Chapter 5

Sustainable growth in South Africa

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This chapter reviews the literature on the drivers of growth in South Africa. While growth has picked up since the mid-1990s, there are a number of impediments to faster, sustainable growth. These include a continued impact of uncertainty on physical capital investment, uncertainty surrounding property rights, incomplete recovery of infrastructure investment, market distortions that thwart competition in product markets and an excessively rigid labour code. In addition, skills creation, credit and R&D activity remain too low, while credit rationing in financial markets stills appears to be a feature of the economy. The fiscal space for more aggressive growth-promoting public expenditure has been reduced by the expansion of welfare payments. A number of policy implications follow from the analysis, including a need for macroeconomic stability and for credible, transparent policies to address economic and social infrastructure bottlenecks, to maintain fiscal discipline in the face of pressures for further expansion in welfare payments, and to reform product and labour market regulations. Finally, action is also needed to improve the quality of education, create incentives for R&D activity, and improve the efficiency of the financial sector.

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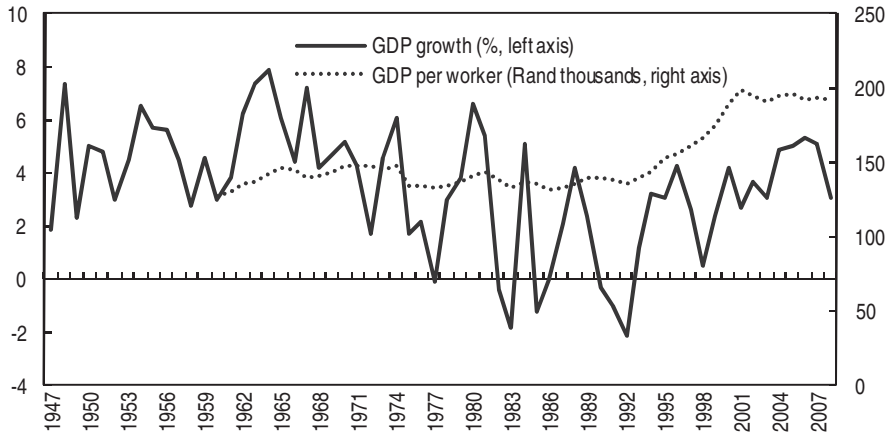
Introduction

This chapter focuses on the prospects for sustainable growth in South Africa. The country's economic performance has improved considerably since the turn of the century (Figure 5.1). After a long period of deceleration over the years 1970-95, growth has not only returned to positive territory, but it has also trended upwards, suggesting that the improvement in performance has been sustained. The only countervailing evidence is the decline in growth due to the financial crisis of 2008-09. GDP per capita has been rising, reversing a long downward trend since approximately 1980.

Figure 5.1. South Africa's growth performance, 1947-2008



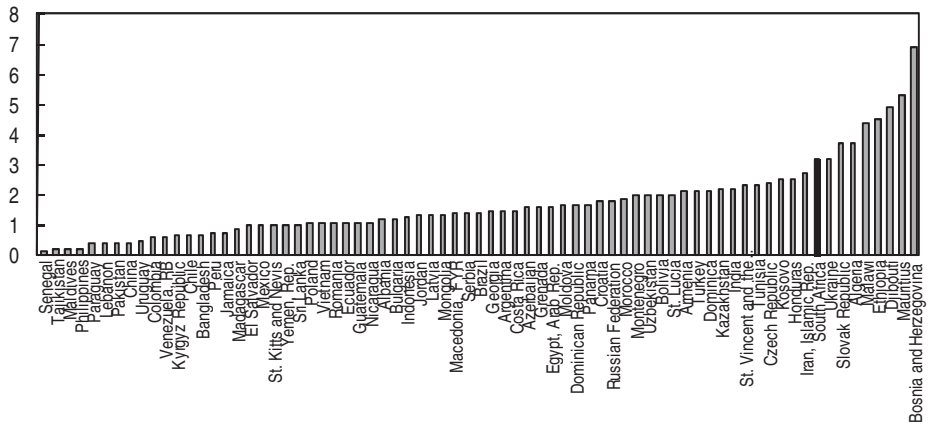
Source: South African Reserve Bank.

There are reasons for optimism, although South Africa's growth performance has not been unambiguously strong in the post-1995 period. Output per worker, which remained essentially constant during 1960-90, rose in response to substantial labour shedding in the formal sector in the 1990s and has trended down since 2000 as employment has begun to rise again. Job creation appears to have been associated with productivity losses, rather than gains, raising questions about the sustainability of employment growth as the economy resumes strong growth.

In addition, South Africa's high unemployment and income inequality have led to the development of an extensive welfare system, which imposes a significant burden on the budget. Expenditure on social safety nets accounts for 3-4% of GDP (Figure 5.2), which is high in comparison with other middle-income and developing nations.

Figure 5.2. Social assistance expenditures: International comparisons

In per cent of GDP



Source: World Bank (2009), Weigand and Grosh (2008).

The coverage of the chapter is guided by the potential growth drivers identified by growth theory. Thus, it covers capital accumulation, and to some extent its interaction with savings behaviour. Attention is paid to international capital flows, in terms of both portfolio and foreign direct investment. A particularly important consideration is the role of the public sector in capital accumulation in the form of infrastructure investment, as well as the presence of market distortions that thwart competition in product and labour markets and hence productivity growth.

Since modern growth theory emphasizes the importance of technological progress and human capital accumulation, the chapter also reviews the role of innovation and human capital investment. The ability of the education system to meet the demands of an economy that appears to rely increasingly on TFP growth, rather than factor accumulation, is examined. Finally, the chapter breaks new ground by exploring the role of the service sector, which accounts for more than half of GDP in South Africa, paying particular attention to financial services.

Private capital accumulation and its determinants

Standard growth theory places emphasis on factor accumulation. A range of growth accounting studies have confirmed that capital accumulation has been of declining significance in South Africa since the 1970s.[1] This has constrained growth, since South Africa is a middle-income country, where factor accumulation should remain a significant component of growth in real per capita GDP. Yet, the ratio of gross fixed capital formation to GDP, which fell from a peak of more than 30% in the early 1970s to a low of approximately 15% in the 1990s and early 2000s, has since shown signs of recovery, to close to 25% in the first quarter of 2009. Nevertheless, the rise in investment as a proportion of GDP has been financed predominantly by the public sector and is largely attributable to substantial infrastructure programmes in electricity, gas and water, which were launched in the 2000s. While rising from 5 to 26% of sectoral gross value added in electricity, gas and water over the 2009 period, the increase has not yet returned investment to the levels of the late 1970s and early 1980s, when investment in electricity, gas and water accounted for about 40% of sectoral gross value added.

By contrast, investment in manufacturing, financial services, insurance, real estate and business services has remained well below 10% of gross value added. There has been some increase in investment in mining and quarrying, and transport, storage and communications (TSC). In the case of mining, investment has risen from approximately 5% to 11.5% of gross value added, while for the TSC sector the ratio has risen from 5% to 9%. Given the likely effect of the commodity price boom of the 1990s, it remains to be seen whether this increase in investment activity will be maintained. Finally, general government investment is recovering. From a high of approximately 17% of gross value added in the early 1970s, public investment declined to less than 4% in the first half of the 1990s and then rose to close to 7% of the gross value added in the 2000s.

Gross savings have not increased in line with investment. The investment-savings gap rose to approximately 8% of GDP in 2009. Households have dissaved since 2006 - and the household propensity to save out of disposable income was 6 percentage points lower during 2000-05 than the average of upper-middle income countries, and 26.6% and 12.5% lower than the Chinese and Indian levels, respectively. Even allowing for the fact that rising social security payments have reduced the need for precautionary savings (in contrast to the situation in China), South Africa's low savings rate raises specific policy challenges, including a reliance on capital inflows.

What might account for these investment trends? One of the core insights of recent literature is that uncertainty generates a reward for postponing irreversible investment and, as a result, greater uncertainty is likely to lower investment. On the other hand, since uncertainty may be partly due to increased volatility of profits, such that the higher threshold level of profitability needed to trigger investment is satisfied more frequently under uncertainty, investment may actually be encouraged by economic uncertainty. Crucial to any empirical modelling of investment that allows for the irreversibility of investment is that it must allow for an impact of uncertainty on investment.

The empirical literature on investment in South Africa offers a number of consistent insights.[2] *Firstly*, proxies for the rate of return on capital and the user cost of capital are consistently statistically significant in investment equations and conform to theoretical priors. *Secondly*, uncertainty has a statistically significant and strong negative effect on investment at the aggregate level[3] and in manufacturing.[4] Measures of both systemic and sector-specific uncertainty appears to affect investment, although systemic uncertainty has a stronger impact. The implication of these findings is that the standard policy handles - the marginal rates of return and the cost of capital - are significant determinants of investment. Importantly, however, since uncertainty also raises the threshold rate of return below which investment is unlikely to occur, any policy intervention designed to stimulate investment may be constrained in sectors operating below this threshold. Thus, the policy goal should be to create an environment that is stable, predictable without sudden and arbitrary intervention. In effect, lower uncertainty not only stimulates investment directly, but it also renders other policy levers more effective in achieving this objective.

