Haque, "Adjustment with Growth - Relating the Analytical Approaches of the IMF and the World Bank," *Journal of Development Economics*, Vol. 32, No. 1 (1990), pp. 155-179.
- Ndulu, B.J., "Growth and Adjustment in sub-Saharan Africa," Paper presented at the World Bank Economic Issues Conference (Nairobi, June 1990).

- Polak, J.J., "Monetary Analysis of Income Formation and Payments Problems," *IMF Staff Papers*, Vol. 6, No. 1 (1957), pp. 1-50.
- Polak, J.J., "A Marriage Between Fund and Bank Models? - Comment on Khan and Montiel," *IMF Staff Papers*, Vol. 37, No. 1 (1990), pp. 183-186.
- Tarp, F., *Stabilisation and Structural Adjustment - Macroeconomic Frameworks for Analysing the Crisis in sub-Saharan Africa* (London: Routledge, 1993a)
- Tarp, F., *South Africa: Background and Possibilities for Danish Transitional Assistance* (Copenhagen: Danida, 1993b).
- Tarp, F., and P. Brixen, "South Africa - Macroeconomic Perspectives for the Medium-Term: An Application of the Financial Programming and Revised Minimum Standard Modeling Frameworks," Mimeo (Copenhagen: Institute of Economics, University of Copenhagen, 1994).
- Taylor, L., *Varieties of Stabilization Experience: Towards Sensible Macro-economics in the Third World* (Oxford: Clarendon Press, 1988).
- Taylor, L., "Gap Disequilibria: Inflation, Investment, Saving and Foreign Exchange," Working Paper No. 76 (Helsinki: World Institute for Development Economics Research, 1989).
- Taylor, L., *The Rocky Road to Reform: Adjustment, Income Distribution and Growth in the Developing World* (Cambridge, Mass.: The MIT Press, 1993).

A. Core equations for real sector

- (1) $GDP_t = (1 + \gamma_t) * GDP_{t-1}$
- (2) $X_t = (1 + \lambda_t) * X_{t-1}$
- (3) $(IVP_t + IVG_t) / GDP_t = \kappa_0 + \kappa_1 * ((GDP_t - GDP_{t-1}) / GDP_t)$
- (4) $\log(M_t) = \alpha_0 + \alpha_1 * \log(GDP_t) + \alpha_2 * \log(E_t * MPI_t / PD_t)$
- (5) $P_t * CP_t = (1 - \beta_t) * (P_t * GDY_t - (TG_t - GT_t))$
- (6) $(CP_t + CG_t) = GDP_t - IV_t - X_t + M_t$

B. Income effects from terms-of-trade

- (7) $GDY_t = GDP_t + TTADJ_t$
- (8) $TTADJ_t = (X_t * XPI_t / MPI_t) - X_t$

C. Balance of payments - all variables in foreign currency

- (9) $CURBAL_t = (X_t * XPI_t - M_t * MPI_t) + (NFP_t - INTG_t - INTP_t) + (NTRG_t + NTRP_t)$
- (10) $INTG_t = NFBG_{t-1} * IR_t$
- (11) $R_t - R_{t-1} = CURBAL_t + (NFBG_t - NFBG_{t-1}) + (NFBP_t - NFBP_{t-1})$

D. Prices, monetary sector and government accounts

- (12) $P_t = (1 - \theta) * PD_t + \theta * E_t * MPI_t$
 - (13) $MD_t = (1/v_t) * (P_t * GDP_t)$
 - (14) $MS_t - MS_{t-1} = E_t * (R_t - R_{t-1}) + (DC_t - DC_{t-1}) + (E_t - E_{t-1}) * R_{t-1}$
 - (15) $DC_t = DCG_t + DCP_t$
 - (16) $MS_t = MD_t$
 - (17) $BRG_t = P_t * CG_t + P_t * IVG_t + GT_t + E_t * INTG_t - TG_t - E_t * NTRG_t$
 - (18) $BRG_t = E_t * (NFBG_t - NFBG_{t-1}) + (DCG_t - DCG_{t-1}) + (GOB_t - GOB_{t-1})$
-

Variables:

