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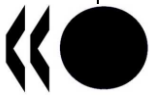**SOUTH AFRICA'S TRADE AND GROWTH**

OECD Trade Policy Working Paper No. 91

by Przemyslaw Kowalski, Ralph Lattimore and Novella Bottini

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ABSTRACT

This paper examines key trade and trade related issues facing South Africa. It describes South Africa's re-entry into the global trade architecture and its economic growth in the context of its trade performance, as well as the composition and performance of South African exports at the product and sector level in the period from the early 1990s to 2006. The study also assesses South Africa's comparative trade performance based on a gravity model of international trade and discusses some key historical and recent trade policy developments. Finally, the study provides an econometric assessment of the impact of South Africa's trade liberalisation during the period from 1988 to 2003 on labour and total factor productivity across its industrial sectors. It shows that while South African trade performance has been good in recent years there is significant room to liberalise further as an adjunct to labour market reforms. Further trade policy liberalisation would bring about important equity and efficiency gains. Multilateral trade liberalisation has the potential to maximise the gains and ease the transition to freer trade for South Africa but unilateral liberalisation also deserves consideration.

Keywords: South Africa, trade, trade network, trade performance, revealed comparative advantage, gravity model, productivity, dynamic gains from trade, tariffs, effective rate of protection, regional integration.

ACKNOWLEDGEMENTS

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SOUTH AFRICA'S TRADE AND GROWTH

Executive summary and conclusions

This paper examines key trade and trade related issues facing South Africa. It describes South Africa's re-entry into the global trade architecture and its economic growth in the context of its trade performance, as well as the composition and performance of South African exports at the product and sector level in the period from the early 1990s to 2006. The study also assesses South Africa's comparative trade performance based on a gravity model of international trade and discusses some key historical and recent trade policy developments. Finally, the study provides an econometric assessment of the impact of South Africa's trade liberalisation during the period from 1988 to 2003 on labour and total factor productivity across its industrial sectors.

The main findings of the paper are summarised below:

General assessment

- South Africa has succeeded to reinsert its economy back into world trade in the mid 1990s following a long period of internal political difficulties and international reactions to the apartheid regime. Since the early 1990s successive South African governments have faced major economic policy challenges to change the institutional structure of the economy and adapt the trade policy regime to the new agenda and structures.

- Since the mid 1990s, the trade sector has not been able to keep up with developments in world markets – especially in raw materials and intermediate goods. Indeed, South Africa's position in the global trade architecture has remained constant or even deteriorated slightly since 1995. This flat trend contrasts with the performance of China, Russia and India who continued to deepen their integration into world trade supply chains after 1995.

- Indicators of trade performance and trade policy suggest that the lagging trade progress may be related in part to the process of trade liberalisation. That process appears to have stalled or even slightly reversed in recent years. The decline in average tariffs and duties collected, for example, has been interrupted and in some cases even reversed direction since 2000 as a result of increasing duties on consumer and, to a lesser extent, intermediate products and raw materials.

- There are some signs suggesting that this may be related to the slow progress in the current multilateral negotiations, growing numbers of preferential trading agreements and the emerging industrial policy strategy, all of which call for maintaining relatively high effective rates of protection on certain sectors.

- With an average annual real GDP growth of close to 5% from 2004 to 2007, South Africa's economic performance has been markedly stronger than in the immediate post-apartheid period of 1994-2003. The per capita income which is already high by BRIICS standards has also been increasing as was the total number of people in employment. However, the employment rate has been lingering around a very low 42-43% in the 1994-2006 period which meant that growth was generated by less than half of the working age population. Such a low and persistent employment

rate indicates that the benefits of recent growth have not been shared as widely as they might have been and that labour market performance represents one of the most essential and daunting challenges for South Africa.

- The expansion of South Africa's share of world GDP over the period from 2003 to 2006, if sustained, could mark a break from a downward trend that has been observed since the beginning of the 1980s. Interestingly, this coincided with an increase in South Africa's share of the value of world exports of goods and services, and services in particular. This signals that there may be more to the pick-up in South Africa's trade since 2003 than the rising precious metals prices and improving terms of trade.