In considering the impact of net rates of return on investment and the associated growth constraints, Eyraud (2009) considers evidence from South Africa and compares it with data from a panel of countries that experienced strong economic recoveries at the turn of the century. The study confirms that South Africa's investment performance is below that of comparator countries, despite the recovery of the 2000s. The savings constraint appears to be among the main culprits, since South Africa's savings-to-GDP ratio was on average 14 percentage points lower than in comparator countries over the 1996-2006 period, with the result that the cost of capital as measured by the real interest rate has remained high in South Africa (despite a decline in the South African real interest rate over 1996-2006).

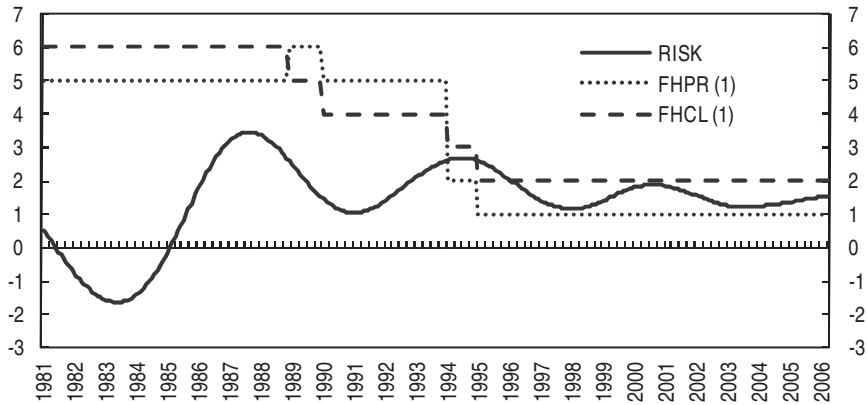
The study also shows that the savings constraint has become increasingly binding over time. The strong decline in household savings has been complemented by a decline in corporate savings. The tax burden on the

corporate sector has risen sharply, despite a declining marginal tax rate, due to improvements in the efficiency of tax collection and a broadening of the tax base. As a result, the ratio of taxes to primary income rose by 25 points between 1996 and 2007. Increased dividend payments, and hence lower retained earnings, also contributed to lower the rate of corporate savings. Note however that the falling corporate saving rate was mitigated by the rising public savings rate.

Given the main findings of the empirical literature on the determinants of investment, it follows that relatively high returns do not necessarily translate themselves into stronger investment growth because they reflect a risk premium, which remains high by international standards. The measure of systemic uncertainty that is employed in a number of empirical studies is related to political instability. Fedderke and Luiz (2008a) examine the institutional determinants of investment in greater detail and find that - in addition to the rate of return on capital, the user cost of capital and systemic political uncertainty - property rights are important drivers of capital accumulation.[5] The study confirms not only a strong direct impact of property rights on investment, but also that property rights affect political instability. Significantly, the study shows that crime has an additional strong impact on uncertainty. Fedderke and Luiz (2008b) extend these findings and demonstrate that social and human capital are closely related to the political and economic environment, and that human capital accumulation and crime are important determinants of the long-term evolution of the institutional measures that directly impact on investment. Fielding (1999) also finds a positive effect for a property rights measure.

In addition, while systemic risk has improved considerably over the past 15 years, it has not been eliminated. According to the methodology used by Fedderke and Pillay (2010), Figure 5.3 shows a measure of the time-varying risk implied under the hypothesis that the expectations hypothesis holds in the determination of the yield curve. The risk premium associated with long-term bonds declined through the 1990s. However, comparison of the risk measure implied by the yield curve with the Freedom House's Political Rights and Civil Liberties index suggests that the decline in the measurable risk implied by the yield curve has not been as dramatic as it might have been given the concomitant strengthening of political institutions.

Figure 5.3. Risk, political rights and civil liberties, 1981-2006



1. FHPR denotes the Freedom House's Political Rights index and FHCL denotes the Freedom House's Civil Liberties index. The Freedom House indices are on an inverted scale: lower scores denote better rights and freedoms.

Source: Fedderke and Pillay (2010, Figure 11).

To sum up, uncertainty is an important deterrent to investment in South Africa and the institutional environment contributes to the establishment of a favourable climate for investment in a number of dimensions. Property rights, political stability and crime affect investment decisions, as do macroeconomic stability and the predictability of investment returns.

Foreign capital inflows

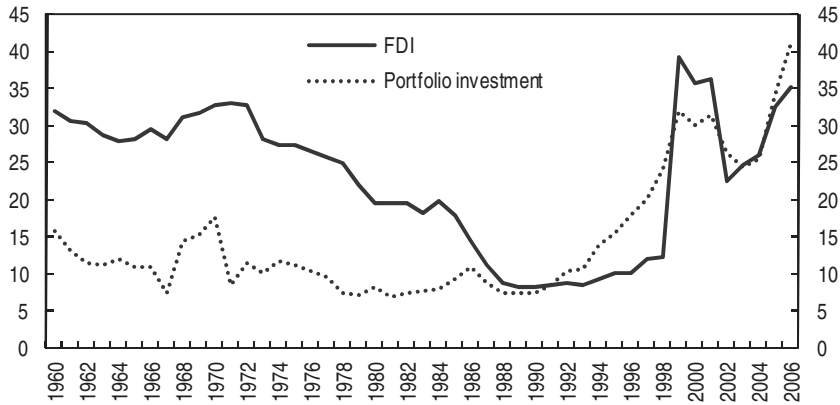
Foreign direct investment and portfolio flows are crucial for South Africa's development, given the country's reliance on foreign capital as a result of low rates of domestic savings.

Foreign direct investment (FDI)

FDI has recovered strongly since 1994 (Figure 5.4). FDI declined gradually during 1956-94 and began to rise again after 1994-98, with a very sharp one-off increase in 1999 due to the re-listing of four large companies from the Johannesburg stock exchange to the London stock exchange.

Figure 5.4. FDI and portfolio investment, 1960-2006

Stocks, in per cent of GDP



Source: Fedderke and Gwenhamo (2009).

Fedderke and Romm (2004) examine the determinants of FDI and its impact on growth in South Africa. They find that there is complementarity between foreign and domestic capital in the long run, implying the presence of positive technological spillovers from foreign to domestic capital. While domestic investment is crowded out by FDI, this impact is restricted to the short run. In addition, FDI has tended to be capital-intensive, suggesting that it has been horizontal rather than vertical. Market size is estimated to encourage FDI (a 1% increase in GDP generates an increase in FDI of approximately 13.6%). By contrast, increases in corporate taxation (elasticity -2.65) and wage costs (elasticity -3.62) hamper FDI. Openness to trade also has a strong impact on FDI: the implied mean elasticities are -4.23 and 6.12 for imports and exports, respectively. Finally, political institutions also matter: both property rights and political stability make South Africa a more attractive destination for foreign investment. The impact of property rights is strong (elasticity 3.81), while political instability appears to have had a far weaker impact on FDI than on portfolio investment or domestic private investment. Given the long-term and potentially irreversible nature of FDI, the greater importance of property rights than political instability is not implausible.

The findings suggest that policy action should focus on reducing political risk, ensuring property rights, promoting wage moderation (ideally by lowering real wages), lowering corporate tax rates and ensuring full

integration of South Africa into the world economy. The empirical findings confirm for FDI what was found to be true for domestic investment. Institutions matter in the sense of rendering returns on investment more certain. However, for both foreign and domestic investment, the impact of the institutional environment is derived from a range of different dimensions, such as political instability, property rights, and market structure and size, which may interact with one another. Finally, additional research could address the question of how FDI might evolve from the current predominance of horizontal to increased vertical FDI.

Portfolio flows

Fedderke and Liu (2002) examine the determinants of portfolio flows in South Africa. Capital flows are expected to respond positively to higher domestic returns on assets and negatively to risk and higher returns on foreign assets. The estimation results conform to theoretical priors: higher rates of return on assets and lower risk encourage capital inflows. Capital flows are also sensitive to political risk, just as FDI and domestic investment. Changes in political rights and political instability impact on capital flows: greater political instability and political liberalisation have tended to encourage capital outflows.

Capital flows and capital flight have become more favourable to South Africa since the early 1990s. However, lowering political uncertainties and the need to offer healthy rates of return to potential investors should continue to be a central concern of policy makers. The policy inference reflects that for portfolio investment, as much as for foreign direct investment, and for domestic capital formation, institutional determinants of uncertainty have been found to matter, and matter strongly for South Africa.

The composition of capital inflows

South Africa's political liberalisation in 1994 led to its reintegration into the world economy. Since 1994 South Africa has attracted relatively more portfolio investment than FDI. On average, FDI inflows amounted to 1.5% of GDP per year between 1994 and 2002, against about 3.5% of GDP for portfolio investment.[6] The current composition of foreign investment contrasts sharply with the pre-1994 period. Ahmed *et al.* (2005) point out that the predominance of portfolio investment inflows deviates from the experience of other middle-income countries, where FDI tends to outweigh portfolio investment.

