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P A P E R S

A Gap and Macro Decomposition
Analysis for South Africa,
1993-2002

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Section 1: Introduction

The South African government is evaluating the economy's performance over its first decade in power. This period can be characterised by a 'double' liberalisation: democratisation of the political process going hand in hand with liberalisation of the economy. This paper provides a broad overview of the macroeconomic aspects of this liberalisation.

Economic liberalisation might be expected to change the working of the macroeconomy: as the economy opens up, the foreign sector should begin to play more of a role in aggregate demand. Also, the lifting of constraints may disturb the established savings-investment process as new economic conditions face savers and investors. From this perspective, one of the questions that comes to mind when examining the macroeconomic policies, trends and events in the last ten years of the South African economy, is whether or not there have been significant changes during the liberalisation period in demand side parameters such as import coefficients and savings rates along with jumps in flows such as annual exports, investment, etc. Following methodologies presented in Berg & Taylor (2001) and Davies & Rattsø (2001), it is perhaps interesting to look at how output has responded to these shifts, using a simple three gap analysis and decomposition of aggregate demand "injections" (investment, government spending, exports) versus "leakages" (saving, taxes, imports). The key point is that in macroeconomic equilibrium, totals of injections must be equal to the total of leakages.

From the identification of contractionary and expansionary factors in effective demand it is then possible to arrive at the economy's real-financial balance. Changes in financial claims against the various institutions (private sector, public sector, foreign sector) require that some real economic variables have to adjust. On the other hand, for example, a contractionary stance of the rest of the world suggests that some other sector must increase liabilities or lower assets.

In order to examine what this means for the demand for labour, one can undertake a decomposition of employment growth. It is important here to bring the issue of productivity growth into the picture. In expanding sectors, productivity increases may not necessarily translate into reduced unemployment; in slow-growing or shrinking sectors, higher productivity may even result in an employment decline. Finally, linking employment growth to productivity gains during the period of liberalisation may point to important shifts in earnings patterns.

This paper provides an overview of macroeconomic performance and trends in South Africa since 1990. It employs various forms of decomposition analysis to describe important trends. Organisation: after a brief background to the South African scene in the next section we start our analysis with a three-gap exposition of savings and investment in South Africa. This is followed by a decomposition of aggregate demand into leakages and injections. We then explore a decomposition of employment and labour productivity growth.

Section 2: Context

It is useful to have a story on which to peg any economic analysis. In the context of the overall review programme in which this paper is being written, our stylised story is as follows. Like most economies in the new millennium, South Africa's main macroeconomic policy problem is how to manage 'globalisation'. Most economies faced increasing globalisation pressures in the 1990s. Without taking a pro- or anti- globalisation stance, we would argue that globalisation confronts any national economic policy makers with the need to balance two important competing considerations. On the one hand, globalisation constrains national economic policies. Certain policies are inconsistent with the forces of globalisation and reduce the benefits that might be garnered from it. For example, a fixed exchange rate coupled with fiscal indiscipline can undermine export competitiveness, which is essential if the economy is to benefit from expanded global trade. Similarly, fiscal discipline is necessary to attract foreign investment, a key driver of globalisation benefits.

On the other hand, there are likely to be domestic social demands that need to be addressed. The logic of social policies often appears to run counter to the logic of globalisation, particularly in the short-run and during any transitional process of opening up. Good policy is a matter of managing these two: how do policy makers ensure that legitimate domestic social concerns are not sacrificed by the pursuit of macroeconomic policies consistent with liberalisation and other forms of globalisation. Domestic social concerns are not only legitimate in their own right. Failure to meet them may threaten the success and sustainability of any benefits from globalisation.

History has perhaps sharpened this dilemma for South Africa. It faced – and faces – the problem of managing 'normal' globalisation. But the ending of apartheid compounded this problem in two ways. First, reintegration into the global economy, which started in 1990 after the ANC was unbanned, meant there was a double impetus for 'globalisation' – reintegration plus subsequent liberalisation (tariff reduction, financial liberalisation) begun in 1994. Second, the legacy of apartheid exacerbated both social expectations and the need to satisfy them.

From outside South Africa, it often appears that the policy debate has been between those who feel that immediate needs of social policy should take precedence over macroeconomic concerns, and those who give primacy to macroeconomic concerns. The argument for the latter – seen by many critics to be the stance of official economic policy in South Africa – is that growth requires macroeconomic stability, which will allow social concerns to be addressed more sustainably in the long run. The arguments for giving primacy to the social agenda are that 'in the long run we are all dead' – social needs carry a moral imperative to be addressed immediately – and that failure to address them will lead to social forces that will themselves threaten macroeconomic stability and, as was argued above, the success of globalisation in itself. Bluntly speaking, failure by the public sector to ensure the provision of sufficient education and health care, in the name of fiscal discipline and an investor friendly environment, will result in a low productivity labour force, which will be unable to reap the benefits created in certain sectors by globalisation.

It is always dangerous to present economic policies as sharply opposed alternatives. However, in public debates on policy there is often perceived to be a clash between macroeconomics and social policy. It is probably helpful to state explicitly our perspective on this. Policy interventions to promote social economic justice (if they work) make direct contributions to improving social conditions. In this sense, their intended effects are transparent and apparently easy to understand. On the other hand, the contribution of

macroeconomic policies to social conditions is indirect and thus less apparent. It is thus sometimes difficult to understand why there might be a trade off between the two types of economic policy. It is also understandable why social activists oppose policy packages that reduce social interventions in order to maintain macroeconomic stability.

Macroeconomic instability comes about because aggregate demand exceeds aggregate supply by an excessive amount. Broadly speaking, excess aggregate demand means that the amount of goods and services that domestic residents want to use is greater than the amount available. Something has to give, either to increase the availability – bringing in more goods from outside, for example – or to ration the shortage – through inflationary redistribution of income to reduce demand, for example.

The exact way in which the economy attempts to adjust back to balance will depend upon a host of factors such as institutional norms in wage setting, various policy frameworks that are in place, and so on. Thus, for example, if the authorities maintain a fixed exchange rate, the instability is likely to manifest itself as a current account deficit and a debt crisis. With the price fixed, the excess demand is satisfied by sucking goods in from outside; this is only possible if debt is allowed to rise.

If, however, the authorities allow the exchange rate to float, then excess demand will manifest itself in a depreciating exchange rate. In effect, the depreciating currency raises the price of goods for domestic buyers and reduces the excess demand through a price mechanism.

Both these processes can be accompanied by inflation. A depreciating exchange rate can start off a cost-push inflationary episode, which might be sustained depending on the relative strengths of various social forces trying to protect their real incomes. With a fixed exchange rate, that part of excess demand that cannot be satisfied by rising imports will cause domestic inflation. At a given exchange rate, domestic inflation will reduce competitiveness and place further pressure on the current account, which will cause either further depreciation or debt accumulation, depending on the exchange rate regime. There is thus a reinforcing feedback.

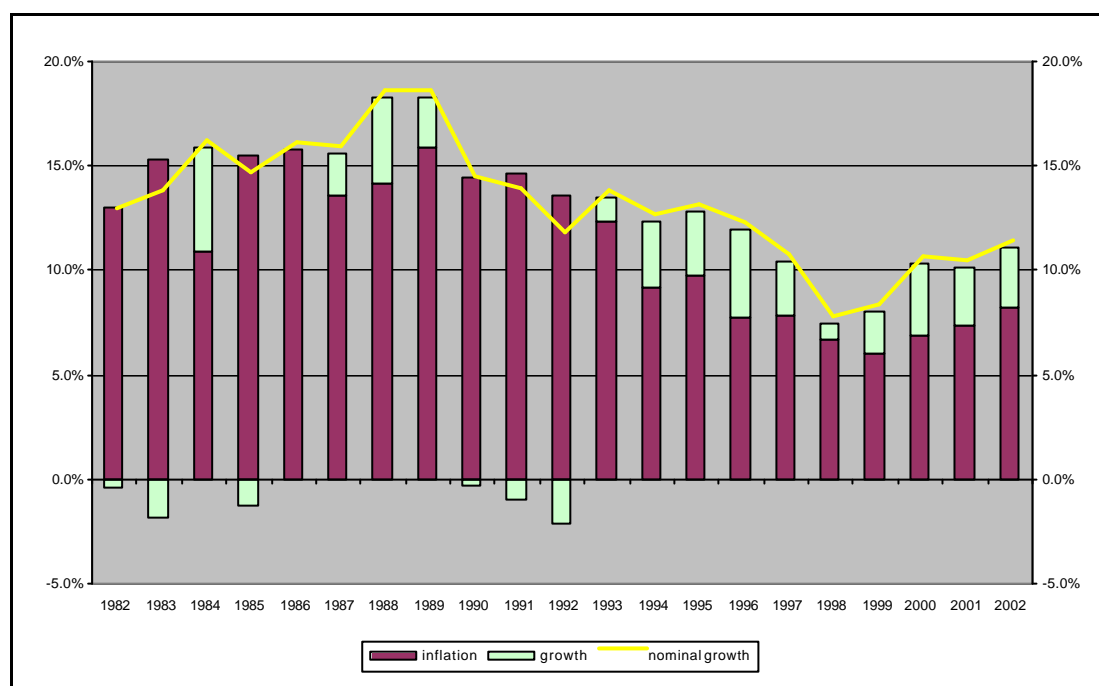
These responses impact negatively on social conditions. Inflation generally has a negative distributional impact. Falling export competitiveness leads at best to slower growth and at worst to job losses. The social response to these privations can then set off various vicious circles.

It thus seems clear that in principle those concerned with social policy should also be concerned with macroeconomic stability. However, while it is both theoretically and empirically incontrovertible that macroeconomic instability is harmful for society, this does not mean that macroeconomic stability necessarily and automatically promotes good social conditions. It is necessary that the enabling environment it provides be used to the good. This may require social intervention on the part of the state. However, this does not imply that *any* social intervention will be beneficial. Many such interventions are irresponsible, either because their wider consequences are ignored, or because they are motivated by populist political interests rather than genuine concern for social welfare. Such policies do not provide sustainable solutions to the problems they purport to address. Insofar as they fail to consider their macroeconomic implications, they may contain within themselves the seeds for their own failure.

Any given change in a ‘standard’ measure of macro instability – the current account balance, budget deficits, inflation etc – can be ‘explained’ by a number of different immediate ‘causes’. For example, an increased current account deficit must, by definition, mean that

availability of foreign exchange has grown more slowly than its use. But was the proximate cause falling exports or rising imports? Or perhaps both were rising, but exports not as fast as imports? Or perhaps the deterioration reflects changes in the invisible account? Similarly, the implications of a budget deficit – and the appropriate policy responses – are different if it came about because of rising current expenditure, falling revenue, or rising capital expenditure. Distinguishing between these different immediate ‘causes’ gives some insight into underlying macroeconomic forces driving the macroeconomy. We use a decomposition

Figure 1: Inflation and Growth in South Africa



Source: SARB Quarterly Bulletin

method that allows us to begin to distinguish between such immediate ‘causes’.