- Trade reforms had already started to be implemented in the period preceding 1994. This was reflected in robust rates of export and import volume growth in the 1988-1993 period. Indeed, in the first years (1994-1999) of majority rule the average growth rates of exports were actually slightly lower as compared to the preceding period, probably reflecting the restructuring of the economy, while import volume growth rates picked up more quickly post 1994 and stayed above those of exports until very recently.

- These developments contributed to the worsening of South Africa's current account since 2003 which, up until then, was either in moderate surplus or an insignificant deficit. What drove these current account developments was a deteriorating balance on the trade in goods side which became negative in 2004 for the first time since the early 1980s. Balances on services, income and current transfers have not undergone significant changes, although the balance on services in 2006 has reached its lowest position in the 1994-2006 period.

- As far as financing of these deficits is concerned, portfolio investment regained its position on the financial account reaching almost 8% of GDP in 2006 and outperforming the levels from before 2001. Somewhat worryingly, direct investment inflows have been much weaker raising questions about the sustainability of the current account position.

- Indeed, the current financial crisis and economic downturn are having a negative impact on international financial flows and thus can negatively impact the financing of South Africa's deepening current account deficits. Another aspect of the current global financial and economic turmoil is the worsening terms of trade for commodity producers, including South Africa. These recent unexpected events have added to already existing economic (electricity shortages and inflation), social (health and crime) and political (unexpected resignation of President Thabo Mbeki in September 2008) problems of the country. All these factors reduce somewhat the confidence with respect to South Africa's future growth and commercial performance.

Trade performance

- South Africa has been gaining market shares in a number of dynamic products that have been growing in world markets at a rate faster than average as well as in a number of less dynamic products. This reflects South Africa's broad-based comparative advantage across a range of products.

- However, an overall feature of South Africa's trade is the increase in export and import concentration to levels that are higher than those observed in OECD economies. The Top 25 HS6 (6 digit) products are dominated by the valuable mineral products South Africa is noted for. However, their composition changed significantly over the decade. In 1996, they included diamonds, chromium, gold, nickel, manganese, zirconium and copper. In 2006, platinum replaced diamonds at the top and rhodium and palladium replaced titanium, manganese and zirconium.

- There are also major differences to the order in which individual products appear in the revealed comparative advantage index list and the top export list. If resources in the tradable sector were allocated most efficiently, these two lists would be consistent with one another. This points to potential trade and industry policy distortions. For example, South Africa reveals a moderate comparative advantage in machinery and equipment items. These products are, however, towards the top of the major export list suggesting an element of implicit export subsidisation. On the other hand, the situation for some agricultural products appears to be the reverse—there are fewer agricultural products in the major export list than one might expect from the revealed comparative advantage data. This suggests that industry and trade policy in South Africa is implicitly taxing the agricultural sector through negative relative rates of trade protection. This is consistent with some independent evidence that policy assistance to non-agricultural tradable sectors has increased relative to South African agricultural sectors. Furthermore, this implicit export tax on agricultural products has grown in recent years – from a relatively neutral position prior to 2000.

- Another notable feature of South Africa's trade performance is the decline in the proportion of low-skill manufactures in the mix since 1996. If this decline is an accurate depiction of a rising skill intensity in the export mix then it shows a lack of congruence with the low-skill endowment of the workforce as a whole and the slow progress in raising skill levels over the last decade.

- South African services exports represent around 18% of current account credits. Services exports are heavily concentrated in travel services (65.6% in 2006) and their importance has risen 50%[1] since the trade embargos were lifted. In absolute terms, the rise is more dramatic—exports of travel services rose from USD 2.1 billion in 1995 to USD 7.9 billion in 2006. This points to the important endowments the country has in tourist attractions. This is a valuable set of resources in balance of payments terms because the provision of tourism services is usually very intensive in its employment of low-skilled labour.

- When South Africa's trade performance is assessed in a comparative framework using the gravity model of international trade, South Africa presents itself as one of the BRIICS countries that have been expanding their relative exports much faster than the US, especially since early 1990s. In fact, South Africa is in the group of countries like India, Indonesia and Russia that have been performing at least as well as China. South Africa even surpassed China's relative performance in certain years.