It has been argued that the composition of capital inflows determines whether or not the capital is beneficial or detrimental to the host country (Dooley and Warner, 1995). In this regard, FDI is often considered superior to portfolio flows and foreign loans, as it potentially facilitates the transfer of new technology and helps improve workers' skills and market access by the recipient country (Borensztein *et al*., 1998). Furthermore, FDI is generally considered to be more stable and resilient than portfolio investment during periods of financial stress.

There is, however, an alternative strand of literature, which argues that the relative share of FDI in foreign capital inflows tends to be lower in countries that are safer and have better institutions and policies. This argument is based on the notion that FDI is less subject to expropriation than other forms of capital inflows because of its intangible nature (technology and brand names) (Albuquerque, 2003). Countries that have tighter financial constraints and weak institutions will therefore be primarily reliant on FDI, which is seen as harder to expropriate. Interpreting a high relative share of FDI in foreign capital inflows as a sign of good economic health is therefore unwarranted. By contrast, Faria and Mauro (2004) argue that the inalienability of FDI applies mostly to high technology or human capital-intensive sectors, where the benefits of expropriating foreign capital by the host country are very low. In most developing countries, FDI is concentrated in capital-intensive and/or the commodities sectors, where the host country can easily expropriate foreign capital. Under such conditions, the Albuquerque prediction breaks down, and a combination of institutional weaknesses and high domestic risk alters the composition of foreign capital towards non-FDI inflows.

In testing these alternative hypotheses, Fedderke and Gwenhamo (2009) take into account the quality of property rights in South Africa and Zimbabwe to control for the possibility of neighbourhood effects. The authors show that South African political instability has a negative and statistically significant effect on the relative share of FDI in total foreign capital stocks with an elasticity of -0.94. Symmetrically, an improvement of property rights leads to an increase in the relative share of FDI in foreign capital stocks, although this effect is only marginally statistically significant.

Since the findings suggest that domestic risk and institutional inefficiency reduce the relative share of FDI in the stock of foreign capital, they contradict the FDI inalienability hypothesis proposed by Albuquerque (2003) in favour of the Faria and Mauro (2004) alternative. The likely explanation is that South Africa specialises in the production of natural resources and/or capital-intensive goods, where the host country can expropriate foreign investment easily. When property rights and the institutional environment weaken under such circumstances, foreign

investors tend to shift their investment away from FDI to other forms of foreign capital, such as portfolio capital, thus reducing the relative share of FDI in the stock of foreign capital. As regards neighbourhood effects, property rights in Zimbabwe have a negative and statistically significant effect on South Africa's share of FDI in capital flows in the long run. Thus, as property rights worsen (improve) in Zimbabwe, the share of FDI in total foreign capital stocks increases (decreases) in South Africa. The implication is that Zimbabwe and South Africa compete for FDI in similar sectors. By contrast, poor property rights in Zimbabwe appear to raise the perceived risk for portfolio investment in South Africa, too.

Infrastructure

The 1970-2000 period saw a strong decline in investment in economic infrastructure (Perkins *et al*., 2005). Investment fell from 8.1% of GDP to 2.4% of GDP, below the international benchmark of 3-6% that is identified by Kessides (1993). This resulted in a 72% fall in investment in per capita terms.

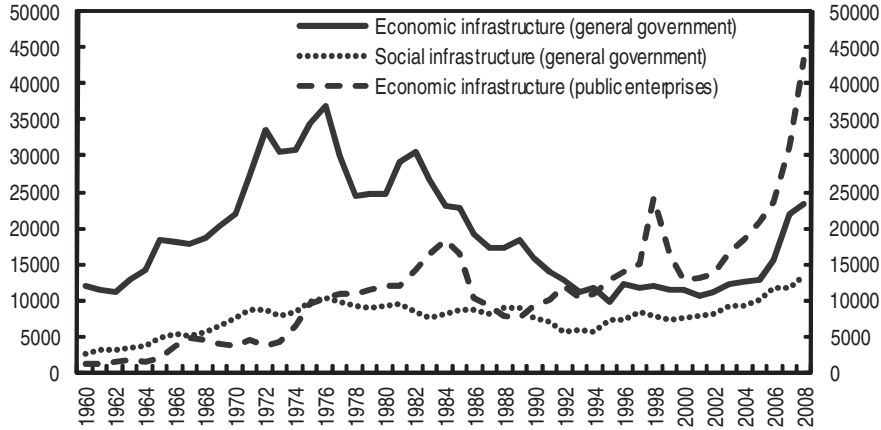
Yet, there is considerable empirical evidence pointing to a strong productivity impact of economic infrastructure in South Africa. Fedderke *et al*. (2006) find that a 1% increase in infrastructure investment increases the fixed capital stock by 1.4%, while a 1% increase in the fixed capital stock increases GDP by 0.06%. Electricity generation affects GDP with an elasticity of 0.2. Similarly, Fedderke and Bogetić (2009) examine the impact of infrastructure on productivity, as measured by both labour and total factor productivity, for a panel of 24 South African manufacturing sectors between 1975 and 2000. They find that aggregate infrastructure investment affects labour productivity and total factor productivity positively, and economically meaningfully. In terms of specific measures of infrastructure, electricity, railway, air transport and in particular roads impact labour productivity at statistically significant levels. The results for total factor productivity are broadly consistent.

Given this background, the evidence from the 2000s regarding economic infrastructure investment is reassuring (Figure 5.5). The decline in government spending on infrastructure development from the mid-1970s to the mid-1990s has been reversed. However, infrastructure expenditure remained essentially constant in real terms from 1995 through 2005. Since the early 2000s investment in infrastructure by public corporations has increased strongly and contributed to the rise in aggregate investment. By contrast, investment in social infrastructure has risen by much less.

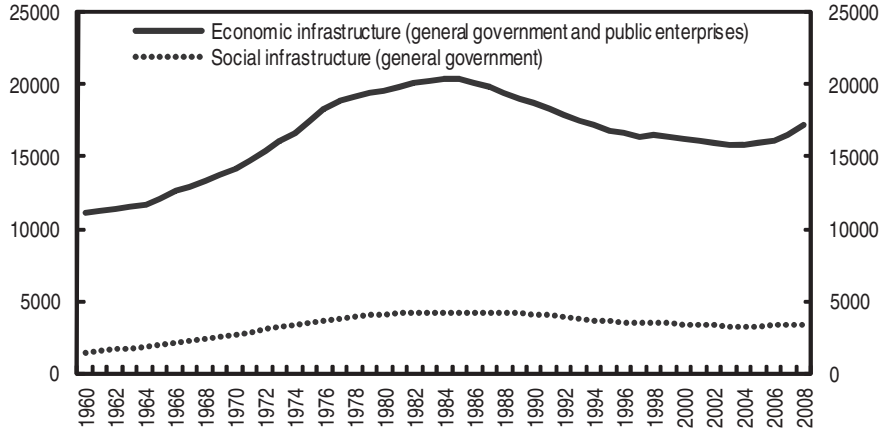
Figure 5.5. Infrastructure indicators, 1960-2008

In millions of Rand, 2000 prices

Gross fixed capital formation



Public capital stock per capita



Source: South African Reserve Bank and Statistics South Africa for mid-year population estimates.

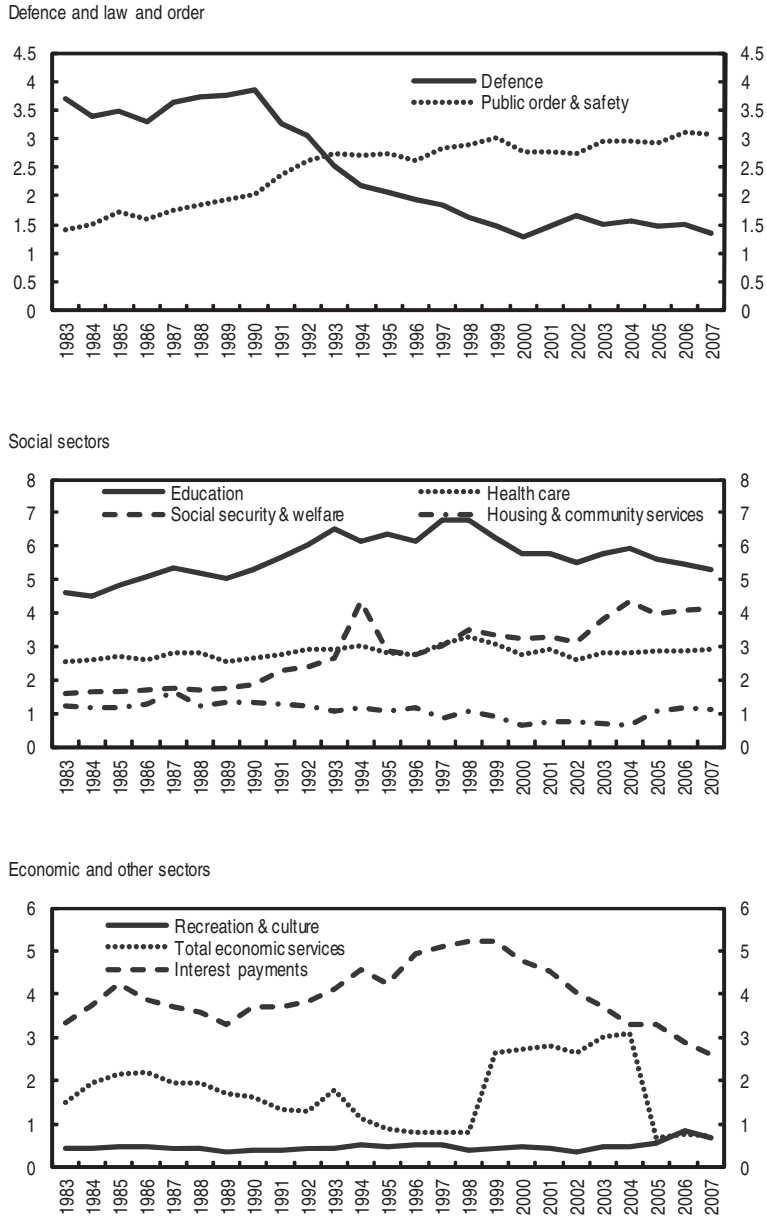
However, once corrected for population size, the recovery in infrastructure investment has only become evident since 2006-07. The increase in investment since 2000 has simply halted the decline in the capital