The decomposition focuses on components of aggregate demand. In effect it assumes that there is excess capacity in the economy, so that aggregate output is determined from the demand rather than the supply side. Although we have not tested this assumption, it is worth thinking about it. It assumes that any increase in demand can be met by increased utilisation of existing capacity rather than by having to raise factor prices. This implies that, if we were able to control for capacity growth and other factors, aggregate output and the aggregate price level would not be correlated. One should therefore look at the relationship between these two variables. Our time frame – 1993-2002 – is inadequate for econometric analysis using annual data, but we can get some impressionistic patterns from the data.

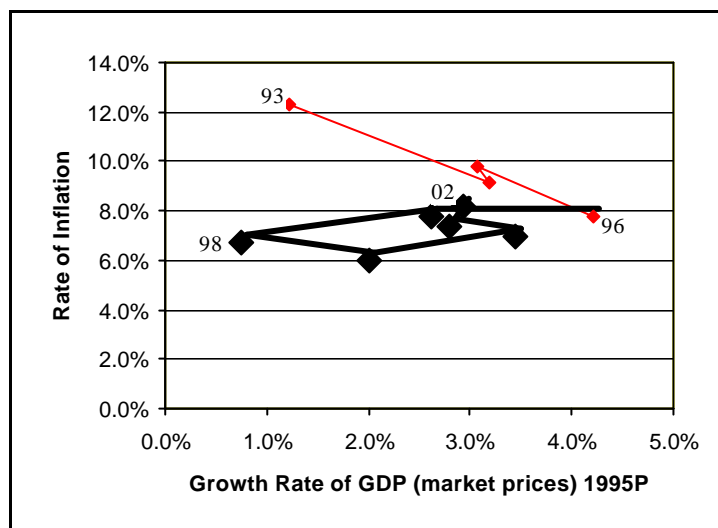
Figure 1 shows growth rates for nominal and real GDP and inflation rates, as measured by the GDP deflator². There is a noticeable change after 1993: inflation rates are lower than previously while real growth is invariably positive.

² The rates may differ from the conventional wisdom in SA literature. They have been calculated as continuous growth rates $[= \ln(x_1) - \ln(x_2)]$ and are thus smaller than the conventionally estimated year-on-year percentage changes. The advantage of the continuous growth rates is that the growth rate of a variable that is a product of components is equal to the sum of the growth rates of the components.

Since we expect both of these variables to be autocorrelated (this year's value is highly correlated with last year's), we also plot the growth rates (Figure 2).

Casual observation suggests that between 1993 and 1996, there was an inverse relationship between the two. Since 1996 however, there has hardly been any relationship: growth rates have varied between 0.8% and 4.2%, but inflation has varied between 6.0% and 8.2%³. This possibly suggests that the inflation-growth nexus changed after 1996. Prior to this, there seems to be a trade off between the two variables, in which higher growth is associated with lower inflation. After 1996 the relationship becomes less clear, with large variations in

Figure 2: Inflation and Growth in South Africa, 1993-2002



Source: SARB Quarterly Bulletin

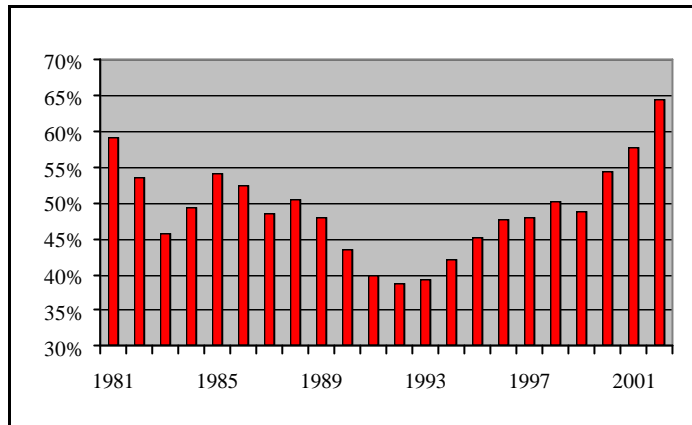
growth while inflation moved in a narrow band. Although this evidence is by no means definitive, it does not suggest that its is entirely inappropriate to proceed with the demand decomposition. It also suggests – very tentatively – that there might have been a change in the inflation-growth nexus after 1996

A ten-year review seems an appropriate time to examine how these (possibly) contradictory forces have been balanced in practice at the macroeconomic level. The decomposition methodology we employ allows us to begin to distinguish between sources of outcomes.

³ Between 1997 and 2002 the coefficient of variation for inflation is 8.6% while that for growth is 36.5%. The correlation coefficient between the two is 0.99 for 1993-96 and 0.46 for 1997-2002.

The focus of the study is from 1993 to the present. It is useful to divide the overall period into

Figure 3: South Africa's Trade Ratio



Source: SARB Quarterly Bulletin

two: pre-liberalisation (1993 through 1997) and liberalised (1998-2002). Figure 3 shows South Africa's trade ratio from 1981 through 2002⁴. For the period under review one can see that it started to grow in 1992, perhaps reflecting post-apartheid reintegration. The slowdown in 1997-99 was probably related to the Asian crisis, but might also reflect the ending of the impetus provided by the ending of apartheid. The acceleration after 1999 reflects both world recovery and domestic liberalisation policies starting to make an impact. (The average annual rate of growth of the ratio was 5.5% between 1993 and 1996, 0.8% between 1997 and 1999 and 9.8% between 2000 and 2002.).

⁴ The trade ratio is measured as the sum of export and import values to GDP (in current prices). It is a commonly used crude measure of how open an economy is.

Section 3: A Gap Analysis for South Africa

It is useful to begin our decomposition analysis with a ‘gap analysis’ of savings and investment, a non-behavioural framework for showing interactions between private, public and foreign sectors. We start by setting out the framework and then look at the results it gives for South Africa. The gap framework is an accounting approach derived from the national accounts. Our national income accounting identity gives

$$(1) \quad Y + M = C + I + X$$

where Y is gross domestic product at market prices, M is imports of goods and services, C is final current expenditure (summed over households and the general government), I is gross capital formation (or domestic investment) and X is exports of goods and services.

This simply reminds us that, *ex post*, the total use of goods and services in any given period must be equal to their total availability⁵. Rearranging and remembering that $Y - C = S$, i.e., domestic savings, gives

$$(2) \quad I - S = M - X$$

Domestic investment can only exceed domestic savings if imports exceed exports. Since we are dealing with *ex post* magnitudes, this relationship derives from a consistent set of national accounts, not from any particular theory of economic behaviour. But it carries a basic truth. A country can only use more goods and services than it produces ($I > S$ or $I - S > 0$) if there is a net inflow of goods and services from outside ($M > X$ or $M - X > 0$).

It is more usual to present the gaps as

$$(3) \quad S - I = X - M$$

In this form, use of domestic resources in excess of domestic availability shows up as a negative domestic gap ($S - I < 0$). Similarly a negative foreign gap is the same as a current account deficit on the balance of payments ($X - M < 0$). The left hand side is called the domestic gap while the right hand side is the foreign gap.

There are two last modifications we need to make before applying the framework. Since national savings are normally measured as the difference between Gross National Disposable Income and Current (private and public) Consumption, it is convenient to present (3) as

$$(4) \quad S - I = X - M + NFA + NTA$$

where $NFA = net$ factor payments from abroad and $NTA = net$ transfers from abroad⁶.

⁵ This identity is elementary to all economists. It is an *ex post* identity because any increase in stocks (inventories) is investment and are thus used. We use the terms ‘availability’ and ‘use’ rather than ‘supply’ and ‘demand’ to emphasise the absence of any behavioural assumptions in the identity. It is sometimes suggested that the identity is not ‘true’ because of activities such as home and informal sector production. This is a question of measurement, not of the validity of the identity.

⁶ This is simply a matter of being consistent in our measures of national income (Y) and savings (S) and the foreign sector (X and M):

- a) if $Y = GDP$, then $S =$ gross domestic savings and $X - M$ represents the balance of trade.
- b) If $Y = GNP (= GDP + NFA)$, then $S =$ Gross National Savings and we must add NFA to $X - M$
- c) If $Y = GNDI (= GNP + NTA)$, then $S =$ Gross Savings, and we must add NTA to $X - M + NFA$

The last of these is the normal usage of the term “Savings”. It is also the most useful for us to employ in our later analysis.

This modification means that the right hand side of (4) shows the full current account balance of the balance of payments⁷.

Secondly, we can further decompose the domestic gap into a private and a public sector⁸. To do this we first have to define the two sectors. In this paper we equate the public sector to “general government” and add public corporations in with the private sector. This is necessary because the data do not allow us to identify the income of public corporations separately.

We define Government income (Y_g) as Government current income *less* Interest payments on public debt, *less* Government subsidies *less* Government current transfers to households *less* Government transfers to the rest of the world⁹. We then define private income (Y_p) as Gross National Disposable Income (GNDI, at market prices) *less* government income (Y_g).

Given the breakdown of current consumption expenditure between the private and public sector as per the national account, we can then derive savings in the two sectors: $S_g = Y_g - C_g$ and $S_p = Y_p - C_p$. This allows us to decompose the domestic gap into

$$(5) \quad (S_p - I_g) + (S_p - I_p) = X - M$$

Ideally we should present the data in constant prices. However, inconsistencies in the national accounts source data prevent this and we rather present in current prices as percentages of GNDI. This amounts to assuming that the deflator is the same for all components of national income. Data sources are shown in Appendix A.

Table 1: The Three Gaps in South Africa (percent of Gross National Disposable Income)

	Sp	Ip	Private Gap	Sg	Ig	Public Gap	Domestic Gap	Forex Earnings	Forex Use	Foreign Gap
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1990	22.4	14.0	8.4	-2.4	4.0	-6.4	2.0	26.7	24.7	2.0
1991	22.3	13.7	8.6	-3.2	3.5	-6.7	1.9	24.0	22.1	1.9
1992	24.2	12.2	12.0	-7.5	2.9	-10.4	1.5	22.7	21.2	1.5
1993	23.8	13.1	10.6	-6.9	2.6	-9.4	1.2	22.7	21.5	1.2
1994	23.3	14.8	8.5	-6.0	2.4	-8.4	0.1	23.5	23.4	0.1
1995	21.2	16.0	5.3	-4.3	2.4	-6.8	-1.5	24.4	25.9	-1.5
1996	21.8	15.2	6.5	-5.2	2.7	-7.9	-1.4	26.1	27.4	-1.4
1997	20.2	14.3	5.9	-4.7	2.8	-7.5	-1.6	26.2	27.8	-1.6
1998	18.1	14.4	3.7	-2.9	2.7	-5.5	-1.8	27.6	29.3	-1.8
1999	17.8	13.8	4.0	-1.9	2.6	-4.5	-0.5	27.8	28.3	-0.5
2000	17.7	13.7	3.9	-2.0	2.4	-4.4	-0.4	31.4	31.9	-0.4
2001	15.6	13.4	2.2	-0.2	2.3	-2.5	-0.3	34.0	34.3	-0.3
2002	16.8	14.1	2.7	-0.2	2.2	-2.4	0.3	37.0	36.6	0.3

Source: SARB Quarterly Bulletin and own calculations

Table 1 shows the three gaps for South Africa since 1990. To interpret it, begin with the foreign gap in column 10. This is the Current Account Balance on the Balance of Payments (CAB). It is noticeable that

- it is relatively small. The *absolute* value of the gap averaged 3.3% of GNDI in the 1980s, 1.1% between 1990 and 2002, and 0.8% since 1997. This low ratio is what one would

⁷ Strictly speaking, the RHS of identity (3) shows the balance of trade, not the current account balance.

