I. Background and Objectives

Monetary policy in South Africa’s transition economy has in recent years undergone important regime changes. Given capital account liberalisation from the mid-1990s, and medium-term constraints on fiscal policy, monetary policy has the major responsibility for curbing inflation and currency instability, and yet trying to ensure sufficient growth for longer-term political stability.

Extensive financial liberalisation from the 1980s, and a more open capital account from 1995, has implied that the broad money supply (M3) targets implemented from 1986 became even less achievable. A broader set of indicators began to supplement M3 targets, such as the exchange rate, asset prices, the output gap (the deviation of output from capacity), the balance of payments, wage settlements, survey-based inflation expectations, total credit extension, and the fiscal stance. In early 1998, the South African Reserve Bank (SARB) Governor formally acknowledged the move to a “more eclectic approach to monetary policy”. The M3 growth guidelines were de-emphasised, operating over a three-year rather than annual basis; and from early 1998, a new system of monetary accommodation was introduced with daily tenders of liquidity through repurchase transactions.

The retirement of the Governor in July 1999 was taken as an opportunity for major reforms of the policy structures. In late 1999, inflation targeting was adopted (of CPI-X, a consumer price index (CPI) measure excluding mortgage interest payments). This aims to enhance policy transparency and accountability and thereby to decrease inflationary expectations. By contrast with targeting the exchange rate directly, the exchange rate is viewed as only one factor influencing inflation. This should result in less interest rate volatility, with less detrimental effects on growth. However, successful inflation targeting demands good
forecasting models of inflation, clarity on the mechanisms of monetary transmission, an institutional design that guarantees the transparency and accountability of policy, and a shared understanding with the private sector of the effectiveness of monetary policy for inflation.

The need for sound econometric modelling in South Africa has never been greater. Yet, the SARB lacks capacity in this area (communication, SARB). In the past eighteen months, external advice has been used to develop a revised quarterly econometric macro-model (not yet published). However, the Bank’s models still omit important interest rate transmission channels: via wealth effects, and so asset prices; and via expectations. This makes it difficult to take a well-informed view of the size and dynamics of the effects of monetary policy. The models in the past gave insufficient attention to the consequences of regime shifts such as financial liberalisation, and, more generally, to the influential Lucas Critique of the use of policy modelling, see Lucas (1976).

The papers produced in this DFID project on monetary policy transmission in South Africa aimed to address some of these omissions using long time series, taking into account past structural features of the economy and involving also careful data scrutiny and data construction. These models have been shared with research staff at the SARB, for example, through workshop presentations (Attachment 1).

More specifically, the objectives were:

1. To contribute to an understanding of the detailed channels of transmission from interest rates to final demand and output, in particular consumption and investment, using far more sophisticated models than hitherto, which also incorporate a range of wealth variables and expectations.
2. To contribute to a parallel understanding of the transmission mechanism on inflation, and to the development of sound forecasting models for inflation needed to make inflation targeting operative.
3. To develop empirical models for the monetary feedback rules, and shifts therein, that is, criteria actually used (rather than announced) by the SARB to guide the market to change short-term interest rates. This is necessary because, by the Lucas Critique of econometric policy modelling, a shift in the monetary feedback rule has potentially profound effects on econometric models, operating through private sector expectations. This analysis is essential for evaluating different feedback rules, for instance, the likely effectiveness of inflation targeting.
4. To interpret money growth, one requires the presence of a stable money demand function. The South African literature in this area is particularly weak, lacking measures of financial liberalisation and expectations and diverse wealth measures. The stability of this function needs reassessment in a more sophisticated econometric model, in order to extract the policy significance of observed M3 changes.
5. Finally, our research aimed to evaluate policy lessons in the light of wider macroeconomic concerns, especially the management of capital flows (foreign savings), domestic savings and the fiscal stance.

II. Methods

The papers required a large number of different data series at various frequencies. Our study mainly utilised the SARB’s data base, supplemented by some data from Statistics South Africa. We had frequent and detailed discussions on data quality and construction with the SARB, and were provided with various unpublished data series.
With incomplete or less than comprehensive data, we constructed data where possible; but in some instances limited data constrained the possible analysis. For example, in the absence of published data on stocks of personal assets (mostly available only on a flow basis, and often at book rather than market value), we constructed the first series for a range of personal assets at market value (section III.2, below). These wealth effects prove very important in personal consumption (saving) and money demand.