stock per capita from 1980, and remains below the peak of the 1980s. A similar story emerges when considering the percentage of GDP spent on either economic or total (economic and social) infrastructure. The decline from 1975 was halted in 2006, with a blip in 1998 due to aircraft purchases by the national carrier. The current level of 6% of GDP remains well below the 10% attained in the mid-1970s.

While rising government consumption may have contributed to falling public capital investment during 1975-90, this has not been the case since the 1990s because the level of government consumption has been constant at approximately 20% of GDP. Nor has there been an upward trend in aggregate government expenditure as a proportion of GDP. Instead, it is the composition of government expenditure that has changed (Figure 5.6). A dramatic increase in social security payments has placed South Africa amongst the countries with the highest levels of expenditure on social welfare in the world. Spending on public order and safety has also doubled as a proportion of GDP, reflecting a persistent, and as yet unresolved, problem of crime. Expenditure on education, while fluctuating between 6-7% of GDP over the early 1990s, has since declined significantly in relative terms. Outlays on health care and housing have been stable in proportion to GDP. Finally, defence expenditure has decreased dramatically, while fiscal prudence since 1994 has resulted in falling debt service outlays.

Figure 5.6. Government expenditure by function, 1983-2007

In per cent of GDP



Source: South African Reserve Bank.

It is notable that from a growth perspective, while there has been some recovery in the proportion of GDP spent on infrastructure, the increasing burden of social welfare has limited the increased infrastructure spending, and come at the expense of a falling proportion of GDP spent on education, together with little improvement in spending on health care. While a commitment to social development may be both understandable and laudable in the context of South Africa's history, it is worth asking whether it has taken place at the expense of long-term growth. A growing body of literature suggests that income inequality, and possibly even the incidence of poverty, has shown little signs of improvement and may even have worsened since the mid-1990s. If this is true, given the context of sharply rising social welfare payments, this outcome suggests either a remarkable policy failure, significant data problems or considerable inefficiency in government spending. The question of whether public expenditure has become overextended in favour of social welfare at the expense of growth-enhancing infrastructure or human-capital accumulation comes to the fore.

Market distortions and constraints

One possible explanation for the relatively poor growth performance of the South African economy is related to market structure. This question is dealt with by focusing on the structure of the country's product markets and its implications for productivity growth, labour market rigidities, and the size and performance of the services sector, particularly financial services.

Competitive pressure in product markets

There appears to be non-negligible pricing power in South Africa's manufacturing sector.[7] Empirical evidence suggests that mark-ups are high in comparative terms, at a level approximately twice as high as that estimated for the United States. Recent empirical studies have pointed to a positive effect from product market competition on productivity growth, particularly at low levels of competition. Aghion *et al*. (2008) examine the South African manufacturing sector by using two industry-level and one firm-level data sets and find that a 10% increase in mean margins is associated with a 1.6 to 2.4 percentage point decrease in productivity growth at the industry and firm levels respectively, while for a second industry-level dataset, a 0.1 unit increase in the Lerner index is associated with a 1 percentage point decrease in productivity growth. Aghion *et al*. (2009) further extend these findings to an open economy model, in which the impact of trade liberalisation on innovation and growth is explicitly

modelled and controlled for in estimation. Not only is the negative impact of pricing power on productivity growth robust to controlling for trade liberalisation, but it is also quantitatively larger in both statistical and economic terms.

The negative impact of pricing power is not restricted to output growth. Fedderke and Szalontai (2009) report both negative investment and employment impacts from industry concentration (on the presumption that there is a link between industry concentration and pricing power), while Fedderke and Naumann (2009) confirm the negative investment impact using more recent manufacturing data.

Constraints in the labour market

The often negative trends in employment by sector that were evident in the 1980s and 1990s, began to reverse in the 2000s (Figure 5.7). This is particularly true for finance but is present even in mining, which accounts for the largest employment losses in previous decades. By contrast, the recovery in manufacturing employment remains sluggish at best.

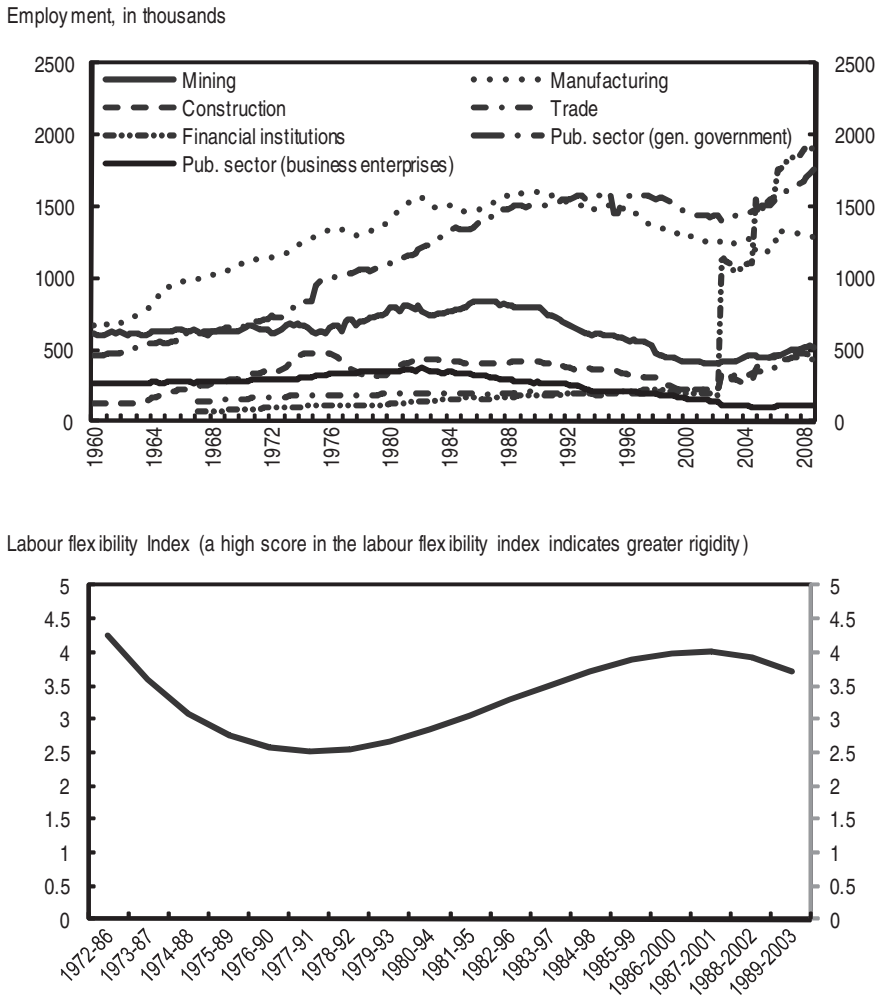
The cost of labour is crucial in determining employment prospects. Banerjee *et al*. (2008) note that real wages would need to fall to clear markets and that this could be achieved through nominal wage restraint. Yet, real wages did not show any substantial changes over the 1995-2005 period, possibly because wage cuts were politically untenable and constrained by the unions.[8] In addition, Fedderke and Hill (2007) derive a measure of flexibility of the labour market in manufacturing from a model that relates labour market institutions with rigidities in product markets. Regulations introduced during the 1990s resulted in greater rigidity in the labour market.

Of course, other factors also matter. Banerjee *et al*. (2008) mention, for example, the ineffectiveness of job search; poor job creation in the informal sector, which they attribute to the likely impact of crime and high start-up costs; and possible impacts of the social security system and education on workers' reservation wages. However, none of these factors contradicts the importance of wage flexibility and restraint.