BRG _t	Government borrowing requirement
CG _t	Government consumption - constant 1992 prices
CP _t	Private sector consumption - constant 1992 prices
CURBAL _t	Current account surplus
DC _t	Total domestic credit
DCG _t	Government domestic credit
DCP _t	Private sector domestic credit
E _t	Nominal exchange rate - 1992 = 1.000
GDP _t	Real GDP - constant 1992 prices
GDY _t	Gross domestic income
GOB _t	Government domestic debt
GT _t	Other government expenditures
INTG _t	Government interest payments on foreign debt
INTP _t	Private interest payments on foreign debt
IR _t	Foreign interest rate
IVG _t	Government investments - constant 1992 prices
IVP _t	Private investments - constant 1992 prices
M _t	Import quantity - constant 1992 prices
MD _t	Money demand
MPI _t	World import price index - 1992 = 1.000
MS _t	Money supply
NFBG _t	Government foreign debt - foreign currency
NFBP _t	Private foreign debt - foreign currency
NFP _t	Other factor services - foreign currency
NTRG _t	Net transfer from rest-of world to government - foreign currency
NTRP _t	Net transfer from rest-of-world to private sector - foreign currency
P _t	General price index - 1992 = 1.000
PD _t	Domestic price index - 1992 = 1.000
R _t	International reserves - foreign currency

TG_t	Government revenue
$TTADJ_t$	Terms of trade adjustment
X_t	Export quantity - constant 1992 prices
XPI_t	World export price index - 1992 = 1.000

Parameters:

α_0_t	Constant in import function
α_1_t	GDP elasticity of import
α_2_t	Real exchange rate elasticity of import
β_t	Private sector saving propensity
γ_t	GDP growth parameter
κ_0_t	Constant in investment function
κ_1_t	Incremental capital-output ratio
λ_t	Export growth parameter
v_t	Money velocity
θ	Weight in price index

Table 2. *Assumptions Underlying the Alternative Scenarios (Annual Change in Per Cent or Percentage Points as Compared to the Baserun)**

Variable	Optimistic Scenario	Pessimistic Scenario
GDP growth rate	+1.0	-1.0
Export growth rate	+0.5	No change
Real government investment	+1.0	-1.0
Other gov. expenditures	+1.0	No change
Government revenue	+2.5 first year +1.0 other years	+1.0
Government bonds	No change	-1.0
Credit extended to private sector	+1.5 first year increasing to +4.0 last year	No change
Money velocity	-1.0	No change
Net foreign government debt (\$ terms)	No change	-5.0
Net foreign private debt (\$ terms)	+1.4†	No change
Export prices	No change	-1.0

*The table indicates (unless otherwise noted) the number of percentage points which growth rates shift as compared to the baserun, and the annual per cent change in variables indicated by their level values. The latter changes are cumulative. In addition to the changes listed, the constant in the investment function and the private sector savings propensity were adjusted slightly downwards when constructing the optimistic scenario. No changes were made in the investment constant, the savings propensity and foreign reserves in the pessimistic scenario as compared to their baserun values. The \$/rand base year exchange rate used was 2.8516.

†Annual increase in billion \$.

Table 3. *Optimistic Scenario - Key Variables*

Year	0	1	2	3	4	5	6	Average (years 0-6)
<i>Material balance:</i>		- Growth Rates in Per Cent -						
Private consumption		-1.3	1.5	2.2	3.2	3.6	3.6	2.1
Public consumption		0.9	2.1	4.9	6.3	7.3	7.1	4.8
Private investment		25.8	14.9	12.9	8.7	4.0	4.0	11.5
Public investment		24.6	22.4	21.0	4.0	4.0	4.0	12.9
Export		0.5	2.0	3.5	3.5	3.5	3.5	2.7
Import		11.7	10.5	9.1	7.0	5.4	5.3	8.2
GDP		1.0	2.5	4.0	4.0	4.0	4.0	3.2
<i>Public Sector:</i>		- Per Cent of GDP -						
Budget surplus	-5.3	-5.5	-5.9	-6.4	-6.4	-6.3	-6.1	
Domestic credit	-1.0	-0.4	-0.3	-0.3	-0.1	0.0	-0.3	
Bond finance	-4.2	-4.2	-4.1	-4.1	-4.0	-4.0	-4.0	
Foreign borrowing	-0.1	-0.9	-1.5	-2.2	-2.3	-2.3	-2.4	
Public sector debt	44.1	45.4	46.4	47.3	48.1	48.8	49.3	
<i>Current account surplus</i>	1.2	-0.9	-2.7	-3.9	-4.8	-5.4	-5.9	
		- Growth Rates in Per Cent -						
<i>General price index</i>		10.0	10.0	10.0	10.0	10.0	10.0	10.0
<i>Nominal exchange rate</i>		4.8	4.7	4.8	5.3	5.4	5.5	5.1