The South African economy has suffered many political shocks and discontinuities, as well as terms of trade shocks. International trade and financial sanctions, foreign disinvestment, capital flight and emigration during the Apartheid era, and their subsequent reversal (to some extent) during the 1990s, have greatly influenced macroeconomic outcomes and policy. There have also been important changes in domestic regimes, notably in exchange rate and monetary policy, and in financial regulation.

Such shifts have required creative modeling of regime breaks. For instance, we employed stochastic trends in income expectations models, which help to capture changes in income growth trends linked to political events. Further, using detailed institutional changes, we constructed indicators for crucial shifts in the monetary policy regime in the 1980s and for financial liberalisation in the 1980s and 1990s. The former plays an important role in our income forecasting models in capturing shifts in the influence of interest rates, and in our real GDP growth forecasting model. Financial liberalisation has important effects in our Taylor rules model, our money demand model and our consumption model. We also created a proxy for the evolving openness to competition in South Africa, which involved modeling unobservable factors such as sanctions and quotas, using a stochastic trend model for the import share of home demand.

The Lucas critique of econometric modelling of policy has had a huge influence on econometric methodology, and with concerns about endogeneity issues, has led to the de-emphasis on large econometric models, and a shift to vector autoregressions (VARs) – see Sims (1980, 1996). In the research we have reported here we have not followed recent fashions in the use of “structural VARs”, where minimal restrictions are imposed on VARs. Instead we have emphasised a structural approach to specific equations, handling expectations through multi-step forecasting models, carefully constructed to deal with regime breaks, and thoroughly tested for stability. Cointegration analysis, see Johansen (1988), Johansen and Juselius (1990) and Hendry and Doornik (1994), has been used to check for econometrically interpretable long-term relationships.

III. Findings

We elaborate our findings under different headings associated with seven different papers (see research output in section VI) which cover various areas of the economic literature.

1. Monetary Policy Regimes and Monetary Policy Feedback Rules

The paper presents a detailed characterisation of the institutions and operation of monetary policy in South Africa during 1970-2000, including its transparency and accountability.

It also provides the first quantitative assessment of the actual interest rate policy rules followed by the SARB in the very “opaque” policy era of 1986-97, (prior to inflation targeting). We employ an extension of the famous Taylor Rule model (Taylor, 1993), to estimate the weights applied to different policy objectives in the interest rate rule with quarterly data, using our own inflation and output gap forecasts to 1998. Key findings are:
• Taylor rules, even when augmented for foreign interest rate influences and interest rate smoothing, and based either on forecast, or actual, inflation and output gap measures, poorly describe the behaviour of the discount rate.
• A satisfactory model includes the deviation of money growth from target in the rule and controls for the extensive financial liberalisation (which, with the removal of quantitative controls on interest rates and credit and restrictions on competition, was associated with a substantial rise in real interest rates in South Africa after 1980).
• In practice, the central bank emphasised current inflation (with a low weight on the output gap), despite claiming to focus largely on money growth targeting. Backward-looking inflation performs poorly in the reaction function. Future inflation also has no weight placed on it; this result is robust both for simple and sophisticated models of inflation forecasts, and may have been influenced by the limited development of inflation forecasting models in the SARB.
• The weight attached to inflation (β) is below that found for policy rules in other countries. In Clarida et al (1998b), the finding is that when inflation rose, the pre-1979 Federal Reserve raised interest rates by less than the rise in inflation so that real interest rates fell (the weight β is less than 1). After 1979, when inflation rose, real interest rates rose, so that policy reaction was more anti-inflationary (β is greater than 1 – termed “leaning against the wind”). For a range of countries, Clarida et al (1998a) found values for β of 1 or higher in the post 1979 period (e.g. β is 1.8 for the Federal Reserve, 2 for Japan and 1.3 for the Bundesbank). We find weights in the region of 0.8 to 1.1 for β in South Africa.
• However, policy had competing preoccupations from late 1985: maintaining surpluses on the current account, related to the difficulty of managing large capital outflows during 1986-94 after the debt crisis; but later, managing the large inflows following democratic elections in 1994 and the freeing of capital controls on foreign investors. We find evidence that excess money growth is less important after 1994, and weak evidence that balance of payments concerns had some influence on monetary policy during 1986-94.