By contrast, trade liberalisation, at least in manufacturing, has been associated with Stolper-Samuelson effects, resulting in higher demand for labour than capital. Fedderke, Shin and Vaze (2010) arrive at this conclusion on the basis of three separate empirical methodologies. The positive impact of trade liberalisation on labour markets is further confirmed by Fiandeiro and Rankin (2008). Of course, this is not to deny that globalisation may also be associated with labour-saving technological change. Fedderke, Shin and Vaze (2010) separate these out from the demand effects of globalisation.

However, trade liberalisation does not appear by itself to have harmed employment in South African manufacturing.

Figure 5.7. Labour market indicators



Source: Fedderke and Hill (2006).

While the introduction of a wage subsidy[9] in order to address high unemployment may not be ideal, at least it has the merit of acknowledging that labour costs constrain the effective functioning of the labour market.

The affordability of this intervention in fiscal terms is a separate, if important, policy question.

Policy implications

What are the policy implications that arise from these findings for an emerging economy with a history of poor industrial and labour market policies, combined with a high degree of natural resource dependence? For most emerging-market economies, the domestic economy is simply too small to allow for domestic demand-based growth. Some reliance on export markets is therefore unavoidable to sustain long-term growth.

Where industrial structures are shaped by policy intervention that favours import substitution and the development of large national champions, the domestic market may be dominated by firms that are sufficiently large to foster competition, but insufficiently large to reap the benefits of economies of scale, which would allow them to compete in world markets. The problem is complicated when labour market distortions constrain access to jobs and maintain high wages for insiders. The obvious policy response in such an environment is to liberalise the economy in order to foster competition in product and labour markets.

So how far has South Africa come in reforming its economy in order to raise competitive pressure? It is not clear it has constrained the pricing power of South African producers (see the discussion of Edwards, 2005).

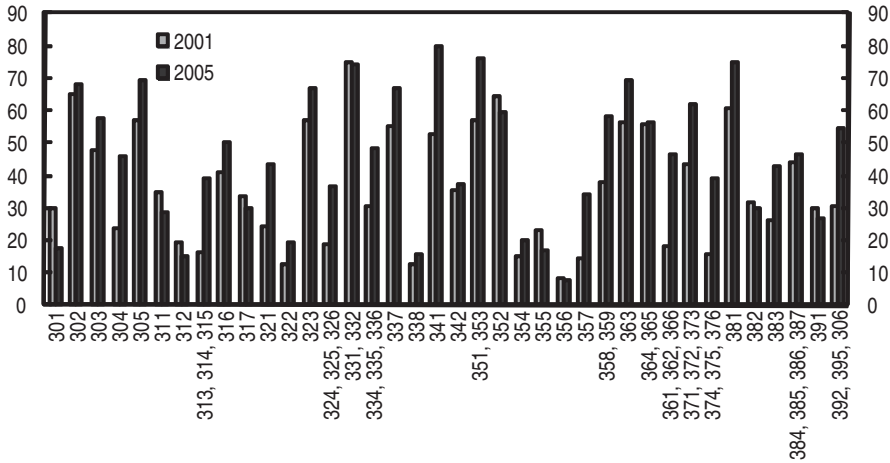
Provided that there is a link between concentration and pricing power, which appears to be supported by the empirical evidence reported in Fedderke, Kularatne and Mariotti (2007), there are arguably positive developments for South African manufacturing industry over the course of the 2000s. Fedderke and Naumann (2009), using data for three-digit manufacturing sectors, show that concentration declined across virtually all industries from 1996-2001, after a long period of steady increase during 1972-96. Unfortunately, however, this finding must be qualified, since the data collection methodology changed dramatically from 1996-2001, thereby undermining comparability. For this reason the CR4 and CR10 firm concentration ratios are reported for output in three-digit manufacturing sectors during 2001-05 (Figure 5.8). The striking finding from the data is that the 2001-05 period saw a further strengthening of market concentration, at least as measured by these concentration ratios, as there was an increase in the proportion of output due to the 4 largest firms in 28 sectors, against a decrease in only 10 sectors. For the proportion reflecting the largest 10 firms, the result was even more marked, with an increased share in 31 sectors, against a decrease in only 7. Given the result reported in Fedderke, Kularatne and Mariotti (2007) of a strong association

between pricing power and industry concentration, the rising industry concentration during the 2000s is undesirable from the point of view of fostering the competitive pressures that Aghion *et al*. (2008) and Aghion *et al*. (2009) identify as important contributors to productivity growth.

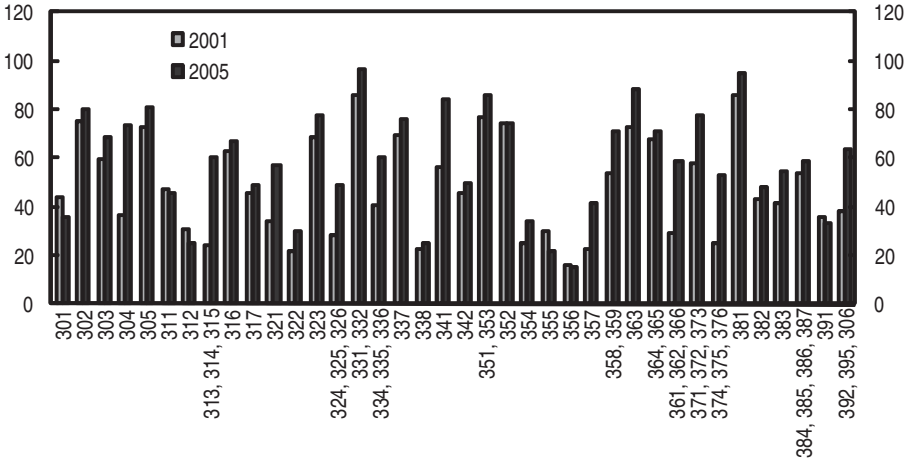
Figure 5.8. Output concentration: CR4 and CR10 ratios, 2001 and 2005

In per cent of output

Relative contribution of four largest firms (CR4), 3-digit manufacturing sectors



Relative contribution of ten largest firms (CR10), 3-digit manufacturing sectors: 2001 vs 2005



Source: Statistics South Africa (Manufacturing Industry: Large Sample Survey, 2001 and 2005).

Growth, innovation and human capital

Modern growth theory has placed innovation and human capital at the heart of productivity growth. Certainly there is empirical evidence to suggest that human capital is important for growth in South Africa. Fedderke (2006b) estimates a Schumpeterian growth model, which incorporates both the impact of research and development (R&D) and human capital on output growth, and shows that R&D expenditure has a more than proportional impact on real output growth in South African manufacturing. Indicators of the quality, rather than the absolute quantity, of human capital are most closely associated with productivity growth, as measured by total factor productivity (TFP). In addition, openness to trade is found to have a positive impact on productivity growth, and industry concentration has a negative impact. These results are consistent with the findings in the previous sub-section.

In the case of South Africa, while the proportion of GDP spent on R&D is comparable to that of other middle-income countries, but the number of R&D scientists per million of population is lower (Table 5.1). South Africa fares unfavourably in terms of R&D performance even with respect to China, which has a considerably lower lever of per capita GDP. More recent data indicate further improvements, but even so R&D spending has not yet reached 1% of GDP and is certainly far from the 2-4% of GDP level reported by countries with a strong reliance on innovation in growth.

Table 5.1. R&D indicators: International comparisons

	Researchers in R&D (Per million people)		R&D expenditure (% of GDP)	
	1990-99	2000-05	1990-99	2000-05
Brazil	-	344	0.82	0.99
China	432	625	0.70	1.21
Russian Federation	3532	3399	0.99	1.18
India	138	-	0.69	0.85
South Africa	665	307	-	0.76
Low income countries	-	-	0.66	0.73
Middle income countries	716	703	0.60	0.77
High income countries	3449	3741	2.33	2.46
South Africa			2005/6	2006/7
R&D expenditure (million Rand)			14149.2	16520.6
R&D expenditure (% of GDP)			0.92	0.95
Civil R&D expenditure (% of GDP)			0.86	0.89
R&D personnel			28798	30986
Researchers			17303	18572
Researchers (headcount)			39264	39591
R&D personnel (per 1000 workers)			2.4	2.5
Researchers (per 1000 workers)			1.5	1.5

Source: World Bank (World Development Indicators) and HSRC (2009:4).

Given the increasing reliance of South African growth on gains in TFP, the continued weakness of R&D expenditure remains a sign of fragility. Equally worrying is the fact that the education system, and the schooling system in particular, continues to deliver poor outcomes in mathematics and science, which Fedderke (2006b) reports as being the key drivers of long-run productivity growth. The dramatic downward trend in both the proportion of graduates in mathematics and the share of university degrees in the natural, engineering and mathematical sciences is a source of concern. Improvements in performance have been limited, despite an already high level of expenditure on education (Simkins, 2005a and 2005b; Van Den Berg, 2009). As a result, skills are likely to remain in short supply for some time, especially since further increases in expenditure on education are likely to be constrained.