⁸ In fact, provided our accounts are consistent, we can decompose it in numerous different ways. For example, it would be possible to break it into provincial gaps if the data were available.

⁹ This explicitly treats government as an pure intermediary between benefactors and beneficiaries as far as transfers are concerned.

expect with a floating exchange rate regime: exchange rate adjustments prevent the CAB from departing too far from zero¹⁰;

- the balance changes from being positive in the pre-liberalisation period to negative in the liberalised period. The direction of this change is consistent with the expected impact of the financial liberalisation that took place simultaneously with the trade liberalisation. Financial liberalisation should lead to inflows of foreign capital. Thus the capital account of the balance of payments should be in surplus, which should be matched by a deficit on the current account. The fact that it is small shows that, whatever financial capital flows took place, the *net* flow of resources associated with this was small¹¹;

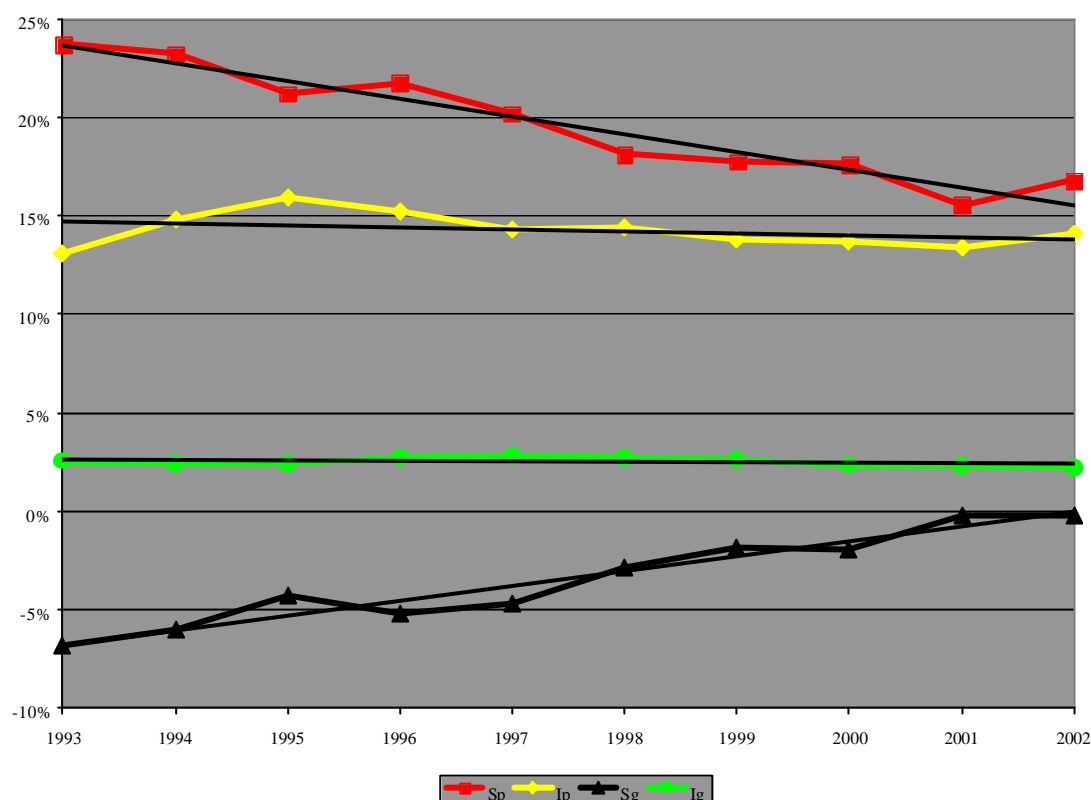
With the foreign gap being kept close to zero, the two domestic gaps are forced to be almost mirror images of each other. We see this in columns (3) and (6) of Table 1: negative public sector balances match positive private sector balances. Three features merit comment:

- Private sector balances are positive throughout the period. In other words, private savings (by households and corporations) exceeded private investment. Because of the CAB constraint, this implies that the public balances were negative.
- The private gap declined as a percentage of GNDI throughout the period, while the relative public gap increased (became a smaller negative number).
- There is no discernable break in the trends. Rapid liberalisation in the second part of our period appears to have had little impact on the observed trends.

¹⁰ It might be asked why it is not exactly zero. In part this could reflect rigidities in the exchange rate adjustment process. But it should be noted that the year to year changes used in the decomposition reflect short run movements in the CAB, and thus reflect temporary disequilibrium in the market.

¹¹ This raises the complex issue of the ‘transfer problem’. A real capital inflow only takes place if there is an associated rise in imports.

Figure 4: Components of the Domestic Gap, 1993-2002



Source: own calculations

The second feature warrants looking at the components that lie behind the domestic gaps. As Table 1 shows, both private and public investment remained relatively constant as shares of GNDI from 1993 on. The decline in the private savings rate and the rise in the public one drove the changing gaps. This is vividly illustrated in Figure 4.

It is important to emphasise that this analysis does not show causation, since there is no behaviour in the ‘model’. The correct interpretation at this stage is that, with the foreign gap being kept close to zero by exchange rate policy, any change in one of the domestic gaps has to be accommodated by an opposite change in the other. The framework is often used to ‘show’ that a rise in the public deficit must **cause** a fall in the private surplus – a typical “crowding out” story in which the private sector is “forced” to finance a budget deficit. But such an interpretation is only possible if one has a model – at least an implicit one – of how causality works in the economy. It could equally be argued that the high private surplus – which arises because of high real interest rates or simply lack of investment opportunities due to low domestic demand – “causes” the public sector to appropriate resources for current and capital spending. What else can the private sector “saver” do than buy government bonds if there are no other investment opportunities?

Looking at Table 1, it would seem that the attempt to reverse crowding out did not bring about the desired increase in private sector investment. Instead, private sector savings went down, i.e., every rand saved by the public sector is associated with a decline in private sector savings of the more or less the same amount. A downward trend in the private sector savings is often observed when financial or trade liberalisation takes place. Prior to liberalisation limited spending outlets may lead to artificially propping up of savings. In addition, opening up to foreign competition may squeeze profits and therefore savings by firms. Any changes

in private savings, however, do not appear to have had any impact on private investment, suggesting that savings are not really a driver of investment in South Africa.

It is instructive to consider what the immediate effects might have been if the changes to the private gap required to match the concomitant change with the public and foreign gaps had come about with savings remaining constant and investment rising. A simple calculation shows that if the private gap over the period remained as it was but was brought about by the private savings rate remaining at its 1994 level (23.3%) while investment rose accordingly, there would have been an additional R221bn (in 1995 prices) of investment over the period 1994 to 2002. This is almost 3 times the level of investment in 1995, and would likely have had a significant effect on growth and employment.

The usefulness of this framework is that it provides us with a descriptive picture of where we need to start looking for explanations of the macroeconomic performance. In the following section we take the method of decomposition a little further.

Section 4: Stance and Multiplier Analysis of Aggregate Demand

The previous section suggested that a major macroeconomic trend in South Africa has been the reduction in the private surplus/public deficit. This appears to be driven by action on savings, in both the public and the private sectors, while investment in both sectors remained relatively constant. We now analyse this theme a little further.

To do so we use a technique developed by various authors in Taylor (2001). From standard Keynesian analysis we know that any change in an exogenous demand component (an injection) will have a multiplier impact on aggregate demand. Its size depends on a) the size of the injection and b) the size of the multiplier. The latter depends inversely on the size of leakages relative to aggregate demand.

The technique we use allows us to decompose changes in the impact into those due to the multiplier and those due to the injection. In simple terms

$$(6) \quad X = kJ$$

where X is aggregate demand, k the multiplier and J exogenous final demand, i.e., the injection.

Comparing one period with the previous we can write

$$(7) \quad X_1 - X_0 = k_1 J_1 - k_0 J_0$$

Some simple manipulation allows us to write

$$(8) \quad X_1 - X_0 = (J_1 - J_0) k_0 + (k_1 - k_0) J_0 + (J_1 - J_0) (k_1 - k_0)$$

or

$$(9) \quad \Delta X = k \Delta J + J \Delta k + \Delta J \Delta k$$

Thus the change in aggregate demand is decomposed in an “injections effect” and a “multiplier effect”. The third term is an interaction term, which will typically be small.

Further comments on the decomposition methodology and how it might relate to econometric analyses can be found in Appendix B.

Table 2: Overall Decomposition of Changes in Aggregate Demand (Rbn, Constant 1995 Prices)

	X	J	k	ΔJ	Δk	ΔX	$k\Delta J$	$J\Delta k$	$\Delta J\Delta k$	Ratio*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1993	594	296	2.005	6	-0.005	10	11	-1	0	0.12
1994	625	318	1.967	22	-0.038	32	44	-11	-1	0.26
1995	656	330	1.991	12	0.024	31	23	8	0	0.34
1996	689	354	1.947	24	-0.044	33	48	-14	-1	0.30
1997	709	360	1.967	7	0.020	20	13	7	0	0.56
1998	719	368	1.953	8	-0.015	11	16	-5	0	0.33
1999	725	371	1.952	2	-0.001	4	5	0	0	0.07
2000	766	404	1.895	33	-0.057	42	65	-21	-2	0.32
2001	791	428	1.848	24	-0.047	25	45	-19	-1	0.42
2002	843	469	1.798	41	-0.050	52	75	-21	-2	0.28

Source: *SARB Quarterly Bulletin* and authors' calculations, Note *: Ratio of the multiplier effect and the injection effect, i.e., column 8 divided by column 7

Table 2 shows the application of this to South Africa for the period under review. The first three columns show the levels of aggregate demand (GNDI plus imports), injections and the multiplier respectively. Columns 4 through 6 show year on year changes in each of these. Columns 7 through 9 show the decomposition. As an example, consider 1996. Column 6 shows that aggregate demand rose by R33bn. The decomposition shows that if injections had risen as they did (by R24bn – column 4), but the multiplier had remained at its 1995 level (1.991 – column 3), aggregate demand would have risen by R48bn. Column 5 shows that the

multiplier fell by -0.044 in 1996. If this had been the only change that occurred, aggregate demand would have fallen by R14bn (Column 8).

In most years, the two effects tend to off-set each other although in 1995 and 1997 they are reinforcing. Over the whole period, the injection effects dominate the multiplier effects. This is to be expected, since the nature of the multiplier limits the size of the changes that can occur. The value of the multiplier is constrained by the fact that the leakage parameters are virtually restricted to vary between 0.1 and about 0.4 or 0.5. Column 10 shows the ratio of the absolute size of the multiplier to the injection effects. There is no discernible trend, although in the last three years both effects seem to be bigger than previously. One might want to see in this some early signs of a change in the relationship, but it is not statistically significant.

Section 5: Decomposing the Component Changes

Following the gap analysis in the earlier section, the components of injections and leakages can be grouped according to the sector most ‘responsible’ for them – the private sector (investment and savings), the public sector (government expenditure and taxation) and the foreign sector (exports and imports). We can then further decompose equation (9) into changes emanating from each sector and those due to injection and leakage changes within each sector.