2. Personal Sector Wealth Measures for South Africa

Without information on the market values of the main components of household wealth, it is difficult to understand the behaviour of aggregate consumer spending and of the broad money holdings of households. Neither the SARB nor other government statistical agencies publish balance sheet wealth estimates on a market value basis, of the type produced by U.S. Federal Reserve Board, the Bank of England and the Office of National Statistics in the U.K., and comparable organisations in Japan and elsewhere.

• We have constructed the first set of estimates at market values of aggregate personal sector wealth holdings in South Africa. Since 1970, the SARB has published flow of funds data and information on households’ holdings of local authority and public enterprise bonds, unit trusts, pension and long-term insurance funds, using a mix of book values and market values; and since 1990 publishes household debt data (unpublished data from 1970). From these data and other sources, it has been possible, with some difficulty, to assemble a profile back to 1970 of the main components of personal sector wealth.
• Most striking has been the rise in pension wealth - overtaking housing wealth in the early 1990s, the rise in debt and directly-held securities, and the relative decline of liquid assets and housing wealth since the early and mid-1980s, respectively. Falling real house prices
since 1984 helps explain the decline in the housing wealth to income ratio, and why pension wealth overtook housing wealth in the early 1990s. Relative rates of return, given the structure of the tax system both for individuals and corporations, have also played a role in the evolution of the composition of personal sector wealth.

- The measured assets and debts constitute the major part of the assets relevant for consumer spending decisions, and have a key role in explaining variations in consumer expenditure in South Africa from 1970 (section III.3).
- Understanding the behaviour of personal sector holdings of broad money requires taking into account variations in the market value of personal sector wealth (section III.7).
- It would be highly desirable for the SARB to construct and publish market value wealth estimates. This is likely, for some assets, to improve the accuracy of the flow of funds estimates. It should also focus the attention of policy-makers on the macroeconomic wealth effects of interest rate policy and fiscal policy, a key part of monetary transmission.

3. Financial Liberalisation, Consumption and Debt

Low saving rates, especially in the personal and government sectors, are symptomatic of a persistent structural weakness in South Africa, which has recently been reflected in high real interest rates and dependence on capital inflows (Aron and Muellbaurer, 2000, World Bank Economic Review 14(3)). South Africa experienced substantial rises in the ratios of consumption and household debt to income from 1983, for which conventional explanations in terms of income, income expectations, interest rates and wealth prove inadequate. We emphasise the role of substantial financial liberalisation in explaining the low saving rate.

The most comprehensive South African consumption function comes from the SARB model, but absent from this model are relative prices, assets and debt, proxies for expectations and measures of financial liberalisation. These are important omissions. Fluctuations in asset prices and changes in financial liberalisation can lead to huge forecasting errors when these variables are omitted.

Our paper remedies most of these problems in estimating the determinants of personal consumption in South Africa from 1970 to 1997, by means of a quarterly solved-out consumption function for households, estimated jointly with an equation for household debt.

- We distinguish three facets of financial liberalisation, which the previous literature does not bring out clearly. Financial liberalisation reduces credit constraints on households engaging in smoothing consumption when they expect income growth; reduces deposits required of first-time buyers of housing; and increases the availability of collateral-backed loans for households which already possess collateral. Financial liberalisation makes possible greater borrowing, and this can give rise to asset booms, which make further borrowing and spending possible. The consumption to income ratio can rise sharply.
- The empirical literature has had difficulties identifying proxies for financial liberalisation. Of these, the debt to income ratio has perhaps proved the most popular, but it risks confounding variations in income, income expectations, interest rates and asset values with financial liberalisation. Our methodological innovation is to treat financial liberalisation as an unobservable, the effects of which were captured through a spline function common to both the consumption and household debt equations (the parameters incorporate qualitative information on the timing of key institutional changes in credit markets).
- The models corroborate the theory and confirm the relevance of financial liberalisation. Both the consumption and debt equations are subject to major structural breaks when
allowance is not made for financial liberalisation. Even though the general equilibrium effects are likely to be substantially less than the partial equilibrium effects, the practical role of financial liberalisation in lowering personal saving rates in South Africa is hard to deny. Moreover, South Africa is unusual for having experienced an extended period of credit market liberalisation without having a boom in house prices, making it easier to distinguish the direct effects of liberalisation from wealth effects.