Starting to address the significance of the service sector

The structure of South African output is unusual, in that the contribution of services is considerably higher than in comparator emerging-market economies and arguably more akin to the structure of developed economies. More research is therefore needed on this sector's performance and contribution to growth. After a long period of fairly substantial external deficits in services during 1970-2000, exports have been growing faster than

imports since 2000. This trend raises important questions as to whether or not South Africa has comparative advantages in services, rather than in manufacturing, especially given the labour costs that are faced by South African producers.

This section focuses on the financial sector for three reasons. *Firstly*, the financial sector is particularly large in South Africa by international comparison. *Secondly*, the process of international reintegration of the South African economy may well have had the most significant impact on the financial sector. *Thirdly*, the interaction between financial deepening and long-run growth is not only pronounced, but also appears to assume a somewhat unusual structure in South Africa. Kularatne (2002) finds that both credit and stock market liquidity have a positive effect on per capita GDP. Crucially, however, the impact is indirect, via the investment channel, with equity market performance stimulating investment in physical capital and credit fuelling the development of the equity market. Thus, credit appears to foster liquidity in the stock market, rather than increasing investment in physical capital stock directly. One possible explanation for the absence of a direct association between financial intermediation and the real sector may be that firms find it difficult to raise working capital from financial intermediaries for investment projects, indicating the presence of credit rationing within the South African economy.

International financial integration

Under the approach taken by Obstfeld (1994), agents share their idiosyncratic risks by trading in the world capital market, with the consequence that consumption will become correlated with world consumption because trade in assets will cancel out country-specific shocks (Leiderman and Razin, 1994). The empirical prediction concerning the correlation of international consumption depends on the ability of agents to engage freely in the trade of assets, on the completeness of markets and also on the verifiability and insurability of events on which an asset returns depend. When this occurs, differences in consumption growth rates across countries are uncorrelated with any random variable on which contingent contracts can be written. All idiosyncratic or country-specific consumption risks that relate to a verifiable random event will be traded away through the appropriate insurance markets. Under these conditions, differences in consumption growth rates would be a function of non-verifiable events only.

The most immediate test of this hypothesis is to estimate the correlation between changes in consumption in any given country, and changes in world consumption or in consumption in a country with a financial market of relevance (such as the United States), such that:

$$\Delta \log(C_{it}) = \alpha + \beta \Delta \log(C_{Wt}) + \varepsilon_{it} \quad (1)$$

where C_{it} and C_{Wt} denote domestic and world consumption in period *t* and country *i*, respectively.

Perfect financial integration implies that $\beta = 1$. There is evidence of partial diversification of domestic consumption risk (partial financial integration) if $0 < \beta < 1$.

A weaker result, albeit still consistent with increasing financial integration, would be of $\partial\beta / \partial t > 0$ over sub-periods. While not providing evidence of perfect financial integration (which requires $\beta = 1$), this finding would still suggest increased financial integration, while allowing for domestic consumption risks to be in part uninsurable, precluding perfect risk diversification.

One problem with the interpretation of β is that, if changes in the growth rate of world output are correlated with changes in the growth rate of domestic output, and changes in the growth rate of domestic output are also correlated with changes in the growth rate of domestic consumption, β might reflect the impact of output growth convergence rather than of rising consumption risk diversification. This would be plausible if output growth rates were converging at a faster rate than consumption growth rates. To allow for the possibility that variations in the growth rate of consumption are brought about by external shocks to output, rather than variations in the growth rate of world consumption, the following equation is estimated:

$$\Delta \log(C_{it}) = \alpha + \beta \Delta \log(C_{Wt}) + \gamma \Delta \log(GDP_{Wt}) + \varepsilon_{it} \quad (2)$$

Given the impact of multi-collinearity on the statistical significance of β and γ, the relevant question here is whether $\Delta \log(C_{Wt})$ or $\Delta \log GDP_{Wt}$ has the strongest impact, and hence whether $\beta > \gamma$ or $\beta < \gamma$, corresponding to increasing diversification of consumption risk due to financial integration and the impact of shocks to world output affecting domestic output and, in turn, domestic consumption.

Equation (2) can be estimated using the log difference of per capita consumption. National income and population data come from the Penn World Table (Version 6.1), as compiled by Heston, Summers and Aten (2002). All variables are measured at 1996 international prices and in real per capita terms. The measurement of GDP, from which all other components are derived, is a fixed base index where the reference year

is 1996. Per capita consumption is weighted by population using $C_{Wt} = \sum_{i=1}^{N} n_{it} C_{it}$, where *n* denotes country *i*'s share in "world" population at time *t*. The aggregates of consumption used in the study are for "world" (World), augmented "OECD" (OECD) as defined by the original Obstfeld study and "emerging market" (EM) groupings.

Changes in the correlation coefficients between changes in the log of real consumption in a range of emerging-market economies and changes in the log of real consumption for the various country aggregates over the 1960-79 and 1980-99 periods support the hypothesis of rising financial integration for emerging-market economies as a whole, and for South Africa in particular. For South Africa, changes in the correlation coefficient are generally positive over the two sample periods, indicating that there is increased financial integration with respect to the world and to emerging-market economies, and also with respect to the following countries: Brazil, Chile, Hong Kong China, Indonesia, Malaysia, Mexico, Philippines, Singapore and Thailand. Evidence of decreased financial integration emerges with respect to the OECD area and Argentina, Chinese Taipei and South Korea. [10] However, it is also important to note that the correlation coefficients between consumption changes are not equal to unity, suggesting that while financial integration has increased, it remains incomplete.

Although there is little evidence to suggest that $\beta = 1$ in equation (1) over the full sample, evidence of perfect financial integration would increase where the β coefficient is close to zero in the first sub-period and close to unity in the second sub-period (Table 5.2, Panel A). This appears to be the case in three countries: Chile, Singapore and Thailand. By contrast, for Chinese Taipei $\beta = 1$ cannot be rejected in either sub-period. Most estimates nevertheless have large standard errors and therefore low precision.

Table 5.2. Domestic consumption correlations, 1960-79 and 1980-99

Panel A: Domestic consumption growth regressed on world consumption growth

	Argentina	Brazil	Chile	Hong Kong, China	Indonesia	South Korea	Mexico	Malaysia	Philippines	Singapore	Thailand	Chinese Taipei	South Africa
1960-79													
Δlog(Cw)	0.12	0.72	0.80	1.68*	-2.61*	1.18*	0.25	-0.29	-0.40	3.41	0.20	0.87*	0.10
	(0.80)	(0.88)	(2.07)	(0.91)	(1.00)	(0.54)	(0.34)	(0.45)	(0.51)	(3.46)	(0.54)	(0.29)	(0.31)
Adj. R^2	-0.05	-0.02	-0.05	0.12	0.24	0.17	-0.03	-0.03	-0.02	0.00	-0.05	0.30	-0.05
1980-99													
Δlog(Cw)	3.03	2.79	4.13*	0.40	-3.80	0.66	0.59	2.23	0.24	1.75*	3.10*	1.43*	0.58
	(1.90)	(1.70)	(2.21)	(1.36)	(2.50)	(1.52)	(1.50)	(2.43)	(1.09)	(0.98)	(1.68)	(0.70)	(0.89)
Adj. R^2	0.07	0.08	0.12	-0.05	0.06	-0.04	-0.05	-0.01	-0.05	0.12	0.11	0.15	-0.03

Panel B: Domestic consumption growth regressed on world consumption growth and world GDP growth

	Argentina	Brazil	Chile	Hong Kong, China	Indonesia	South Korea	Mexico	Malaysia	Philippines	Singapore	Thailand	Chinese Taipei	South Africa
1960-79													
Δlog(Cw)	-0.32	-2.81	-9.31*	-0.74	-0.13	0.51	-0.30	-1.53	0.57	19.20	-1.13	0.61	-1.32*
	(2.30)	(2.35)	(5.35)	(2.87)	(3.15)	(1.53)	(0.98)	(1.25)	(1.46)	(10.31)	(1.51)	(0.83)	(0.81)
Δlog(GDPW)	0.39	3.14*	8.99*	1.72	-1.76	0.59	0.49	1.10	-0.87	-11.21	1.18	0.23	1.27*
	(1.91)	(1.95)	(4.44)	(1.93)	(2.12)	(1.27)	(0.81)	(1.03)	(1.21)	(6.93)	(1.25)	(0.69)	(0.68)
Adj. R^2	-0.11	0.06	0.11	0.11	0.23	0.13	-0.06	-0.02	-0.05	0.09	-0.05	0.26	0.08
1980-99													
Δlog(Cw)	2.17	4.33*	1.05	2.45	-4.57	0.28	1.04	6.10	0.80	1.15	3.88	0.28	1.19
	(2.91)	(2.57)	(3.25)	(1.98)	(3.82)	(2.33)	(2.30)	(3.51)	(1.67)	(1.54)	(2.57)	(1.00)	(1.35)
Δlog(GDPW)	0.85	-1.51	3.02	-2.01	0.76	0.37	-0.43	-3.78	-0.56	0.58	-0.77	1.13*	-0.60
	(2.12)	(1.87)	(2.37)	(1.44)	(2.79)	(1.69)	(1.68)	(2.55)	(1.21)	(1.14)	(1.87)	(0.73)	(0.98)
Adj. R^2	0.03	0.06	0.15	0.00	0.01	-0.10	-0.10	0.05	-0.10	0.08	0.07	0.22	-0.07

Source: Author's estimations.