The rationale for doing this is that each set of actors is responsible for compensating or reinforcing changes. This is most clearly seen in regard to the public sector. The government may have the intention of cutting its expenditure in the context of fiscal reform. This will reduce aggregate demand. However, if at the same time it raises average tax rates due to better tax enforcement, the multiplier falls and the impact of the expenditure cut on aggregate demand is reduced. Similarly, increased private sector investment raises aggregate demand, but a rise in its propensity to save reduces aggregate demand. (Strictly, it reduces the multiplier that determines how exogenous changes impact on demand). There are two alternative approaches to decomposing them and we briefly look at each.

Berg-Taylor Decomposition

Berg & Taylor (2001) suggest that we can think of a particular injection relative to its leakage

Table 3: Stances of the Three Sectors

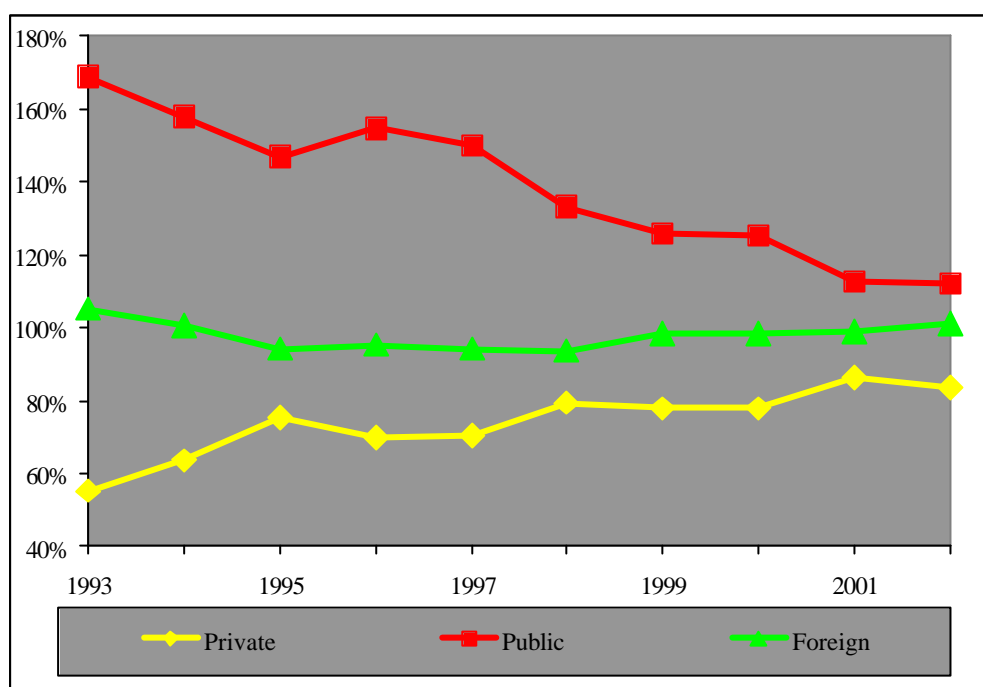
	Private Stance			Public Stance		Foreign Stance	
	Output Rbn 1995P	Rbn 1995P	%	Rbn 1995P	%	Rbn 1995P	%
1993	594	328	55.3	1 002	168.8	626	105.4
1994	625	397	63.6	989	158.2	627	100.3
1995	656	493	75.2	964	146.9	619	94.2
1996	689	482	69.9	1 066	154.8	655	95.1
1997	709	501	70.7	1 061	149.7	669	94.4
1998	719	571	79.4	958	133.1	676	93.9
1999	724	562	77.7	911	125.8	711	98.2
2000	766	595	77.7	958	125.1	756	98.7
2001	791	681	86.1	891	112.7	784	99.1
2002	843	706	83.8	946	112.2	850	100.8
1993-1997	655	437	66.8	1016	155.2	637	97.3
1998-2002	769	622	80.9	930	121.0	756	98.4

Sources: SARB and own calculations; Note: % shows percentage of output

parameter as reflecting the *stance* of the sector. Thus the stance of the private sector is I/s , of the public sector is G/t and of the foreign sector is E/m , where I and E are defined as before, G is government current and capital expenditure, s is the private sector savings rate, t the tax rate and m the propensity to import. The stance shows the sector’s ‘own’ contribution to

aggregate demand – how much its injection translates into aggregate demand when passed through its ‘own’ multiplier. Table 3 gives the relevant figures for South Africa. These

Figure 5: "Stances" as Proportion of Output



Sources: SARB and own calculations

figures have to be interpreted distinctly differently from the previous table.

The simplest way to think of them is that they show what demand would be if only that sector’s injections and leakages operated. Thus actual demand in 1997 was R709bn. If government spending and exports, and the tax and import parameters had all been zero, so that only the private sector stance determined demand, then it would have been R501bn. Similarly the public sector stance would have led to demand of R1061bn and the foreign stance to R669bn.

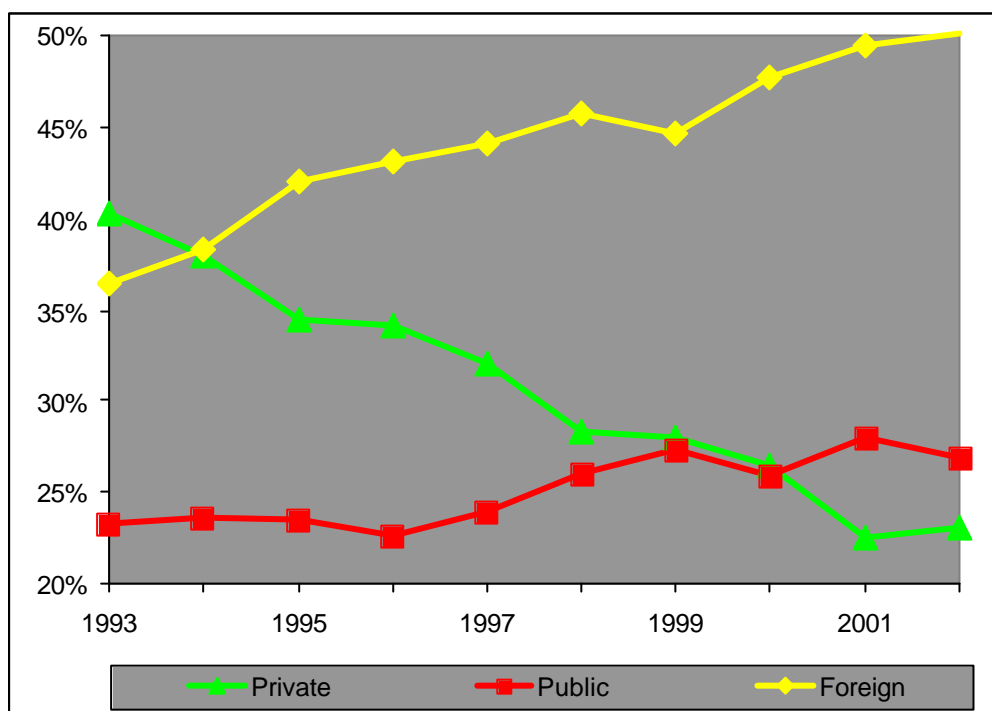
Clearly it does not make any sense to think of the absolute values: the thought experiment of cutting out all sources of injection and all leakages except one is too difficult to contemplate. However, the trend relative to the average does give us some insight. The ‘average’ stance is simply actual demand¹². Table 3 also presents the stances as ratios of this average, and they are plotted in Figure 5.

The public sector stance is consistently above the average, showing that it was ‘pumping demand into the economy’. However, there has been a consistent decline in its relative size, showing that the amount by which it has boosted demand has fallen over the period. The average public stance for the pre-liberalisation period is 155.2%. After liberalisation it falls to 121.0%. For the private stance, the opposite picture is true: it is consistently below the average, but rises over the period.

¹² One can derive this by taking a weighted sum of the three stances, where the weights are the ratio of the sector leakage to total leakages.

The foreign stance is stable and tracks the average. This is what one would expect with the exchange rate regime¹³. Since the CAB is not allowed to move much out of balance, imports and exports must match each other, so that increases in injections (raising the stance) must be matched by countervailing increases in leakages (reducing the stance)¹⁴.

Figure 6: Trends in the Leakage Shares



Source: SARB Quarterly Bulletin and own calculations

This preliminary analysis points to the changing roles of the private and public sectors as drivers of demand in the economy. The changes are relatively steady, rather than discontinuous around the break in trend due to our assumed change in liberalisation. An initial interpretation suggests that changing domestic policies rather than liberalisation drove the change. However, taking the Berg-Taylor decomposition further gives us more insight.

While the stance of a sector gives us some idea of the impact of the sector, it ignores the relative size of the stance in the determination of overall demand. Thus, our figures above show that the private sector stance was well below the average and the public sector stance was well above. But which of these two ‘really’ drove demand depends on their relative sizes. In other words, we could find the same results as above with a very small public sector and a very large private sector or vice versa. Obviously the movement of actual demand would differ.

¹³ The foreign stance is E/m . Since m is defined as M/X , expressing the stance as a percentage of X reduces to E/M . If M is constrained by exchange rate policy to be equal to E , the foreign stance is constrained to be equal to 100%.

¹⁴ For this paper we have “exports” reflects all current sources of foreign exchange (i.e., exports of goods and services *plus* factor payments from abroad *plus* transfers from abroad.) Imports are similarly defined. This is done to maintain consistency between national savings and the rest of the national accounts. If we measured only domestic savings (omitting foreign primary income flows and transfers) the foreign stance is raised to about 110% of the average and the private stance is reduced accordingly. The trends are unaffected.

To take relative sizes into account we need to weight each stance. Some simple algebra shows that the relevant weight is the share of the sector's leakage in total leakages. Figure 6 shows the trends in these. Some observations can be made:

- The relative weight of the public sector is low throughout the period. Thus although the public sector's stance is expansionary, albeit declining, the weight of its contribution to demand reduces the impact.
- The falling relative weight of the private stance runs counter to the increasing trend in its size (seen in Figure 5). Thus the increasing size suggests that the private sector has become more important as a driver of demand, while its falling weight suggests it has become less important.
- The weight of the foreign stance has increased noticeably. We saw that its stance was relatively neutral, as a result of exchange rate management. However, the trend in the weight suggests that its role as a demand driver has risen.
- Although the trend in the weight of the public stance is not as pronounced, it does appear to be rising. Thus, while the public stance has fallen over the period, its weight has risen. The policy intention with regard to the public sector has been to reduce its role in the economy and to maintain fiscal discipline. The falling trend in the stance is consistent with this intention. However, the rising weight runs somewhat counter to it, suggesting that there has been a slight conflict between the two prongs of fiscal policy – the difference between expenditure and revenue and their size¹⁵.

What we have observed thus far is that the impact of different sectors on overall demand is mediated through 'their' injections and 'their' leakages. We can undertake one further decomposition that gives some insight into the relative importance of changes in these components.