- Assets are frequently neglected in consumption modeling. We used our own personal wealth estimates at market value (section III.2), disaggregating wealth into liquid and illiquid wealth measures: gross liquid assets, personal sector debt, and financial and physical illiquid assets. We find positive effects from asset to income ratios: fluctuations in asset values have important implications for consumer spending and increasing household debt.
- We find households largely “pierce the corporate veil”. That is, when dividend payments fall because corporate retentions increase, consumers do not cut expenditure. Indeed the reverse is true if equities rise in price to reflect the higher corporate saving.
- Theory emphasises income expectations, yet they are rarely included empirically. We generate forecasts from a separate income-forecasting model (including equity prices, interest rates, capacity utilisation, and government budget surpluses as regressors), which also captures regime shifts, for instance, in monetary policy. Expected income growth has an important positive effect in explaining the consumption to income ratio.
- Several income uncertainty measures affect consumption in parallel to the effects found for the demand for money (section III.7).
- The model illuminates the monetary transmission mechanism, with multiple channels for the effect of interest rates on consumption expenditure. Increased short-term real interest rates have negative direct effects on consumer spending - but there are likely even larger indirect effects via income expectations and asset prices. In the absence of wealth stock data for South Africa, these apparently large effects have not previously been measured.
- One of the earliest recommendations from our work was to use financial regulation to reduce incentives for risky lending to households.¹

4. **Interest Rate Effects on Output: Evidence from a GDP Forecasting Model**

This paper employs a multi-step forecasting technique in estimations with a stochastic trend to predict real output growth in South Africa, one-year ahead. Underlying the model for forecasting real GDP is an income-expenditure approach with partial adjustment of output to expenditure and to capacity output. The model also builds in allowances for diminished trade and finance related to periodic political crises, monetary policy regime shifts in the 1980s and financial liberalisation. Mineral dependency is reflected through the terms-of-trade shocks. A smooth stochastic trend satisfactorily represents long-run changes in productivity growth.

- Changes in nominal interest rates as well as levels of real rates, have a negative effect on future output. The effects persist for up to three years, even without feedback effects via the other explanatory variables. However, a one percentage point rise in the prime rate now has a smaller effect on output than before the shift in monetary policy in the early 1980s, when policy emphasised liquidity ratios, credit directives and other quantitative controls on credit expansion. One reason for the reduced coefficient is that such controls are excluded

¹ In 1998, capital requirements were raised for lending at mortgage loan-to-value ratios in excess of 85 percent.
from our model yet are likely to be positively correlated with interest rates, implying that
the interest rate effects are probably overstated pre-1983. Secondly, with more liberal
credit markets, borrowers found it easier to refinance when rates rose, so reducing the
impact of interest rates on output.

- Improved terms of trade, and trade and government surpluses to GDP ratios - which also
  respond to interest rate changes, all have a positive effect on future output.

5. Private Sector Investment

Our research in progress with Ben Smit (section V) treats separately three key components of
fixed private corporate capital formation. We formulate a general empirical model
encompassing a range of theoretical models found in the literature. These include “Tobin’s q”
models, in which equity prices are important; models emphasising current cash flows; models
emphasising the user cost of capital; and forward-looking models, where future profitability or
future output is important. We also make allowances for irreversibilities and uncertainty. We
capture expectations both by the one-year ahead forecast of GDP growth (section III.4), and
the one-year ahead forecast of corporate cash flow (building on Aron and Muellbauer, 2000,
*World Bank Economic Review* 14(3)). Our preliminary results imply that there are multiple
channels for interest rate transmission: via the user cost of investment goods (a real interest
rate); expected output; expected cash flows; and equity prices.