There are several countries for which the coefficient on world consumption growth is significantly different from zero in the first sub-period, but not in the second, including Hong Kong China, Indonesia and South Korea. This finding is difficult to explain, as it is hard to argue that these countries have experienced a substantial decrease in their international integration. The result for Hong Kong China could be due to increasing financial integration with China at the expense of the rest of the world.

The remaining countries show no particular trend in their coefficient estimates over time. However, Argentina, Brazil, Malaysia, Mexico, Philippines and South Africa show an increase in the partial correlation coefficient estimated under equation (1), with only Indonesia reporting a decrease. In the case of South Africa, where the sample period is split into four decades, the estimated coefficient is now significantly different from zero in the 1990s, thereby confirming the increased integration of South Africa into world financial markets.

Finally, we also report results from the estimation of equation (2), which accounts for the possible impact of growth convergence on the partial correlation estimated by equation (1) (Table 5.2, Panel B). As world consumption growth, $\Delta \log(C_{Wt})$, and world output growth, $\Delta \log(GDP_{Wt})$, are strongly collinear, the estimates of β and γ are not expected to be significant.

Abstracting from statistical significance, the results show that in the first sub-period, growth convergence dominates financial integration, with $\beta < \gamma$, in Argentina, Brazil, Chile, Hong Kong China, South Korea, Malaysia, Mexico, South Africa and Thailand. Only for Chinese Taipei, Indonesia, Philippines and Singapore does $\beta > \gamma$, suggesting the preponderance of financial integration during 1960-79. By contrast, over the second sub-period, the reverse is true for the majority of countries, with $\beta > \gamma$, suggesting the primacy of financial integration over growth convergence in Argentina, Brazil, Hong Kong China, Malaysia, Mexico, Philippines, Singapore, South Africa and Thailand. Growth convergence only dominates in Chile, Chinese Taipei, Indonesia and South Korea.

The findings reported above are consistent with the evidence presented for the developed world by Obstfeld (1994). Financial integration appears to have improved in emerging-market economies. Furthermore, controlling for the potential impact of growth convergence strengthens the evidence in favour of increased financial integration in the case of South Africa, particularly during the 1990s. Nevertheless, integration remains incomplete.

The size of the financial sector

The financial sector is relatively large in South Africa, even in comparison with developed countries. For example, financial sector output never rose above 10% of GDP in the United States over the 1850-2007 period; yet in South Africa it accounted for about 18% of GDP during 2005-09, approximately twice the size of the sector in the United States. This ratio has been trending upwards in South Africa since the mid-1960s, in particular during the early 1980s and since 1995. The period from 1985 to 1995, while still characterised by growth, showed a more muted rate of increase in the size of the financial sector.

The key policy questions are therefore related to the factors that might account for the financial sector's relatively large size in South Africa and their implications for the performance of the economy in the longer run? According to the methodology proposed by Philippon (2008),[11] financial globalisation is not regarded as an explanatory variable in the United States, given that the country (unlike, say, the United Kingdom) is not a large exporter of financial services and is a net importer of such services. In addition, since financial globalisation is a recent phenomenon, it cannot account for the growth of the financial sector throughout the post-war period. Evidence for South Africa is symmetrical. The net trade balance in both direct and non-direct investment income has been negative for the past 15 years. Indeed, it is only in net travel receipts that South Africa has maintained a net positive trade balance. As such, South Africa continues to be a net importer of financial services, at least at this level of aggregation of the data. Furthermore, South Africa's reintegration into the world financial system took place in the 1990s and 2000s, and therefore cannot account for the steady rise in the share of the financial sector since the mid-1960s.

Standard explanations for the growth of services rest on the elasticity of substitution between goods and services, and a rapid rise in productivity in the manufacturing sector. However, provided that financial services do not enter the objective function of agents but their budget constraints instead, these theoretical explanations for the growth in financial services cannot apply. Empirically this is borne out by low correlations between productivity growth in the manufacturing sector and the share of the financial sector in GDP in the United States. For South Africa, the correlations between the share of financial services in GDP and real GDP (-0.22), real per capita GDP (-0.06), real output per worker (0.04) and real output per worker in the manufacturing sector (-0.02) are also relatively low.

The overlapping-generations general-equilibrium model developed by Philippon (2008) includes agents who choose to work either in the financial

or the real sector, as well as corporate finance and monitoring in response to moral hazard. In the non-financial sector agents face heterogeneous investment opportunities and levels of productivity, and the limits moral hazard places on borrowing, such that agents with low cash flow and good investment opportunity cannot necessarily invest, although the financial sector lowers the borrowing constraint. In equilibrium, the market for corporate financial services clears, and agents are indifferent between working in the financial and real sectors.

The main findings of the model are that, on the supply side, efficiency gains in finance reduce credit rationing and increase (reduce) the size of the financial sector when the sector is inefficient (efficient). On the demand side, demand for finance is high when young firms/industries have better investment opportunities than large/established firms/industries (and vice versa). The intuition is that demand for financial services rises when firms have low cash flows and plentiful investment opportunities. Technically, the result is driven by the joint distribution of current productivity and investment opportunities that drives aggregate demand for financial services, such that low macro demand for financial services may emerge even when moral hazard is severe at the micro level (since firms do not face cash flow constraints).

Efficiency gains in finance have an ambiguous effect on the size of the financial sector. Efficiency gains imply that a given level of monitoring can be performed by a smaller sector, but the fall in the price of financial services raises demand for intermediation. Where the financial sector is small, the demand effect dominates the supply effect. On the other hand, if the efficiency of the financial sector becomes sufficiently large, the supply effect becomes dominant. Under balanced growth, the share of finance in output remains constant. The issue is thus the response of the financial sector to the distribution of investment opportunities (across firms facing differential cash-flow constraints).

The crucial relations in the model are given by equations (21) and (22) in Philippon (2008):

$$\frac{\mu}{\pi} = \left(\frac{\overline{\alpha}}{\pi v} + 1 - F^{\theta}(\alpha_l) \right) m(\alpha_l) - \int_{\alpha_l}^{\alpha_h} m(\alpha) dF^{\theta}(\alpha) \tag{3}$$

$$\mu(1-n) = \pi \int_{\alpha_l}^{\alpha_h} m(\alpha) dF^{\theta}(\alpha) \tag{4}$$

where n denotes th e mass of agents in the real sector, with (1-n) in the financial sector; $\pi \equiv \Pr(\theta = \tilde{\theta})$ denotes the probability of an agent having an investment opportunity $\tilde{\theta}$ in the real sector; α denotes the relative

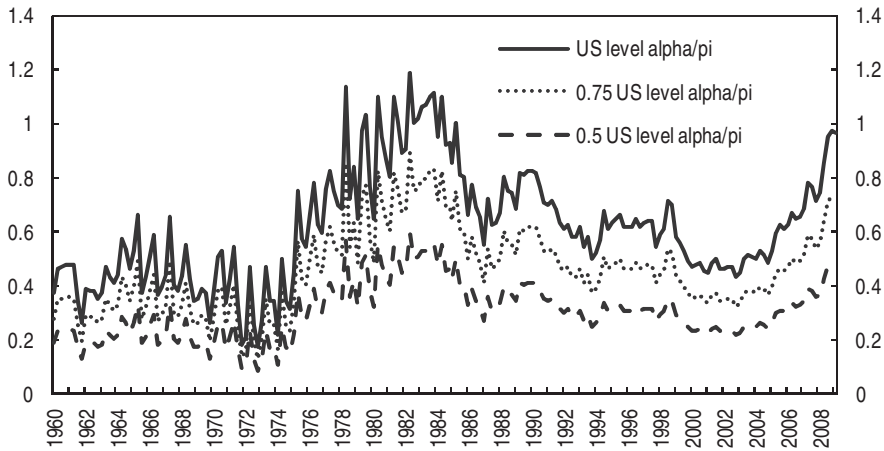
productivity shock of the agent in his/her first period of life, with $E[\alpha] \equiv \bar{\alpha}$ being the unconditional mean of α, given that α and $\tilde{\theta}$ are correlated; $F^{\theta}(\alpha)$ denotes the cumulative distribution function of α conditional on $\tilde{\theta}=\theta$; $\alpha_h=1-(\theta-z)/(r+\delta)$ denotes a threshold level of productivity that triggers financing without monitoring, while α_l denotes the threshold below which financing is not available, such that $\alpha_h-\alpha_l$ denotes the productivity range for which financing with monitoring is profitable and under which financial constraint is present; z denotes the proportion of units of capital an agent can steal at time $t+1$, such that z/θ captures the severity of the moral hazard problem; r denotes the interest rate and δ the depreciation rate of capital; μ denotes the units of monitoring each agent in the financial sector generates; and m denotes the monitoring units produced by the financial sector, such that monitoring reduces the proportion of units of capital an agent can steal to $(z-m)$; finally υ denotes the net present value of the project gross of intermediation costs.