Davies-Rattsø Decomposition

Davies and Rattsø (2001) follow standard decomposition lines by asking what the effect of the change in one component would have been *if none of the other components had changed* (in stead of: *if none of the other components had existed* as in the Berg-Taylor decomposition described above). The algebra is derived by breaking equation (6) into its component parts. Thus:

$$(10) \quad X = kJ = \frac{1}{s+t+m}(I+G+E)$$

We want to examine the sources of change in X from one period to the next. The changes could come from changes in components of the multiplier or from changes in components of the injections. For illustrative purposes, take the private sector. If the only change had been a change in the private sector savings rate, then the change in X would be all due to a multiplier effect. We could write

¹⁵ It should be noted that this inconsistency does not necessarily imply inconsistencies in the actions of government. Being the relative size of 'its' leakage, the weight of a sector's stance can change either because its leakage has been raised or because the leakages of other sectors have fallen. It thus captures the net outcome of all leakage changes, rather than sector specific changes. It is perhaps appropriate to re-emphasise here that the framework does not show causality.

$$(11) \quad \Delta X = \left(\frac{1}{s_1 + t_0 + m_0} - \frac{1}{s_0 + t_0 + m_0} \right) (I_0 + G_0 + E_0) = (k_1^s - k_0) J_0 = J_0 \Delta^s k$$

Similarly, if the only change had been a change in investment – a private sector injection

Table 4: Davies-Rattsø Decomposition

		1993-1997	1998-2002
1. INJECTION EFFECTS		4.4%	5.5%
2.	Private	1.4%	0.4%
3.	Public	0.7%	0.6%
4.	Foreign	2.3%	4.4%
5. LEAKAGE EFFECTS		-0.34%	-1.67%
6.	Private	1.7%	1.4%
7.	Public	-0.4%	-1.1%
8.	Foreign	-1.7%	-2.0%
9. INTERACTION		-0.1%	-0.2%
10. TOTAL		4.0%	3.5%
COMBINED EFFECTS			
11.	Private	3.2%	1.8%
12.	Public	0.3%	-0.5%
13.	Foreign	0.6%	2.4%

Source: own calculations, Note: figures show the average annual percentages of total output measured in constant 1995 prices

effect – we could write

$$(12) \quad \Delta X = \frac{1}{s_0 + t_0 + m_0} [I_1 - I_0] = k_0 \Delta I$$

We can follow this decomposition through all six of the components of changes in final demand. Thus:

$$(13) \quad \Delta X = \underbrace{k_0 \Delta I}_{\text{Injection}} + \underbrace{(k_1^s - k_0) Z_0}_{\text{Leakage Parameter}} + \underbrace{k_0 \Delta G}_{\text{Injection}} + \underbrace{(k_1^i - k_0) Z_0}_{\text{Leakage Parameter}} + \underbrace{k_0 \Delta E}_{\text{Injection}} + \underbrace{(k_1^m - k_0) Z_0}_{\text{Leakage Parameter}} + \underbrace{Z_0 \Delta Z X}_{\text{INTERACTION TERM}}$$

Table 4 provides the results for South Africa for our two periods, which are also illustrated in Figure 7. The decomposed elements sum to overall growth in aggregate demand, since the decomposition is additive. If we begin with the overall effects, aggregate demand (GNDI) rose by 4.0% per year in the first period and 3.5% in the second (Row 10). In the first period, the private sector was the main source of growth, accounting for 3.2 percentage points (Row 11). This contribution dropped by almost half in the second period. In this period, the foreign sector was the dominant source, contributing 2.4 percentage points. This is what might be expected as the economy was opened up. In both periods, the net effect of the public sector was small (Row 12).

Before looking at the decomposed effects, it is worth recalling what the gap analysis showed. There it was noted that the foreign gap was insignificant. How can this be reconciled with our finding now that it is significant? The gap analysis shows the movements in exports and imports. As has been stated repeatedly, a policy of ensuring that the CAB does not get

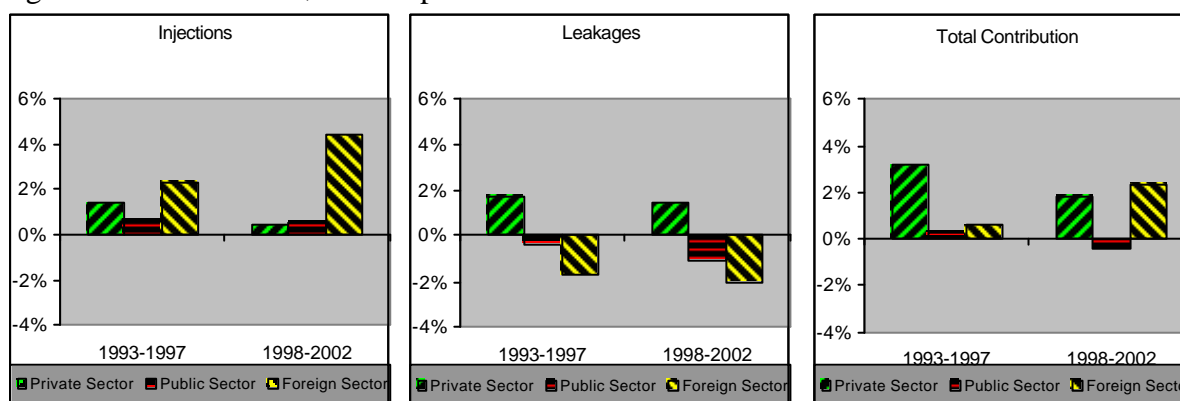
significantly out of balance ensures that this foreign gap always remains around zero. The demand decomposition, however, separates the effects of these two components. On their own, each has a significant impact; taken together they off-set each other.

Looking now at the decomposition into injection and leakage effects. We see that in the first period, the injection effect of the foreign sector dominated the others. If only exports had risen in this period, with all leakages and all other injections remaining constant, then aggregate demand would have risen by 2.3% per year on average (Row 4). This effect is consistent with the expected impact of post-apartheid reintegration. But it was counteracted by the simultaneous rising propensity to import; the effect of this would have been to *reduce* aggregate demand by 1.7%. Thus the impact of the foreign sector was somewhat muted.

By contrast, in this period the private sector contributed to aggregate demand both because investment was rising (contributing 1.4%) and because the propensity to save was falling (contributing 1.7%). Again these are consistent with post-apartheid expectations. The net effect of these was to make the private sector the biggest source of growth in this period.

In the liberalised period (1998-2002) the pattern changed somewhat. Although the two effects counteracted each other in the foreign sector (as previously), the net effect was bigger. The expansion of exports was much faster than the rise in the propensity to import. In the private sector, the falling propensity to save remained dominant, while the injection from investment became smaller

Figure 7: Davies - Rattsø Decomposition



Source: SARB Quarterly Bulletin & own calculations

Most interesting is the role of the public sector. While the injections through government expenditure were positive in both periods, they declined in the latter period. Also, the leakages, through higher tax rates, have become more prominent during the latter period. As a result total contribution has become negative in real terms.

These results seem to run counter to the standard ‘crowding-out’ approach to public-private sector interactions (which underlies the Washington Consensus). The policy thrust with regard to the public sector has been to reduce its size, in order to make space for greater private sector action. However, the figure suggests that the private sector has not expanded to fill the space vacated, since its total contribution to aggregate demand, although still positive, has declined.

The other leg of the liberalisation framework, opening up to the global economy, has been more successful in that the contribution made by the foreign sector has increased

considerably when comparing the two periods. As mentioned above, this is the net effect of increased injections, off set by higher leakages through imports.

The results of both decompositions can be summarised for each sector as follows:

- **The private sector's role as a demand driver has been constant over the period:**
 - ✓ The falling savings rate raised its 'own' multiplier, so that stagnant investment contributed more
 - ✓ But falling savings relative to other leakages also meant it contributed less to demand
- **The public sector's role as a demand driver has been reduced over the period:**
 - ✓ The rising 'tax' rate reduced its 'own' multiplier, but not enough to offset the effect of falling expenditure
 - ✓ But constant 'taxes' relative to other leakages meant that this sector contributed less to demand
- **The foreign sector's role has been increasing:**
 - ✓ The rising import rate reduced its own multiplier, but this was off-set by rising exports
 - ✓ But rising imports relative to other leakages increased the contribution of the sector to demand

These conclusions suggest many questions regarding the changing macroeconomy of South Africa. We raise some of these questions in Section 8: Possible Policy Implications.

The next section explores what the impact has been on some socio-economic dimensions of the South African economy. .

Section 6: Employment decomposition

So far, our story is that the public sector has reduced its impact on demand, the private sector has not expanded to compensate and that the foreign sector has become a more significant driver. Although we do not look at ‘causes’ behind these shifts, it does seem that the reduced role of the public sector emanates directly from the policy stance of fiscal conservatism. As argued earlier, while macroeconomic instability almost certainly harms the social economy, it does not follow that stability automatically promotes it. Macroeconomic stability might be a necessary condition for social progress, but it is not a sufficient one. It is thus relevant to argue whether the success the South African Government has had in maintaining macro stability has translated into social progress. This is a broad issue that is beyond the focus of this paper. But we find it useful to apply the decomposition framework to employment creation, a crucial factor in determining how the fruits of stability are spread. We employ a very simple framework in which the following symbols apply:

Table 5: Ingredients to a decomposition of employment growth

	Symbol	Derivation	Description
1	P		Population
2	E		Economically active or labour force
3	L		Total number of people employed, demand for labour
4	U	$E-L$	Total number of people unemployed
5	e	E/P	Participation rate
6	l	L/P	Employment as proportion of population
7	u	U/E	Unemployment rate, unemployed as proportion of economically active
8	q	$l-u = L/E = l/e$	Employment rate, employed as proportion of economically active

Our focus is employment as a proportion of population, L . From row 6 of the table we can write:

$$(14) \quad \frac{L}{P} = \frac{L}{E} \frac{E}{P}$$

Employment as a proportion of population is the product of the employment rate and the participation rate. Bringing P to the right hand side

$$(15) \quad L = \frac{L}{E} * \frac{E}{P} * P = q * e * P$$

In continuous growth terms we can then write

$$(16) \quad \hat{L} = \hat{q} + \hat{e} + \hat{P}$$

Growth in employment is the sum of growth in the employment rate, q , growth in the participation rate, e , and growth in population, P . With constant employment and participation rates, growth in the number of employed people will be the same as growth in population. Higher participation rates, given constant employment and population growth rates, must be consistent with a higher number of people employed. A higher employment rate, which is off set by a lower participation rate, while the population growth rate remains constant will leave the growth in the number of employed people unchanged.

To avoid any confusion with labour market specialists, we present the underlying data for population, economically active (labour force) and the number of employed and unemployed people in the next table. It can be seen that there is a difference between the population between the age of 15 and 64 (column 2) and the labour force (column 3). The ratio is shown in the next column which states that the labour absorption rate, defined here as the ratio of the labour force and the population between 15 and 64 is declining over time from about 60% in

the 1960s to about 55% in the year 2002. This means that for some or other reason only a fraction of the working age population is registered as being active in the labour market. The residual is assumed not to be looking for work. Reasons may include study or work in the household. In the last three columns we report on the demand for labour and the residual, i.e., unemployment. It can be seen that unemployment has been steadily rising.