Table 4. *Pessimistic Scenario - Key Variables*

Year	0	1	2	3	4	5	6	Average (years 0-6)
<i>Material balance:</i>								
- Growth Rates in Per Cent -								
Private consumption		-2.4	-0.1	0.7	1.6	2.2	2.3	0.7
Public consumption		3.4	-2.0	-0.7	1.8	1.7	1.5	0.9
Private investment		14.8	12.3	11.4	6.1	2.0	2.0	6.3
Public investment		23.2	20.0	18.6	2.0	2.0	2.0	10.7
Export		0.0	1.5	3.0	3.0	3.0	3.0	2.2
Import		7.4	7.5	6.0	4.5	3.2	3.3	5.3
GDP		-1.0	0.5	2.0	2.0	2.0	2.0	1.2
<i>Public Sector:</i>								
- Per Cent of GDP -								
Budget surplus	-5.3	-7.3	-7.8	-8.2	-8.3	-8.2	-8.0	
Domestic credit	-1.0	-3.0	-3.2	-3.3	-3.5	-3.7	-3.7	
Bond finance	-4.2	-3.7	-3.5	-3.3	-3.1	-2.9	-2.8	
Foreign borrowing	-0.1	-0.7	-1.1	-1.6	-1.7	-1.6	-1.5	
Public sector debt	44.1	46.3	48.0	49.3	50.5	51.5	52.1	
<i>Current account surplus</i>	1.2	-0.5	-1.9	-2.8	-3.4	-3.8	-4.1	
- Growth Rates in Per Cent -								
<i>General price index</i>		15.8	16.0	16.1	16.4	16.6	16.7	16.3
<i>Nominal exchange rate</i>		11.4	10.2	10.6	10.7	10.8	10.8	10.8

- i. Depending on the precise definition of this group, it has a size of 20-30% of the total population in contrast to normally only a few percent.

ii. The ANC (1992) Policy Guidelines and the Reconstruction and Development Programme (RDP), originally formulated by the ANC, on the one side, and the Normative Economic Model put out by the Central Economic Advisory Service (1993), on the other hand, are illustrations hereof. Tarp (1993b) can be consulted for further country background.

iii. Illuminating developing country cases are reviewed in Dornbusch and Edwards (1991) and Taylor (1993).

iv. This implies, *inter alia*, that the potentially conflicting policy advice, which emerges from implementing the FP and RMSM models independently of each other, is avoided. Other attempts at integrating the FP and RMSM frameworks include a study by Everaert *et al.* (1990), who present an expanded version of the RMSM called RMSM-X. The RMSM-X includes the external balance and savings-investment identities of the RMSM in addition to the fiscal and monetary identities of the FP model, but stops short of incorporating and specifying behavioural functions for the main macroeconomic variables such as private consumption and investment, money demand, export supply and import demand. While little published material is available, it is understood that such behavioural information will be included in the RMSM-XX models (Easterly *et al.*, 1990). For an extension of the original two-gap models to include a third fiscal gap, see the three-gap literature by Bacha (1990), Ndulu (1990) and Taylor (1989).

v. The functional form used here to determine total investments (i.e., the sum of private and public investment) differs from that in Addison (1989), but was chosen since it proved convenient to work with in model simulations. It is straightforward to show that the coefficient on GDP growth corresponds to the capital-output ratio, whereas the constant is approximately equal to the product of the physical depreciation rate and the capital-output ratio.

vi. The general price level is used in the estimation of nominal private consumption under the assumption that the GDP and private consumption deflators are identical

vii. Domestic debt finance is often not an option for governments in the developing world. In South Africa this source of finance is substantial.

viii. Tarp and Brixen (1994) contains detailed documentation of the base year data. Complete documentation on the base run and the alternative scenarios presented in Section 3 and 4 is also available from the authors.

ix. In addition, the investment level was adjusted slightly downwards in the early years of the forecast period to account for excess capacity.

x. This is somewhat higher than the 6% limit, which it is understood was one of the IMF conditions in recent loan negotiations.