- Foreign direct investment performance of South Africa is mixed. FDI inflows expressed as a percentage of GDP have grown considerably but are lower than, for example, in China, Brazil or the Russian Federation. When expressed as a share of total FDI into low and middle income economies grouping this share is growing very slowly and is currently smaller than in any other of the BRIICS apart from Indonesia. This mixed FDI performance is somewhat puzzling given the apparent relative openness of South Africa's services trade regime.

Policy issues

- South Africa entered the post-apartheid era with a complex system of quantitative restrictions and relatively high tariffs, which were also highly dispersed. At that time, in contrast to most other developing countries, South Africa's tariff structure was characterised by relatively high tariffs on consumer products and lower tariffs on imported machinery and capital goods, resulting in relatively high effective rates of protection (ERPs).

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[1]   From 46% of USD 4.6 billion in 1995 to 65.6% of USD 12 billion in 2006.

- The highest rates of protection in 1994 were recorded for a number of traditionally labour-intensive manufacturing sectors such as *Textiles*, *Wearing apparel*, *Leather products*, *Footwear* and *Furniture* (though *Motor vehicles* and a number of *Chemicals sectors* also had high rates of protection). Low or negative rates were recorded in the *Primary sector* (agriculture and mining), *Machinery and equipment*, *Professional and scientific equipment* and *Other transport products*.

- The ERP structure may seem rational from the point of view of broadly protecting 'traditional' labour-intensive sectors. Indeed, the 2003 ERPs seem to be higher in sectors where the ratios of fixed capital to formal employment are quite low. Yet, at the same time these sectors that are intensive in their use of labour overall are also the sectors with relatively low shares of unskilled employment. The latter tendency may be seen as an unintended consequence since, as many recent assessments emphasise, unemployment is particularly severe in the unskilled segments of the labour force. Additionally, high ERPs correlate negatively with firm concentration and levels of competition across industries and with the productivity performance across these sectors.

- The estimates suggest that effective protection has been reduced significantly over the 1990s, particularly when surcharges are taken into account. Yet, importantly, several indicators suggest that the process of liberalisation has largely stalled in recent years. The decline in average tariff seems to have stopped or even have been reversed since 2000. Similarly, tax revenue on international trade and transactions expressed as percentage of imports, revenue or GDP has increased noticeably in 2004-2007. Our analysis indicates that this was driven by increasing duties on consumer goods though, with respect to 1999, small increases have been recorded also in intermediate products and the raw materials category.

- At this stage of work on South Africa's trade and growth, the OECD Secretariat has not been able to gather and analyse comprehensive data on the importance of services trade and services trade barriers for South Africa's economy although the structure of recent economic growth suggests that they may be of key importance. The available indicators of trade restrictiveness for services seem to suggest that South Africa's services trade regime is relatively liberal as compared to other emerging and developing economies as well as the OECD.

- South Africa's manufacturing sector is an interesting case study as it experienced a mixed pattern of liberalisation over the 1988-2003 period and similarly in TFP growth. In the initial years (88-93) average protection across manufacturing sectors actually increased somewhat. This was followed by a period of liberalisation (94-99) and a period of continued liberalisation (but at a much slower rate) over the period 2000-03. TFP was on average declining over the 88-93 period, growing moderately over the 94-99 period and accelerating over the 2000-03 period. This broad pattern does not provide a crystal clear picture of correlation between liberalisation periods and periods of faster TFP growth. However, a positive link could certainly be argued if one assumes time lags between policy reforms and industry responses.

- Our econometric assessment of productivity determinants in South Africa suggests that the levels of effective rates of protection have significantly affected TFP growth rates over the 1988-2003 period. It is estimated that the effect of effective rate of protection on total factor productivity is negative, significant and consistently robust with respect to various control variables. It is estimated that the decrease in the effective rate of protection observed over the whole period implies an increase of annual TFP growth rate by approximately 1 percentage point. This is equivalent to more than 100% of the actual average annual TFP growth rate over the period. These results suggest that trade liberalisation was indeed an important contributor to TFP growth, and in general to output growth, across South African manufacturing sectors.

- There are signs that South African authorities continue to see merit in further liberalisation but remain vigilant in the context of the protracted multilateral trade negotiations in the WTO and the current environment of proliferating regional trade agreements. In the WTO context a strategy of retaining 'negotiating currency' and not taking unilateral liberalisation actions is not an isolated case. All this may make South Africa's policy makers reluctant to unilaterally continue trade reforms but the political benefits of such a strategy should be considered in the context of the ongoing costs of protection for the economy. Each year protection costs are incurred, the economy as a whole performs at a slower pace than would otherwise be the case.