6. Inflation forecasting and monetary transmission effects

The recent move to inflation targeting demands good forecasting models of inflation. Apart
from the inflation equation in the SARB macro-model, there are no published forecasting
models of inflation for South Africa. The SARB adopts a Phillips curve specification in which
wages and import prices feed into final goods prices; and wage inflation depends, among other
things, on the output gap. They utilise a simple expectations proxy, but long-run influences on
inflation are absent, such as the increased openness of the economy to import competition and
the gradual adjustment of relative prices.

This paper addresses such omissions using an innovative multi-step forecasting technique in single equation estimations, with stochastic trends or proxies for trade openness
to predict inflation one-year ahead. Multi-step forecasting models have the advantage of
transparency and ease of use, and multi-step forecasts may be superior in the presence of

Key findings are:

- The forward inflation rate (measured using the consumer price deflator, and thus excluding
  mortgage costs) falls when the openness of the economy increases. A key structural feature
  of inflation in South Africa is its persistence, with an increasing trend until the early 1990s,
  and a decreasing trend thereafter. One possible explanation is the evolving openness of the
  economy, affected by unobservable factors such as international sanctions and also quotas,
  as well as other trade measures. A model for the import share of home demand, with a
  stochastic trend to model the unobservable factors, yields an innovative and plausible proxy
  for openness.
- Inflation falls when wholesale prices are low relative to consumer prices. Other price
  factors reducing inflation are lower foreign inflation and a low indirect tax rate.
- Inflation falls when the output gap falls, in common with other studies, but there is little
  evidence for money or credit growth effects (these effects appear at a two-year ahead
horizon). Given the evidence of interest rate effects on output (section III.4), this clarifies an important monetary policy channel on inflation.

- The two-year change in the current account surplus to GDP ratio helps to forecast inflation a year ahead. Being sensitive to short-term interest rates, this gives another monetary policy channel for interest rates.
- Inflation falls when the real exchange rate is high (appreciated). In general, the empirical literature on exchange rates finds no stable relationship between exchange rates and short-term interest rates. If interest rate rises cause growth prospects to deteriorate sharply, they can have a negative impact on long-term capital inflows, and a perverse effect on the exchange rate (as occurred during the 1996-98 exchange rate crises in South Africa).
- Increases in the real prime interest rate, and in our proxy for the mortgage cost component in the CPI index, both raise inflation in the following year. The first, and weaker effect, captures the increased costs for businesses with debt. The second effect operates via the mortgage cost component of the CPI feeding into labour costs.
- The mortgage cost component in the CPI has unfortunate policy implications, as well as a weak conceptual basis in the context of liberalised mortgage markets (discussed in section III.8). Note that financial liberalisation, by raising the real level of mortgage debt relative to income, has, over the years, raised the weight of this component in the CPI.
- An alternative version of the model incorporating a stochastic trend instead of the import trend gives similar results. This method offers a practical method for dealing with shifts in long-run inflationary expectations, such as might arise from the adoption of inflation targeting, or from other slowly evolving structural changes in the economy (e.g. trade liberalisation, deregulation of markets, and a tougher government stance on unions).

7. **The Stability of Money Demand in South Africa**

To interpret money growth, one requires the presence of a stable money demand function. We provide a comprehensive survey of past literature on South African demand for money (including the SARB’s model): this literature is particularly weak. Key omissions are the neglect of wealth measures, financial liberalisation, uncertainty and volatility measures, and income expectations. Theoretically-sensible restrictions such as the homogeneity of money are often not imposed; e many studies fail to use sensible own and alternative rates of interest, and typically ignore the interest rate ceilings in force before 1980.

We examine private sector demand for broad money using error correction models and the Johansen method. In addressing the above omissions, our model is the first for South Africa to employ measures of assets (section III.2 above); expectations (section III.3); volatility, turnover and uncertainty measures; and a financial liberalisation indicator (section III.3).

Our key findings on the private sector demand for broad money are:

- For 1980-98, we find a stable money demand function when wealth and financial liberalisation are included. The model is barely stable in the absence of these effects. The inclusion of income expectations, a measure of uncertainty, and volatility and turnover measures, further improve the fit and stability, while the wealth effects remain significant.
- The coefficients are sensible theoretically. Income has the expected coefficient of 1. Consistent with our work on consumption, financial liberalisation has a negative coefficient, which implies precautionary balances are less desired when borrowing is easier. We find the
same ratio of importance of illiquid to liquid wealth as in the consumption model. However, housing wealth is only relevant after financial liberalisation took effect from the mid-1980s.