Then, μ/π can be thought of as the efficiency of the financial sector, while $E[\alpha]/\pi=\bar{\alpha}/\pi$ is a technology parameter characterising production in the real sector. In calibrating the model to South Africa, the moral hazard intensity z/θ is estimated at 0.75. Under the assumption of an identical ratio of market-to-book value of 2 and given that the real interest rate implied by yields on 10-year government bond averages 0.75, the moral hazard intensity is only marginally above that of the United States. For a market value to book ratio of 1.5, the level assumed by Philippon (2008) for the United States, the moral hazard intensity coefficient is 0.83. Similarly, while Philippon (2008) sets $\alpha_h=0.5$, the average parameter over the sample period, given the real interest rate, is only marginally above 0.5 for South Africa.

The implied proportion of firms that have access to financial intermediation, $1-F(\alpha_l)$, is sensitive in level terms to the technology parameter of production in the real sector, $\bar{\alpha}/\pi$, although this is not true for the trend structure. Figure 5.9 reports the implied proportion of firms with access to financial intermediation under the assumption that South African real sector productivity is 1, 0.75, and 0.5 times the level of the United States. The empirical evidence is that credit rationing has been a persistent feature of the South African economy, although with differential intensities over time. While the period corresponding to the gold-price boom of the early 1980s increased the proportion of firms with access to intermediation (and the trend increased over the late 1990s and 2000s), the 1970s, 1980s and 1990s were characterised by relatively severe credit rationing. Even with the improvement of the 2000s, if South African productivity is 0.75 of the level of the United States, at least 30% of firms are credit constrained. With productivity at 0.5 of the US level, the proportion of credit-rationed firms rises to approximately 50%.

Figure 5.9. Credit rationing indicators, 19602008

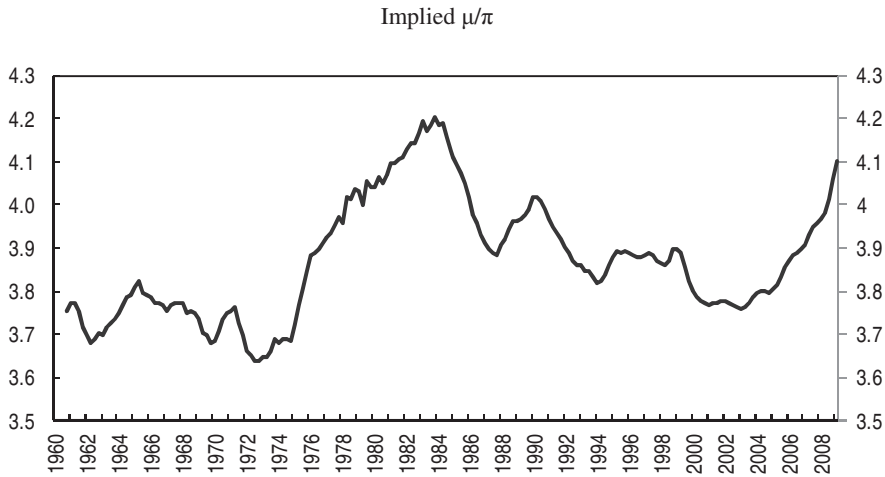
Implied 1-F(α_l)



Source: Author's simulations.

The trends in the proportion of credit-rationed firms are mirrored by the implied estimate of the efficiency parameter of the financial sector, μ/π, which rose during the 2000s, following a period of protracted losses in the 1980s and 1990s (Figure 5.10). However, the marked increase in the size of the financial sector corresponds to the efficiency gains implied by Figure 5.10.

Figure 5.10. Implied efficiency of the financial sector, 1960-2008



Source: Author's simulations.

One of the reasons why South Africa continues to maintain its "dual economy" structure is that potential investors are unable to access credit markets due to credit rationing. However, the rising efficiency of the financial sector implies that further financial deepening could be a source of competitive strength for the economy. An obvious policy implication is that the efficiency of the financial sector requires further improvement and that access to finance by new firms merits attention.

Conclusions

The analysis developed above suggests that the main constraints to sustainable growth in South Africa are:

- Uncertainty surrounding investment projects, which hampers both domestic capital accumulation and foreign capital inflows. The role of institutions, particularly the security of property rights, is especially important in this regard. The predictability of policy actions is a further requirement.
- Infrastructure investment, while improving over the past decade, continues to fall short of the country's capital-deepening needs.
- Market distortions continue to be a feature of the South African economy. Productivity growth is hampered in product markets by

insufficient competition. While nominal import tariffs have come down since 1994, concentration at the firm and industry levels continues to suggest the presence of significant pricing power despite trade liberalisation.

- The functioning of labour markets is also constrained by rigidities, resulting in continued high unemployment.
- Inadequate human capital and R&D activity constrain the ability of the economy to switch to a TFP-intensive growth path.
- The role of the financial sector merits special attention. The financial sector is unusually large in South Africa, in part due to the continued presence of credit rationing and the need for firms to obtain financial monitoring services in the face of moral hazard. It also reflects the presence of potential efficiency gains in financial intermediation during the 2000s.
- An aspect of South African public finances that deserves more attention in technical analysis and policy debate is the distribution of public expenditure. South Africa has opted for the development of a strong social security system relatively early in its development, which is understandable given the country's history. The question is whether this is going to constrain the budget's ability to sustain the level of infrastructure and human capital expenditure that is needed to improve the country's growth prospects.

Notes

1. See Fedderke (2002), Arora and Bhundia (2003), Arora (2005), Du Plessis and Smit (2009) and Eyraud (2009).
2. There are at least 11 recent studies on investment in South Africa. For a comprehensive review see Fedderke (2009).
3. See Fielding (1997, 2002), Kularatne (2002), Mariotti (2002), Romm (2005), Fedderke & Luiz (2008a).
4. See Fielding (1999, 2000), Fedderke (2004), Fedderke and Szalontai (2005) and Fedderke and Naumann (2005).
5. Both the political instability and the property rights variables stem from Fedderke, De Kadt and Luiz (2001).
6. The only exception to the predominance of portfolio investment stocks in the post-1990 era was between 1999 and 2001, a period during which FDI stocks seem to have grown much faster than portfolio investment stocks. However, as noted above, this increase in FDI was not due to new FDI inflows, but rather to the fact that four of South Africa's largest multi-national corporations moved their listing from the Johannesburg Stock Exchange to the London Stock Exchange. The South African plants of these firms thus became part of South Africa's FDI stocks, inflating the growth of FDI stocks.
7. See Fedderke, Kularatne and Mariotti (2007) at the three digit manufacturing level, with the latter result finding further support from Edwards and van De Winkel (2005), Fedderke and Hill (2007), and Aghion et al (2008).
8. It should be noted that the conventional view of the wage elasticity of employment in South Africa centres on 0.7, which explains why the anticipated decrease in the nominal wage required for appreciable increases in employment are viewed as potentially large. However, it is not clear that the estimated elasticity is correct. When the labour force is disaggregated by skills type, wage elasticities are often greater than 1 in absolute terms especially for unskilled labour. For the manufacturing

sector, labour usage equations which control for the relative price of capital to labour, also report price elasticities of labour usage well above unity.

9. As proposed in the 2010 State of the Nation, and Budget, for instance.

10. Care must be taken in interpreting this evidence, however. First, note that consideration of correlation coefficients between countries and country aggregates over four subperiods, the 1960s, 1970s, 1980s and 1990s, indicates that for South Africa the increased correlation during the 1990s is centred on the OECD and the world as a whole. This evidence is consistent with the notion that the South African economy reintegrated with its traditional trading partners in the OECD during the course of the 1990s, rather than with emerging market economies. Second, recall that OECD for this study denotes an augmented grouping of countries, defined by the original Obstfeld study.

11. The overlapping generations general equilibrium model developed by Philippon (2008) includes agents who choose to work either in the financial or the real sectors. In the non-financial sector, agents face heterogeneous investment opportunities and levels of productivity, and, because of moral hazard, agents with low cash flow and good investment opportunity cannot necessarily invest, though the financial sector weakens their borrowing constraint. In equilibrium, the market for corporate financial services clears and agents are indifferent about choosing between working in the financial and real sectors.

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From:

Growth and Sustainability in Brazil, China, India, Indonesia and South Africa

Access the complete publication at:
https://doi.org/10.1787/9789264090200-en

Please cite this chapter as:

Fedderke, Johannes (2010), "Sustainable growth in South Africa", in Luiz de Mello (ed.), *Growth and Sustainability in Brazil, China, India, Indonesia and South Africa*, OECD Publishing, Paris.

DOI: https://doi.org/10.1787/9789264090200-8-en

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