- Because of its regional position and commodity orientation, South Africa may be seen as an attractive preferential trade agreement partner and is already an important regional hub for African commerce, though preferential trade always bears the risk of discrimination and associated economic costs. As such, preferential trade is a second best option as compared to broad based multilateral liberalisation.

- The *OECD Economic Review of South Africa* (OECD, 2008) emphasised the need for South Africa to address major labour market issues relating to low-skilled employment and the equity and other gains that would ensue from doing so. This report has shown that while South African trade performance has been good in recent years there is significant room to liberalise further as an adjunct to labour market reforms. Further trade policy liberalisation would result in efficiency and real income gains which are important to South Africa irrespective of the outcome of the Doha Round. Multilateral trade liberalisation has the potential to ease the transition to freer trade for South Africa but there are other options. The objective is to reduce unemployed resources and to get resources into their most valuable use.

1. Introduction

1.   South Africa managed to dramatically reinsert its economy back into the world trade environment in the mid 1990s following a long period of internal political difficulties and international reactions to the apartheid regime. Since the early 1990s South African governments have faced major economic policy challenges to change the institutional structure of the economy and adapt the trade policy regime to the new agenda and structures.

2.   South Africa's re-entry into the global trade architecture can be visualised quantitatively by a network index of the country's role in the architecture of world trade in goods.[2] The index measures the likelihood that South Africa is involved in a randomly selected trade chain in the network of 217 countries that comprise the dataset. An intuitive explanation of this centrality measure is as follows. Let us assume that a node (South Africa) sends a message to a target node (say, Japan). The message is transmitted initially to a neighbouring node and then the message follows links from that node, chosen randomly, and continues until it reaches the target node. The probabilities assigned to outgoing links are determined by the intensity of the relationship (value of trade), so that links representing higher trade value will be chosen with higher probability. A high index for South Africa means that the likelihood it is a part of any given trade chain present within the network is high and therefore it has access to a higher proportion of shorter links to send a 'message' to any other potential country in the world trade network. Furthermore, a high proportion of 'messages' sent by other countries to all other countries will go through South Africa. The index thus reflects the trade connectivity (value and number of bilateral trade relationships) of a country and its partners, and its partners' partners, encompassing the whole trade chain. In other words, it captures the influence of South Africa across the whole lengths of all trade chains. The centrality index is expressed in percent (ile) form – in other words ranked against the other 216 countries in the analysis (see Reyes, Garcia and Lattimore, 2008, for details).

3.   Figure 1.1 illustrates the relative importance of South Africa and some other larger emerging economies in the architecture of world trade via the country's degree of centrality in the world trade network in merchandise goods over the period 1980-2005. The decline in South Africa's trade centrality is clear during the 1980s as the trade embargoes took effect. The economy was deep in the "outer periphery" of the world network at this time (below the 85th percentile). Then from the early 1990s, the centrality index rose dramatically with the lifting of the trade sanctions, climbing into the inner periphery within five years (between the 90th and 95th percentiles). The trade economy has remained in this position ever since. Indeed, its centrality may have deteriorated slightly since 1995. This plateauing effect since 1995 contrasts with the performance of China, Russia and India whose indices continued to rise after 1995. China's performance has been outstanding and it is now a member of elite traders in the core of the network (above the 95th percentile). India too is approaching a core position.

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[2]   The appeal of network analysis for the study of international economic integration (global trade architecture) is that it allows for a whole-structure appreciation of the web of trade interactions. When trade to GDP ratios are used to measure the degree of integration of a country in the world economy, only direct relationships between a country and the world market or between two partner countries are captured. Network analysis, on the other hand, can draw from direct and indirect trade relationships. Accordingly, network analysis results in a more in-depth picture of integration. It enables us to analyse both the structure of the network as an entity and the role of individual actors within the network. For example, it is possible to show how the average number of trading partners and the intensity of these trading relationships have evolved, and therefore whether or not globalisation is encouraging a bi-polar trade pattern. But network analysis can also be used to assess changes in the overall importance of a given country in the trade network.