- There are sensible interest rate effects. When the short-term interest rate differential between money and alternative assets rises, the demand for money falls quite rapidly.
- Stock-market volatility has a positive effect, with the interpretation that greater economic uncertainty increases precautionary balances. Inflation volatility has a negative effect: the greater the uncertainty, the greater the risk that money balances will be eroded by inflation. Higher transactions volumes for shares and housing are also associated with larger M3 holdings.
- Our proxy for unemployment uncertainty, the change in capacity utilisation, behaves similarly to our findings for consumption. With greater uncertainty, households consume less and increase precautionary balances, and this probably applies to firms too.
- Cointegration analysis using the Johansen method supports our findings on the longer-run determinants of broad money demand.

8. **Overview**

The actual interest rate policy rules followed by the SARB in the “opaque” policy era prior to inflation targeting were examined empirically for the first time (section III.1). Controlling for excess money, financial liberalisation and the foreign interest rate, there was little “leaning against the wind” by the central bank, but a real interest rate almost invariant with inflation. This does not suggest a highly anti-inflationary stance after 1986, as has been claimed (though competing balance of payments concerns partly explain the result).

The new interest policy rules under inflation targeting can be seen as variants, using different weights, of the interest rate feedback rules we have found to describe past behaviour. Our analysis thus helps to understand the likely continuities as well as changes in policy. Moreover, many structural economic features will persist across different regimes.

The research as a whole provides evidence for the importance and complexity of the interest rate transmission mechanism on private sector demand, and hence on GDP in South Africa. The need for transparent and sensible policy rules is thus reinforced, to minimise domestic sources of uncertainty and encourage higher levels of investment.

For instance, we find multiple channels for the effect of interest rates on consumption expenditure (section III.3), both direct effects, but especially large indirect effects via income expectations and asset values, not previously measured (using our own wealth measures - section III.2). We have suggested that the SARB, like the Bank of England, should be constructing and using such wealth measures in their models. Given the multiple possible influences on asset prices - including foreign interest rates and foreign equity prices - to quantify the marginal effect of domestic interest rate changes alone requires separate models for the main asset prices of equities, bonds and housing, in addition to the consumption function and income forecasts. This remains an important task for future work.

In our output-forecasting model (section III.4), we find long-lasting negative effects of real interest rates (up to three years), as well as effects from changes in nominal interest rates. These effects have been altered by changes in the monetary policy regime. One reason is that with more liberal credit markets, borrowers found it easier to refinance when rates rose, so reducing the impact of interest rates on output.

Our preliminary results on private sector investment (section III.5) also imply that there are multiple channels for interest rate transmission, via the user cost of investment goods (a real interest rate); expected output; expected cash flows; and via equity prices.
Our inflation-forecasting model (section III.6) provides evidence that the short-term effects of higher interest rates can be perverse. Higher interest rates both raise the capital costs of business and the mortgage cost component in the CPI. The economic rationale for a high mortgage interest weight in the CPI (12.9 percent) is weak, because in South Africa’s highly liberal mortgage market, with temporary rises in interest rates, most borrowers can easily refinance. Sharp hikes in interest rates, as occurred in the currency crises of 1996 and 1998, exacerbated inflation through the mortgage component of the CPI and resulted in an unpleasant stagflationary aftermath. The introduction of CPI-X (excluding mortgage interest) occurred at the height of interest rates in 1998, and the benefits of subsequent interest rate reductions were therefore not fully reflected in wage settlements.

Inflation targeting will use the CPI-X, but wage negotiators still focus on the headline CPI (or whichever measure is higher). There is a strong case for switching to an imputed rent measure in the CPI, as in the U.S. in 1983 and Australia in 1998. The case is stronger than in the U.K., since the market-leased sector is substantially larger (10 percent in the U.K.). If this change in the measurement of home-owners’ housing costs were adopted, a substantial flexible market-leased sector should be encouraged for market rents to be a valid proxy for such costs. Had this change been adopted in 1990, some of the output sacrifice in the 1990s, thought necessary to bring down inflation, could have been avoided. There has been little policy debate on these issues in South Africa.