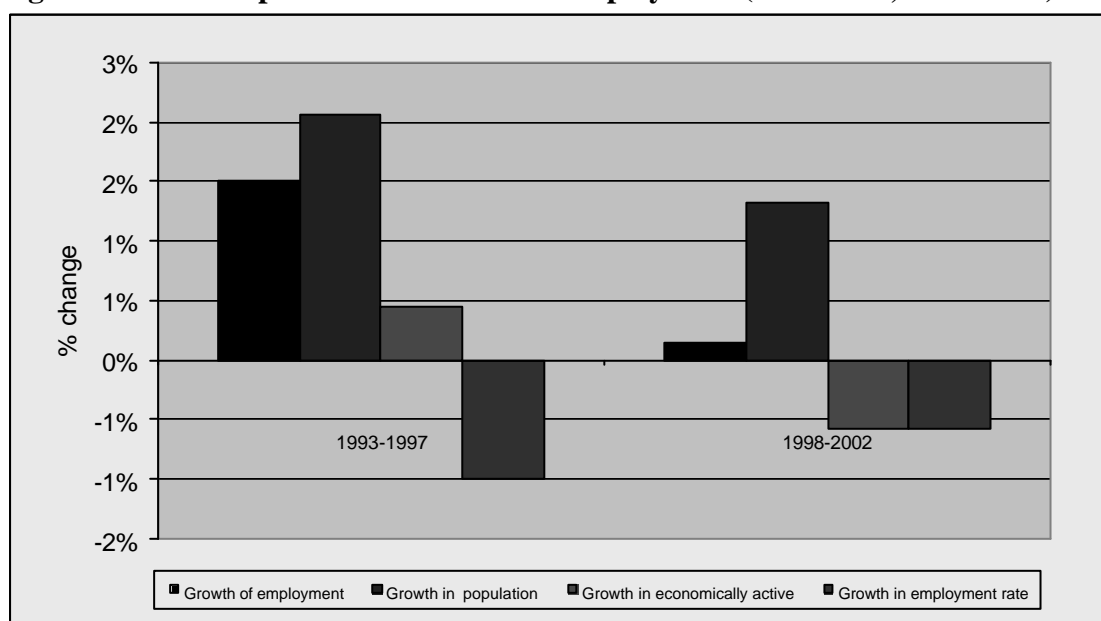
Table 6: Demographics, labour force and labour demand estimates for South Africa

	1	2	3	4	5	6	7
	Population	Population 15-64	Labour force	Labour absorption rate %	Formal and informal sector (total) employment	Formal and informal sector (total) unemployment	Formal and informal sector (total) unemployment rate %
1992	36,583,851	21,881,847	12,881,367	59	10,441,845	2,439,522	19
1993	37,528,308	22,658,532	13,265,304	59	10,502,635	2,762,669	21
1994	38,518,961	23,472,280	13,671,915	58	10,767,942	2,903,973	21
1995	39,544,578	24,312,555	14,096,765	58	10,945,982	3,150,783	22
1996	40,578,034	25,157,304	14,576,805	58	11,180,984	3,395,821	23
1997	41,606,644	25,998,984	15,036,231	58	11,321,195	3,715,036	25
1998	42,547,062	26,743,398	15,422,566	58	11,332,332	4,090,234	27
1999	43,397,825	27,394,103	15,736,852	57	11,381,726	4,355,126	28
2000	44,169,721	27,978,293	16,003,500	57	11,403,572	4,599,928	29
2001	44,852,070	28,488,960	15,717,500	55	11,288,983	4,428,517	28
2002	45,439,203	28,922,281	15,998,000	55	11,418,127	4,579,873	29

Source: Quantec (www.quantec.co.za), based on various population censuses, household surveys, labour market surveys, manpower surveys and DBSA Standardised Employment Series

The results of the additive decomposition, as derived in equation (16), are summarised in the next figure for the first and the last 5 year period¹⁶.

Figure 8: A Decomposition of Growth in Employment (1993-1997, 1998-2002)



Source: own calculations

In the first period employment grew by almost 2% per year on average. The decomposition suggests that the main reason for this was simply population growth: more people were employed mainly because there were more people. However, some of the growth (0.4

¹⁶ Although available at a finer sectoral detail of 10 industries and for every year of the period of observation

percentage points per year) was 'caused' by growth of the labour force relative to population – the participation rate increased. As against these two trends, the employment rate – the ratio of employed people to the labour force – declined. The decomposition thus highlights that the 'successful' creation of jobs in the first period masked a worrying trend – the job market was not absorbing people at the rate at which they were entering the work force. In the second period, employment actually declined. This immediately suggests that the liberalised economy was not good at creating jobs. We might thus suggest that the fiscal macroeconomic conservatism did not bear fruit at this level. However, the decomposition reveals that this masked a slowing down in the decline of the employment rate – which might be regarded as a hopeful sign that the policies are beginning to provide jobs.

One problem with the decomposition is that the labour force as measured in official statistics may be influenced by the employment rate. 'Discouraged' job-seekers may not report themselves in a way that includes them in the labour force. Nevertheless, although population growth has dropped considerably in the last 5 years, growth in the number of people employed has grinded to a virtual halt because the remaining positive population growth rate is off set by a decline in the rate of economically active and a decline in the employment rate, i.e., the number of people employed as a proportion of the number of economically active people. In other words, people are not only losing their jobs, they are also withdrawing from the labour market.

Section 7: Decomposition of Growth in Labour Productivity

According to an extensive cross country analysis of experiences of developing and transitional economies with liberalisation during the 1990s across a wide range, Berg & Taylor (2001) found that a common pattern is slow output growth in the traded goods sectors combined with positive productivity growth. Non-traded goods sectors on the other hand were characterised by higher output growth and relatively low productivity growth. This observation is counterintuitive to the generally held believe that traded goods sectors would benefit more from liberalisation than non-trade goods sectors. Several reasons have been advanced. Appreciation of the exchange rate (associated with capital inflows following financial liberalisation) causes demand to switch to imports and away from exports. In addition, demand for labour can also decline due to open unemployment, factor immobility, factor market imperfections and increasing returns to scale. In contrast to the Stolper-Samuelson theorem, in which the remuneration of the relatively abundant factor – typically labour in these countries - is supposed to increase. As a result of this decline in the demand for labour and modest growth in output, labour productivity is then expected to increase.

To see how this story fits the South African circumstances during the last 10 years, we employ a framework of decomposing the growth in labour productivity by sector. At the aggregate level labour productivity is defined as output per unit of labour.

$$(17) \quad r = \frac{X}{L}$$

In continuous growth format we can write (17) as

$$(18) \quad \hat{p} = \hat{X} - \hat{L}$$

in which any symbol with a hat is a continuous % growth rate, i.e., $\hat{X} = \ln(X_1) - \ln(X_0)$. Now we introduce sectors so that output and employment of sectors $1 \dots i$ sum to X and L respectively, i.e., $X = \sum X_i$ and $L = \sum L_i$ where the subscript indicates sector i . By substituting in and a bit of algebra (see Appendix C) we get:

$$(19) \quad \hat{r} = \sum \left(\frac{X_i}{X} \hat{X}_i - \frac{L_i}{L} \hat{L}_i \right)$$

Productivity growth, \hat{r} , can thus be decomposed additively into the difference between sector weighted output change and sector weighted employment change. Output growth has a positive impact on productivity growth and employment growth a negative one.

We use provisional employment data from the TIPS South African Standardised Industry Data Base (www.tips.org.za) and value added data (at constant 1995 prices) from the SARB Quarterly Bulletin (March 2003, www.resbank.co.za) for the period 1993-2002.

The full results of the decomposition are shown in the next table, including value added in the first tableau and employment in the second tableau. The (weighted) contributions of output to growth in labour productivity are shown in the next tableau followed by the (negative of the) contribution of employment to growth in labour productivity. A positive number in Tableau D is to be interpreted as a decline in the weighted growth in employment as less workers will now produce the same amount, everything else held constant. Since the decomposition methodology shown in (19) is additive, the sum of each element of Tableau D and its corresponding element of Tableau E will yield growth in sectoral labour productivity.

We focus on manufacturing as an exponent of the traded goods sector. It can be seen in the third column of Tableaus D and E respectively that relatively modest contributions of output have been combined with a decline in the contribution of employment to yield relatively high growth in labour productivity. Financial services, in column 8, show somewhat opposite trends, with relatively robust growth in output, increasing or very low declines in employment yielding relatively modest increases in labour productivity.

Table 7: A Decomposition of Labour Productivity (1993-2002) for 9 main sectors of the South African economy