Figure 1.1 Striding towards the core of the trade network

Evolution of BRIICS centrality indices (1980 -2005)
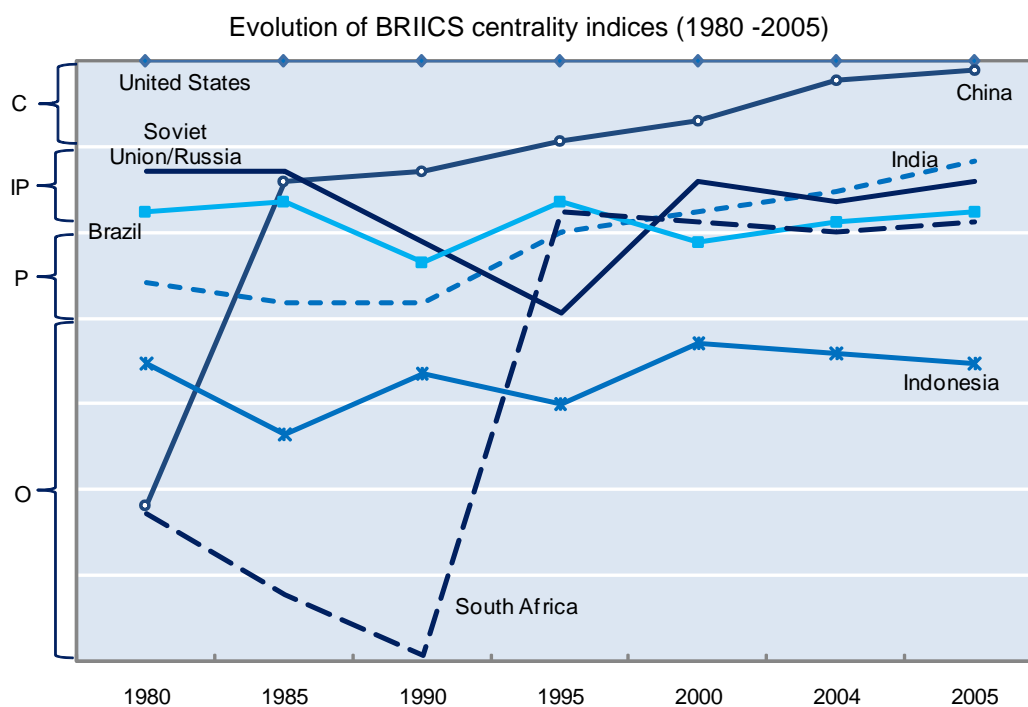
Note: Core countries are defined as in or above the 95th percentile of the Random Walk. Between Centrality index, inner periphery 90-94th percentile, periphery countries 85-89th percentile and outer periphery countries below the 80th percentile.

Source: Reyes, Garcia and Lattimore (2008), on UN ComTrade database.

4.   Reyes, Garcia and Lattimore (2008) also calculated this centrality index (and a number of other indices) for South Africa for four sub-groups of traded products – raw materials, intermediate goods, capital goods and consumer products. The network indices for these disaggregated products mirror the slight deterioration for total trade discussed above with some differences. The centrality index for raw materials falls from 1995 to 2000 and then again to 2005. This is somewhat surprising given South Africa's endowments in valuable mineral resources. The index for intermediate goods trade also deteriorates from 1995 to 2000. However, it subsequently stabilises at this level. South Africa's centrality in global capital goods and consumer goods markets increases from 1995 to 2000—again somewhat surprising given the strength of the minerals sector. However, even these later two categories have relatively low indices in 2005 which is consistent with the pattern for total goods trade.

5.   This plateauing performance of South Africa in trade centrality terms could mean that there has been some stagnation in international market development relative to other countries. One can't be too emphatic about that, however, because the plateauing may result from a lesser need for South Africa to develop a higher range of trade links, given its pattern of comparative advantages, than China requires in its circumstances. Without further information we can't distinguish between the two possibilities.