A further institutional change could also have a marked impact on consumption and hence inflationary pressures. Since the early 1990s there has been great concern about the low level of aggregate saving in South Africa (and the high dependence on volatile capital inflows). We show that very liberal lending practices encourage low levels of household saving, and recommend more stringent financial regulation (section III.3).

Finally, this project has used theory-consistent and comprehensive models, including crucial but often-neglected variables, highlighting important channels of monetary transmission from interest rates to inflation. In general, our models offer improvements for macro-models of the South African economy. Moreover, an improved understanding of the complex channels of influence of interest rates can enhance the effectiveness of policy. For example, an improved M3 model (section III.7) will improve the monetary sector of SARB’s quarterly econometric model, and help avoid drawing misleading policy conclusions. Thus, while a fall in capacity utilisation and raised stock market volatility may cause a rise in precautionary M3 balances, it would be quite wrong to deduce that stronger growth or higher inflation was to follow – the kind of conclusion the SARB may have drawn in the past.

IV. Dissemination

Our principal means of dissemination has been via conferences, seminars and workshops, in South Africa, the U.K., and abroad. Attachment 1 contains a list of these presentations.

We have submitted our papers to the CSAE working paper series. We will also publish several of the papers in the working paper series of the Centre for Economic Policy Research, University of London (which includes a non-technical summary), and have reserved funds from DFID and Nuffield College for this purpose. There has been a wide circulation of our draft papers by post and electronic mail to academics, policy-makers and the private sector in S.A., academics elsewhere, and international institutions (e.g. The World Bank and International Monetary Fund). We intend to prepare newspaper articles for the business press.

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2 Statistics South Africa has considered making this alteration.
V. **Capacity-building and collaboration**

The capacity-building element of the project, which has involved visits to the CSAE from both junior and senior members of the National Treasury and the SARB, has been hugely successful and appreciated by the participants. (Quarterly reports to DFID have regularly attached correspondence from the participants and the programmes followed.)

The following visits have taken place:

Dr. Daleen Smal, Deputy Head, Research Department, SARB and Rowan Walter, Researcher, Economics Department, SARB, 27th October- 9th November, 1999.

Mr. Theo Van Rensburg, Director, Macroeconomic Policy, National Treasury, 3-14th March, 2000.

Dr. Daleen Smal, Deputy Head, Research Department and Member of the Monetary Policy Committee, SARB and Pamela Mjandane, Researcher, Economics Department, SARB, 11-25 October, 2000.

Mr. Gert Marincowitz, Senior Economist, National Treasury, 19-28th February, 2001.

In addition we have held well-attended workshops and seminars in South Africa, with participation from both the SARB and the National Treasury, discussing research findings and emphasising modelling techniques (Attachment 1).

Our main collaborator, Prof. Ben Smit, Director of the Bureau of Economic Research at Stellenbosch University, has advised us on several papers. However, we have also had ongoing close cooperation from senior practitioners at the SARB throughout the project, particularly on detailed data issues. We have forged a good relationship with the SARB for our future DFID project on inflation targeting, where we directly collaborate on two papers.

VI. **Research Output and Appended Papers**

The project output has appeared in the following papers, journal articles and book chapters, and has exceeded the original promises of the project. Some of these papers were reviewed in 2001 by a DFID referee for a follow-up grant on “Governance and inflation targeting in South Africa for sustainable growth” (the application was successful). Peer-review was required for four of the conference presentations (see Attachment 1).

   [also appeared as Working Paper of the Bank of Chile WPS/00.89].


Attachment 1: Dissemination of Results

1. Workshops and seminars in South Africa

Our DFID project findings are likely to be discussed in the forthcoming Monetary Policy Review, South African Reserve Bank.

Workshop at the South African Reserve Bank, attended by the National Treasury, 19-20th March, 2001. Follow-up meetings were held with senior researchers.

Discussion on DFID research findings at Anglo-American Corporation headquarters, Johannesburg, 23rd March, 2001. Fifteen economists from the private financial sector were also invited.


"Private Saving in South Africa", Staff Seminar Series, School of Economics, University of Cape Town, September, 1999.