Tableau A: Value Added (1995 Rmillion constant basic prices)											
	1	2	3	4	5	6	7	8	9	10	11
	Agr	Min	Manf	Electr	Constr	Trade	Transp	Finserv	Othserv	Othprod	Govtserv
1993	22,366	35,782	97,114	16,133	14,804	66,121	38,507	76,580	11,341	13,556	79,366
1994	24,126	35,946	99,706	17,069	15,233	67,780	40,281	79,378	12,420	13,687	80,157
1995	19,317	34,830	106,180	17,408	15,774	71,768	44,538	82,162	13,690	13,855	80,832
1996	23,950	34,542	107,648	19,287	16,092	74,415	47,271	87,737	14,210	14,066	82,393
1997	24,153	35,120	110,562	20,034	16,646	74,748	50,879	91,866	13,971	14,298	83,043
1998	22,519	34,840	108,418	20,358	17,084	73,905	54,273	96,737	14,108	14,626	82,728
1999	23,658	34,472	108,085	20,728	16,670	74,161	58,141	104,191	14,439	14,919	82,160
2000	25,453	33,690	113,596	20,873	17,115	77,492	62,211	109,220	15,121	15,205	81,458
2001	25,031	33,176	117,700	21,149	18,054	80,062	66,533	114,152	15,711	15,449	81,084
2002	26,022	32,982	122,352	21,474	18,428	82,071	70,590	118,425	16,071	15,683	81,736
Tableau B: Employment											
	Agr	Min	Manf	Electr	Constr	Trade	Transp	Finserv	Othserv	Othprod	Govtserv
1993	868,600	562,869	1,440,686	75,400	369,491	759,000	364,800	464,200	173,566	1,103,291	1,333,707
1994	860,700	607,183	1,427,045	71,300	362,524	733,856	339,900	469,300	176,301	1,098,883	1,521,821
1995	853,100	594,407	1,433,500	71,400	352,106	757,566	348,000	480,000	180,885	1,094,275	1,509,752
1996	845,600	566,428	1,456,883	73,200	323,747	764,282	343,900	491,800	183,045	1,097,967	1,575,486
1997	830,294	547,388	1,396,429	72,394	310,235	769,258	338,214	512,279	186,706	1,116,117	1,576,997
1998	814,254	459,755	1,350,784	75,944	279,549	804,663	287,471	517,111	187,639	1,125,564	1,556,347
1999	799,593	432,458	1,315,723	77,652	233,414	880,338	283,131	497,849	189,169	1,125,884	1,509,960
2000	783,235	416,270	1,296,166	72,643	222,420	873,118	273,162	485,054	191,309	1,124,391	1,455,550
2001	766,255	406,630	1,262,623	71,795	218,638	883,773	260,914	495,856	191,467	1,156,924	1,434,947
2002	734,323	410,536	1,263,697	70,682	211,104	885,971	266,341	526,423	201,212	1,155,251	1,439,370
Tableau C: Weighted Output Contribution to Labour Productivity											
	Agr	Min	Manf	Electr	Constr	Trade	Transp	Finserv	Othserv	Othprod	Govtserv
1993	0.8%	0.2%	0.0%	0.1%	-0.2%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%
1994	0.4%	0.0%	0.5%	0.2%	0.1%	0.3%	0.4%	0.6%	0.2%	0.1%	0.2%
1995	-1.1%	-0.2%	1.3%	0.1%	0.1%	0.8%	0.8%	0.6%	0.2%	0.0%	0.1%
1996	0.8%	-0.1%	0.3%	0.4%	0.1%	0.5%	0.5%	1.1%	0.1%	0.0%	0.3%
1997	0.0%	0.1%	0.6%	0.1%	0.1%	0.1%	0.7%	0.8%	0.1%	0.0%	0.1%
1998	-0.3%	-0.1%	-0.4%	0.1%	0.1%	-0.2%	0.6%	0.9%	0.0%	0.1%	-0.1%
1999	0.2%	-0.1%	-0.1%	0.1%	-0.1%	0.0%	0.7%	1.3%	0.1%	0.1%	-0.1%
2000	0.3%	-0.1%	1.0%	0.0%	0.1%	0.6%	0.7%	0.9%	0.1%	0.1%	-0.1%
2001	-0.1%	-0.1%	0.7%	0.0%	0.2%	0.4%	0.7%	0.8%	0.1%	0.0%	-0.1%
2002	0.2%	0.0%	0.8%	0.1%	0.1%	0.3%	0.7%	0.7%	0.1%	0.0%	0.1%
Tableau D: Weighted Employment Contribution to Labour Productivity											
	Agr	Min	Manf	Electr	Constr	Trade	Transp	Finserv	Othserv	Othprod	Govtserv
1993	0.1%	0.5%	0.5%	0.1%	0.0%	0.2%	0.5%	-0.1%	-0.1%	0.1%	0.0%
1994	0.1%	-0.6%	0.2%	0.1%	0.1%	0.3%	0.3%	-0.1%	0.0%	0.1%	-2.6%
1995	0.1%	0.2%	-0.1%	0.0%	0.1%	-0.3%	0.1%	-0.1%	-0.1%	0.1%	0.2%
1996	0.1%	0.4%	-0.3%	0.0%	0.4%	-0.1%	0.1%	-0.2%	0.0%	0.0%	-0.9%
1997	0.2%	0.2%	0.8%	0.0%	0.2%	-0.1%	0.1%	-0.3%	0.0%	-0.2%	0.0%
1998	0.2%	1.1%	0.6%	0.0%	0.4%	-0.5%	0.6%	-0.1%	0.0%	-0.1%	0.3%
1999	0.2%	0.4%	0.5%	0.0%	0.6%	-1.1%	0.1%	0.3%	0.0%	0.0%	0.6%
2000	0.2%	0.2%	0.3%	0.1%	0.1%	0.1%	0.1%	0.2%	0.0%	0.0%	0.7%
2001	0.2%	0.1%	0.5%	0.0%	0.1%	-0.1%	0.2%	-0.2%	0.0%	-0.5%	0.3%
2002	0.4%	-0.1%	0.0%	0.0%	0.1%	0.0%	-0.1%	-0.4%	-0.1%	0.0%	-0.1%
Tableau E: Change in Labour Productivity											
	Agr	Min	Manf	Electr	Constr	Trade	Transp	Finserv	Othserv	Othprod	Govtserv
1993	0.9%	0.7%	0.4%	0.2%	-0.3%	0.3%	0.7%	0.0%	-0.1%	0.1%	0.1%
1994	0.5%	-0.6%	0.7%	0.2%	0.2%	0.7%	0.7%	0.5%	0.2%	0.1%	-2.5%
1995	-1.0%	-0.1%	1.2%	0.1%	0.2%	0.5%	0.7%	0.4%	0.2%	0.1%	0.3%
1996	0.9%	0.3%	0.0%	0.3%	0.4%	0.4%	0.6%	0.9%	0.1%	0.0%	-0.6%
1997	0.2%	0.4%	1.3%	0.2%	0.3%	0.0%	0.7%	0.5%	-0.1%	-0.2%	0.1%
1998	-0.1%	1.0%	0.2%	0.0%	0.5%	-0.6%	1.2%	0.8%	0.0%	-0.1%	0.2%
1999	0.4%	0.3%	0.4%	0.0%	0.5%	-1.0%	0.8%	1.6%	0.0%	0.0%	0.5%
2000	0.5%	0.1%	1.2%	0.1%	0.2%	0.7%	0.8%	1.1%	0.1%	0.1%	0.6%
2001	0.2%	0.0%	1.2%	0.1%	0.2%	0.3%	0.9%	0.7%	0.1%	-0.4%	0.2%
2002	0.6%	-0.1%	0.8%	0.1%	0.2%	0.3%	0.6%	0.3%	-0.1%	0.1%	0.0%

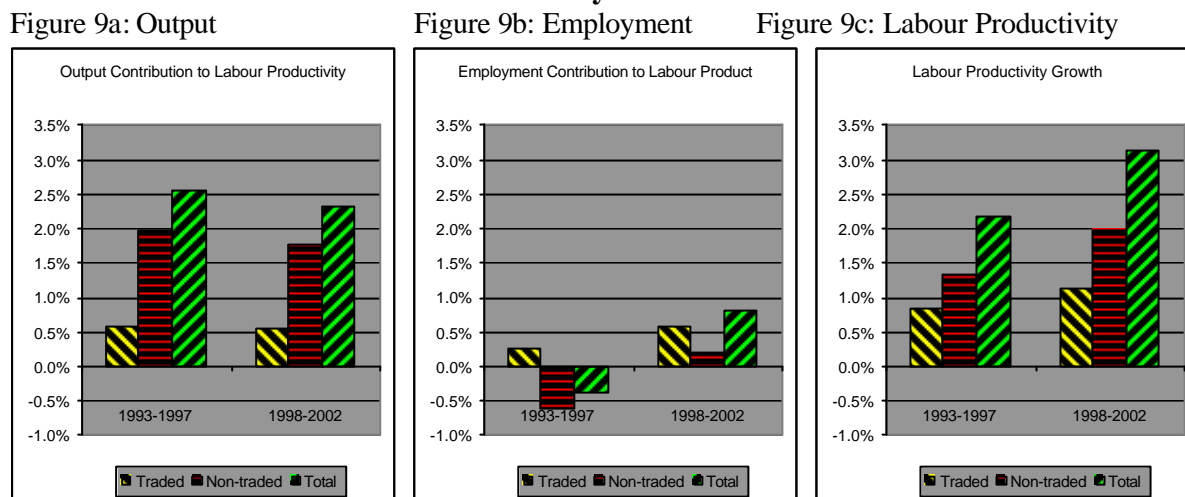
Source: TIPS Standardised Industry Data Base (employment), SARB Quarterly Bulletin (March 2003, value added) and own calculations

A more condensed summary of the above results is offered in the next set of figures. For reasons of convenience we define the traded sector as comprising agriculture, mining and manufacturing. All other sectors are aggregated in the non-traded sector. This classification is somewhat arbitrary as it can easily be argued that a range of tertiary sector's output is traded these days. However, an appropriate breakdown of service sectors into traded and non-traded components requires additional investigation. The chosen breakdown – which is a common

approximation to the correct breakdown - is the best that we can come up with at this stage. We now also focus on period average annual growth rates for the first and the second 5 years of the period of observation.

As before, the additive nature of the decomposition allows us to sum the contributions by output and employment shown in the first two parts so as to arrive at labour productivity growth rates in the third part of the figure.

Figure 9: A Decomposition of Labour Productivity (1993-2002) for traded and non-traded sectors of the South African economy



Source: TIPS Standardised Industry Data Base (employment), SARB Quarterly Bulletin (March 2003, value added) and own calculations

It is clear from the figures that while growth in the traded sectors has been much lower than in the non-traded sector, labour productivity growth has also been relatively modest. This pattern fits the international evidence mentioned above. However, the story in the non-traded goods sector as a whole (as opposed to just financial services) has been slightly different in that robust output growth combined with employment growth, at least in the first period, or roughly constant employment rates (in the second period), have resulted in labour productivity growth rates that are relatively higher than for the traded goods sectors. In short, the labour productivity story is dominated by the non-traded goods sectors, with the traded goods sectors playing a less dominant role.

It also appears that the output effect dominated the employment effect at the aggregate level throughout the period. Employment growth makes a negative contribution to labour productivity in the first period. In the second, declining employment subsequently augments labour productivity growth.

Section 8: Possible Policy Implications

Since the investigations undertaken in this paper are based on a non-behavioural methodology, they do not show cause and effect. One therefore needs to be cautious about policy-relevant conclusions drawn from them. At best, the analysis provides some guidance about the broad framework within which specific policies, based on more detailed research, must operate. More often, our policy implications in fact suggest areas in which further knowledge should be sought before detailed policies can be designed. We have taken this approach in part because other studies in the 10 year review provide more detailed investigations of specific policy areas. But we also feel that it is important for policy makers to consider the constraints imposed on specific policies by the requirements of macroeconomic consistency, and to consider the inter-relatedness of policies with different targets – even policies designed to affect completely different sectors.

The main conclusion we have drawn from the demand analysis is that the past ten years have seen the public sector's role as a demand driver decline and that the 'space' created by this has been taken up by the foreign rather than the private sector. This raises some questions about the impact of policies followed over the past decade, and poses questions as to the direction policy should take in the future. The analysis allows only the broad objectives of such policy to be sketched, rather than the detailed instruments. We believe that the evidence suggests that the consequences of reducing the role of the public sector have not been as positive as might have been hoped. However, the analysis does not provide evidence as to why this is the case. We have noted that the reduced public deficit was matched by a falling private savings rate rather than rising investment. As indicated on page 12, this entailed a sizable 'lost opportunity' for investment, growth and employment creation. A central question for future policy has to be how to reverse this trend. Our paper does not provide an answer, but we might raise some relevant considerations.

To understand what kinds of policies might be appropriate it is useful to think about whether the observed trends were primarily the result of macroeconomic policies – which might be reversible in the short-run – or of more deep-seated structural features of the South African political economy – which might be somewhat more difficult to address.

We have speculated at various points in the paper as to why the trends might be policy-driven. Trade liberalisation and deregulation might cause savings rates to fall, by removing constraints on spending, particularly for high-income groups that might be expected to be important savers. At the same time, the policy of high interest rates targeted at restraining inflation may also have restricted investment. Even if investment is not particularly sensitive to interest rates, it is possible that the tight credit regime they imply also restricts investment.

If these were in fact the drivers behind the trends, then policy makers should begin by reconsidering the high interest rate policy. Have the monetary authorities been overly cautious because of their concerns over inflation? If it is necessary to restrict demand, can the effects on investment be countered through the fiscal system? The message is relatively straight-forward: if the stagnant investment relative to GDP is the result of policy, reverse the policy. Compare the costs of the policy – in terms of foregone investment – with its benefits – in terms of lower inflation.