6.   Nevertheless, several other indicators considered in the remainder of this report suggest that this may be related to the process of liberalisation that has largely stalled or backed up in recent years. The decline in average tariff and duties collected, for example, seems to have stopped or even have been reversed since 2000 as a result of increasing duties on consumer and, to a lesser extent, intermediate products and raw materials. There are some signs that this is related to slow progress in ongoing multilateral trade negotiations, growing number of preferential trading agreements and the emerging

industrial policy strategy, which seems to call for maintaining relatively high effective rates of protection on certain sectors.

7.   It might be tentatively concluded that South Africa's trade performance received a very strong initial boost relative to other countries following the removal of the trade sanctions but that the trade sector has not been able to keep up with developments in other countries since 1995 – especially in raw materials and intermediate goods.

8.   The renewed openness to trade since the mid-1990s provided South Africa with an opportunity to gain from the world trading environment but it did not provide guarantees of gains from trade. The gains from trade arise from creating a competitive tradeable sector that responds to changes in world demand patterns and the world architecture of global supply chains.

Table 1.1 Selected economic and geographical indicators

	China	India	South Africa	Germany	Japan	US
Agricultural land (000' sq. km) in 2003	5 563	1 802	996	170	47	4 148
Arable land (hectares, mln) in 2003	143	160	15	12	4	174
Population, total (mln)	1 312	1 110	47	82	128	299
Birth rate, crude (per 1,000 people)	12	24	23	8	9	14
Death rate, crude (per 1,000 people)	7	8	21	10	9	8
GDP (current US$ bln)	2 645	912	255	2 897	4 368	13 164
GDP per capita, PPP (constant 2005 international $)	4 501	2 393	8 807	31 324	30 961	42 610
GINI index	47	37	58	28	n/a	41
Goods exports (BoP, current US$ bln)	970	124	64	1 131	616	1 027
Goods imports (BoP, current US$ bln)	752	167	70	934	535	1 861
Service exports (BoP, current US$ bln)	92	75	12	173	117	419
Service imports (BoP, current US$ bln)	101	64	14	215	136	343
Distance from Belgium (in km)	7 971	6 420	9 536	-	9 463	5 892
Distance from US (in km)	10 994	11 762	12 582	6 035	10 856	-
Distance from Japan (in km)	2 098	5 848	14 746	9 298	-	10 856

Source: WDI, CEPII and authors' calculations.

9.   Over a longer historical perspective, South Africa has developed from its status as a colony based on its resource endowments in agricultural land and mineral resources. In this respect South Africa has endowment ratios in physical resources that have similarities with Canada, Russia, Brazil, the US and Australia. The current endowment of agricultural land is two hectares per head of population (Table 1.1).[3] This is nearly 50% more than the US, 5 times the ratio in China and ten times that of Germany.[4] For this reason South Africa developed a comparative advantage in agriculture from earliest times. The relative importance of trade in agricultural products changed, however, with the discovery of South Africa's large endowments in precious stones and metals. These mineral endowments make South Africa more like Canada and Russia in terms of mineral deposits but with agricultural land more like Australia's climatic zone.

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[3]   A major Land Reform is currently being implemented in South Africa with a view to redistribute the land towards black disadvantaged population. This takes the form of grants that allow those disadvantaged farmers to acquire more land than otherwise would be the case (see OECD, 2009 for further information).

[4]   South Africa's endowments in arable land are only half that of the US in per capita terms, Table 1.1. Accordingly, it is not surprising that South African agriculture has tended to concentrate arable land use in high valued crops like grapes, fruit and nuts and relatively less in broad acre crops (like cereals) where the US specializes. Non-arable agricultural land is then devoted to sheep and cattle farming in addition to wildlife tourism and conservation purposes.

10.   South Africa's endowments in particular mineral resources have provided a major starting platform in tradeables for over a century. There is a long literature that has been concerned with the long term growth prospects of natural resource based exporters. Recent empirical work in this area has been conducted by Lederman and Maloney (2007). They have surveyed a number of natural resource based exporters and conclude that "natural resources are neither curse nor destiny". A natural resource base certainly provides a platform for growth but the destiny of a resource rich country, in developmental terms, usually requires major parallel investments in human and physical capital. The composition of South Africa's trade reflects these developments in education, social services and research and development and the concomitant broadening in comparative advantages over many years. As outlined in the recent review of the South African economy (OECD, 2008), the major challenges facing South Africa are to improve investments in these areas of human capital and infrastructure in the new political environment.