2. Dissemination in the U.K.

Workshop, Centre for the Study of Economics and Finance in South Africa (CREFSA), London School of Economics, scheduled for November, 2001. CREFSA will also present research on South Africa, and there will be discussants. A wide range of participants will be invited, from the media, business and financial sectors, NGOs and U.K. government and policy bodies.


3. Dissemination abroad


Two seminars on research findings were given in Washington, on March 5, 2001 at the IMF (Research Division); and on March 6, 2001 at the World Bank (Southern African Division).


HIGHLIGHTS: GREATER UNDERSTANDING OF THE ECONOMIC EFFECTS OF INTEREST RATES SHOULD IMPROVE POLICY

Our South African research finds convincing evidence that higher interest rates reduce consumption, private investment and output. Previously neglected indirect effects operate via the influence of interest rates on asset prices and expectations of income and profit growth. Our inflation-forecasting model shows interest rates can also raise inflation in the short-run. Partly responsible is the use of mortgage interest rates rather than imputed rent to measure housing costs in the consumer price index. Also, financial deregulation has raised debt and decreased saving, and has led to higher real interest rates. A combination of institutional design faults, and policy errors in 1996-8, damaged growth, leaving inflation higher than it need have been.

This research has resulted in eight papers. First, econometric methods are used to analyse the rules followed by the Reserve Bank in setting interest rates prior to inflation targeting. A second paper constructs personal sector wealth estimates, crucial in explaining consumption (saving) and the demand for money. We study the determinants of consumer spending, the demand for broad money and private corporate investment in three papers. Two further papers use multi-step forecasting methods to forecast inflation and growth a year ahead, and clarify the roles of interest rates in the monetary transmission mechanism. An overview paper synthesises the research, and discusses practical and policy implications. Previous research, including the econometric models of the Reserve Bank, does not do justice to the complexity of the monetary transmission channels. The move to inflation-targeting in S.A. underlines the importance of good econometric models and a clear understanding of these channels for policy.

The key research findings:

- The Reserve Bank’s interest rate setting in 1986-97 was driven by foreign interest rates (reflecting concerns for the exchange rate), current domestic inflation, and liberalisation of consumer credit, not just money targets (and from 1994, these targets became irrelevant).
- Our constructed personal wealth measures have a key role in explaining variations in consumer expenditure and demand for money.
- Measured financial liberalisation is crucial in several models, corroborates the theory, and undoubtedly lowered personal saving rates.
- Future output declines with the real interest rate and changes in nominal interest rates (effects reduced with a liberalised monetary policy regime).
- Future inflation falls with increased openness of the economy; and rises with increased real prime interest rates (increased costs for indebted businesses), and the mortgage cost component in the CPI index (feeding into labour costs); amongst other factors.
- A stable money demand function, 1980-98, with plausible income and interest rate effects requires the inclusion of wealth and financial liberalisation. Measures of income expectations, uncertainty and turnover further improve fit and stability.

Practical steps for improving the Reserve Bank’s macro-model include:

- Measuring personal sector assets (as in the U.S. and U.K.), incorporating these in behavioural equations, and adding asset price models to close the system and clarify the monetary transmission channels in the systems context.
• Including expectation effects derived from multi-step reduced-form forecasting models in behavioural equations.
• Incorporating indicators for financial liberalisation, and other regime shifts, in behavioural equations.
• Using stochastic trends to capture slowly-moving evolutionary trends (e.g. in measuring the output gap), or to capture regime shifts for improved robustness of forecasting.
• Our research reinforces the Reserve Bank’s recent attention to the importance of long-run solutions in econometric models.

Some policy recommendations:
• Our findings on financial liberalisation suggest prudential regulation could be used to correct the more extreme effects of financial deregulation.
• Revise the treatment of homeowners’ costs in the CPI, by switching to an imputed rent measure or a mixture of imputed rents and mortgage interest. Public policy should then not discourage the rented sector.
• Uncertainty measures matter in a range of models: improving transparency in a rule-based monetary policy framework is likely to improve growth prospects.

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Three of the key papers are:
http://www.economics.ox.ac.uk/CSAEadmin/workingpapers/pdfs

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South Africa + monetary policy transmission + monetary policy rules + inflation forecasting
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