However, even if investment could be raised this easily, if none of the other components of the three gaps were changed (by policy), an adjustment process would be set off to re-balance the gaps. To control the process, policy should attempt to continue to reduce the public deficit (cutting expenditure or raising the effective tax rate) or to reverse the decline in the private

savings rate. Alternatively, increased foreign investment could allow the foreign gap move into deficit, accommodating the rising domestic investment. In our view, raising the savings rate would be the first prize. However, unlike investment, a policy induced decline in the savings rate is difficult to reverse. If, as we have speculated, it is due to liberalisation, it reflects a structural change adjusting to the new liberalised economy¹⁷. It would not seem sensible to try to reverse this by reversing the liberalisation! Rather policies should be targeted at trying to raise the rate within the new economy. Further research needs to be undertaken into the nature of savings in South Africa. Policies addressing this might include encouraging the development of new instruments for mobilising savings or using the tax system to tackle declining corporate savings rates.

However, it is not at all clear that the causes of the trends are short-run and reversible. The savings rate has been falling fairly consistently since 1985. As we have noted throughout the paper, there does not appear to be a break in the trends as the second phase of liberalisation came in. Casual evidence therefore suggests that the reasons for the trends are more structural. It is likely that both ‘uncertainty’ and ‘historical tensions’ between the new government and the old private sector play contributory roles. If this is the case, policies have to be much more broadly based. In essence, the first set of explanations says that the trends are due to management issues while the second are related to the whole social/political/economic environment. It would seem much more difficult to change the latter.

Detailed studies would have to be undertaken – or past studies reviewed – to come up with a clear list of what such structural inhibitions to increasing private sector investment and/or the private savings rate might be. It is likely that they all operate by raising uncertainty, which encourages both investors and savers to adopt a ‘wait and see’ policy. We do not know the effects that emigration has had on the savings rate, but given the economic status of the émigrés, it is likely to have reduced it. We would also want to explore whether ‘black empowerment investment’ – necessary to reverse historical inheritances – has led to a phase in which investible funds are used primarily for transferring rather than creating wealth.

However, one of the immediate policy implications is that it may be necessary to reconsider the applicability of the ‘crowding out’ model to macroeconomic policy in South Africa. Two considerations are important. First, the standard basis for crowding out comes from a comparative static framework in which speed of adjustment is not considered. It is essentially assumed that as one sector contracts the other simultaneously expands. If the response of the private sector is sluggish, then the pace of contraction of the public sector has to be reconsidered. If it is too rapid it may induce a deflationary contraction of the economy. Secondly, if there are structural obstacles that inhibit the expansion of the private sector into the space created by the reduced public sector, there may be a need for continued public sector intervention during a transitional period. Fiscal stability on its own is unlikely to stimulate investment.

This latter consideration suggests that policy makers should explore public-private partnerships to encourage private investment.

All of the foregoing discussion is focussed on trying to expand the role of the private sector. Our analysis also showed that the foreign sector has become the dominant demand driver in the economy. This raises the another set of policy considerations related to the increased

¹⁷ In other words, the current configuration of the liberalised economy is consistent with a low savings rate.

exposure of the economy to global economic trends. How should policies be designed to manage the risks this entails?

Liberalisation is intended to raise ‘microeconomic’ risk, in the sense that firms are subject to greater competitive pressures. The risk we are concerned with is macroeconomic. Any decline in export demand caused by a down turn in the world economy will translate into a greater reduction in aggregate demand than it would have previously. In 1994 a 10% decline in exports would, *ceteris paribus*, have caused a 3.8% decline in aggregate demand; in 2002 it would have caused a 5.1% decline.

All our ‘analysis’ can suggest in this regard is that policy makers have to be aware of the changed circumstances and to consider mechanisms by which any contractionary impulses imported from the global economy might be counteracted by domestic demand management. However, the area of country risk management is one that merits serious investigation.

Our employment decompositions have shown that ‘the liberalised economy was not good at creating jobs’. Since employment is one of the main channels through which the fruits of globalisation and growth should be spread, this raises many questions for the policy maker.

- Why has growth not been employment generating?
 - ✓ Are there policies followed at present that inhibit employment expansion?
 - ✓ Are there policies that could be introduced that would enhance employment growth?
 - ✓ What has been the role of technical change in the lack of employment growth?
- Does lack of employment growth create a need for more social interventions by government to make economic growth more inclusive?
- Does the lack of employment growth pose a threat to the sustainability of current policies with their focus on liberalisation and macroeconomic stability?

Our final decompositions show that non-traded sectors have dominated traded sectors in terms of productivity growth, since higher output growth is matched with slower employment growth. This is a double-edged sword for policy makers. Global competitive considerations require productivity growth, but this reduces the elasticity of employment with respect to output and can inhibit employment growth. The only way to overcome the potential dilemma is to stimulate faster output growth, so that productivity growth can take place with employment growth.

Finally, the question of how to develop faster productivity growth in the traded sector remains important from a competitiveness perspective. Productivity increases in the non-traded goods sector indirectly enhances competitiveness in traded goods, in that it can reduce the costs of inputs. But it is probably important to consider policies that might stimulate productivity growth in traded goods directly.

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Appendix A: Data Sources

Symbol	Description	Source
X	Aggregate Supply	Gross National Disposable Income at Market Prices (RB6018J) + Imports of Goods & Services (RB6014J)
Yp	Private Incomes	Final Consumption Expenditure by Households (RB6007J) - Residual Item (RB60011J) + Private Savings [=Gross Capital Formation (RB6180) - Government Savings (RB6202J) + Balance on Current Account (RB6260)]
T	Net Taxes	Government Disposable Income (RB6693J), which is Government Current Income (RB6254J) - Interest on Public Debt (RB6255J) - Subsidies (RB6005J) - Current Transfers to Households (RB6257J) - Transfers to the Rest of the World (RB6258J)
Cp	Private Consumption	Final Consumption Expenditure by Households (RB6007J) - Residual Item (RB60011J)
Ip	Private Investment	Gross Capital Formation by Public Corporations (RB6182J) + Gross Capital Formation by Private Business Enterprises (RB6183J)
G	Government Spending	Final Consumption Expenditure by General Government (RB6008J) + Gross Capital Formation by General Government (RB6181J)
E	Exports	Exports of Goods and Services (RB6013J)
M	Imports	Imports of Goods & Services (RB6014J)

Appendix B: A Comment on the Decomposition Methodology

Economists more familiar with macroeconomic methods to policy analysis might raise questions about the relationship between the accounting decomposition and econometric approaches. This is controversial. The issue is not whether the accounting approach is wrong or right – it is correct in the sense that it is internally consistent. It is rather a matter of whether it shows us anything. This is not the place for a methodological debate. We use the method because

- a) it is ‘theory neutral’: it does not rely on any specific theory about what drives the macro economy. Whatever theory one adopts must explain the changes we describe. In this sense, the approach might be regarded as ‘pre-theoretic’;
- b) the ‘what-if’ scenario approach is relatively easy for none economists to understand.

For those who do want to think about it more, it may be interesting to reflect that the macroeconomic approach essentially specifies that there are ‘true’ values of the leakage parameters that are related to the observed values as

$$(B1) \quad \hat{a}_t = a_t + e_t$$

where \hat{a}_t is the actual value, a_t is the ‘true’ value and e_t is an ‘error’ term

Econometricians estimate the ‘true’ value using methods of varying sophistication, typically some form of regression analysis. All of the approaches assume that the error term is random and has a mean of zero over time. This is logical, because any systematic deviation from the true value should be included in the true value. These are the values that would be used to estimate the multiplier in traditional analysis.

In the decomposition approach we use the actual value. Thus, econometricians could argue that what it picks up are the variations due to the random error terms. However, while the error may be ‘random’ in a statistical sense, in any one year a substantial part of the ‘error’ may have a causal explanation. In this sense, it would be better to call it a ‘deviation’ rather than an error. We could express as

$$\text{eqn B1} \quad \hat{a}_t = a_t + ?_t + e_t$$

$?_t + e_t$ shows the full deviation from the structural value, broken into $?_t$, an explainable deviation, and e_t , an inexplicable deviation. Over time $?_t + e_t$ will equal zero, but in the short run it is useful to know that the parameter has changed for some or other reason.

Appendix C: Derivation of the Decomposition of Growth in Labour Productivity

Write labour productivity as output per unit of labour in the following way

$$\text{eqn C 1} \quad r = \frac{X}{L}$$

In continuous growth format we can write eqn C 1 as

$$\text{eqn C 2} \quad \hat{r} = \hat{X} - \hat{L}$$

in which any symbol with a hat is a % change off the base of period 0, e.g.,

$$\text{eqn C 3} \quad \hat{X} = \frac{X^1 - X^0}{X^0}$$

where the superscripts indicate period 0 and 1 respectively. Note that in terms of the actual calculations we use the continuous change format, rather than the discrete change format. The latter is, however, maintained here for display purposes. Introducing the two periods and adding and subtracting unit values on the right hand side yields:

$$\text{eqn C 4} \quad \hat{r} = (\hat{X} + 1) - (\hat{L} + 1) = \left(\frac{X^1 - X^0}{X^0} + 1 \right) - \left(\frac{L^1 - L^0}{L^0} + 1 \right) = \frac{X^1}{X^0} - \frac{L^1}{L^0}$$

Now we introduce sectors so that output and employment of sectors $1 \dots i$ sum to X and L respectively, i.e., $X = \sum X_i$ and $L = \sum L_i$ where the subscript indicates sector i . After substitution at the correct location we get:

$$\text{eqn C 5} \quad \hat{r} = \frac{X^1}{X^0} - \frac{L^1}{L^0} = \frac{\sum X_i^1}{X^0} - \frac{\sum L_i^1}{L^0}$$

Again, we subtract and add unit values on the right hand side and simplify

$$\begin{aligned} \text{eqn C 6} \quad \hat{r} &= \left(\frac{\sum X_i^1}{X^0} - 1 \right) - \left(\frac{\sum L_i^1}{L^0} - 1 \right) = \left(\frac{\sum X_i^1}{X^0} - \frac{\sum X_i^0}{X^0} \right) - \left(\frac{\sum L_i^1}{L^0} - \frac{\sum L_i^0}{L^0} \right) \\ &= \frac{\sum (X_i^1 - X_i^0)}{X^0} - \frac{\sum (L_i^1 - L_i^0)}{L^0} = \sum \frac{(X_i^1 - X_i^0)}{X^0} - \sum \frac{(L_i^1 - L_i^0)}{L^0} \end{aligned}$$

Since $\sum X_i^0 / X^0 = 1$ and X^0 is a constant in the summation (and likewise for L), we can finalise the derivation as follows

$$\begin{aligned} \text{eqn C 7} \quad \hat{r} &= \sum \frac{X_i^0}{X^0} \sum \frac{(X_i^1 - X_i^0)}{X^0} - \sum \frac{L_i^0}{L^0} \sum \frac{(L_i^1 - L_i^0)}{L^0} \\ &= \sum \left[\frac{X_i^0}{X^0} \frac{(X_i^1 - X_i^0)}{X^0} - \frac{L_i^0}{L^0} \frac{(L_i^1 - L_i^0)}{L^0} \right] \\ &= \sum \left(\frac{X_i}{X} \hat{X}_i - \frac{L_i}{L} \hat{L}_i \right) \end{aligned}$$

In the end, productivity growth, \hat{r} , can be decomposed additively into the difference between sector weighted output change and sector weighted employment change. Output growth has a positive impact on productivity growth but employment growth has a negative impact.