11.   The remainder of this report introduces an initial broad set of South African trade and trade related issues. The breadth of the approach necessarily means that, in this paper, depth needs to be sacrificed in the interests of brevity. This approach seems to be appropriate within the OECD Enhanced Engagement initiative context which is designed to start a process of discussion with South African authorities over the next few years.

12.   In the remainder of this report Section 2 deals with South Africa's recent economic growth in the context of its trade performance. Section 3 takes a closer look at the composition and performance of South Africa's exports at a product and sector level. Section 4 provides an econometric assessment of South Africa's comparative trade performance based on a gravity model of international trade. Section 5 presents a discussion of the main historical and recent trade policy developments. Section 6 provides an econometric assessment of the impact of South Africa's trade liberalisation during the period from 1988 to 2003 on labour and total factor productivity across its industrial sectors.

2.   South Africa's economic growth

2.1   GDP growth 1994-2002 and 2003-2007

13.   With average annual real GDP growth of close to 5% from 2004 to 2007, South Africa's economic performance has been distinguishably stronger than in the immediate post-apartheid period 1994-2003 (average real GDP growth of approximately 3% per annum, see Figure 2.1). Though not unprecedented, real GDP growth reached 5.1% in 2007, a growth rate at which income more than doubles over a 15 year period. The per capita income which is already high by BRIICS standards has also been increasing (Annex Figure 2.1) as was the total number of people in employment.

14.   More recently, however, the global economic slowdown is estimated to have brought down the real GDP growth rate to 3.1% in 2008. Current IMF projections of real GDP growth are -0.3% in 2009 and 1.9% in 2010 (IMF, 2009).

Figure 2.1 South Africa's GDP growth

moving 5-year average of annual growth rates
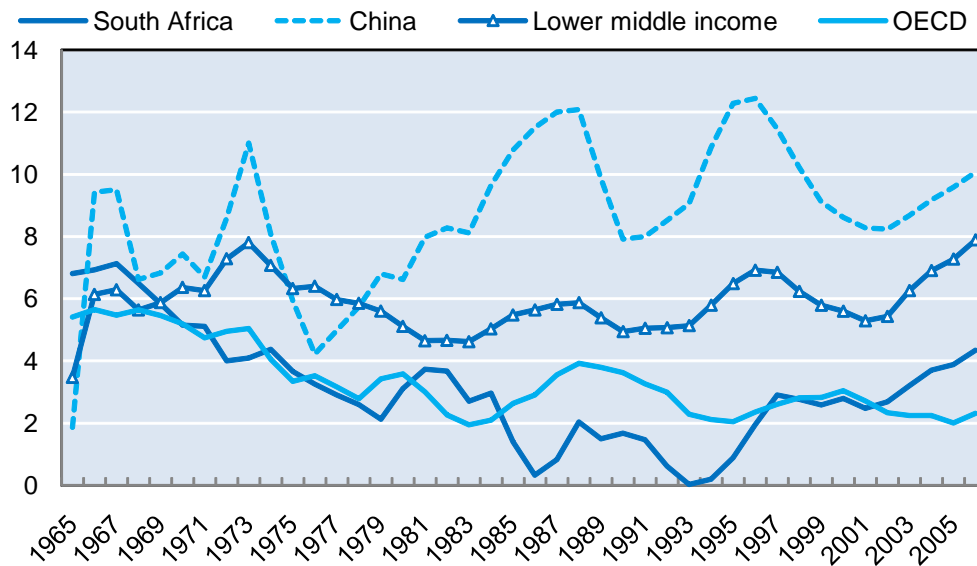
Source: WDI.

15.   The employment rate has been lingering around a very low 42-43% in the 1994-2006 period which meant that the growth was generated by less than half of the working age population. Such a low and persistent employment rate indicates that the benefits of recent growth have not been shared as widely as they might have been and that labour market performance represents one of the most essential and daunting challenges for South Africa.

16.   South Africa's growth rates have been higher than the average growth rates for the OECD area and the world economy since 2000 but remain lower than those for the lower middle income countries, not to mention rapidly emerging economies such as China or other BRIICS countries (Brazil is an exception, Figure 2.2).

Figure 2.2 Average real GDP growth rates

Source: WDI.

13
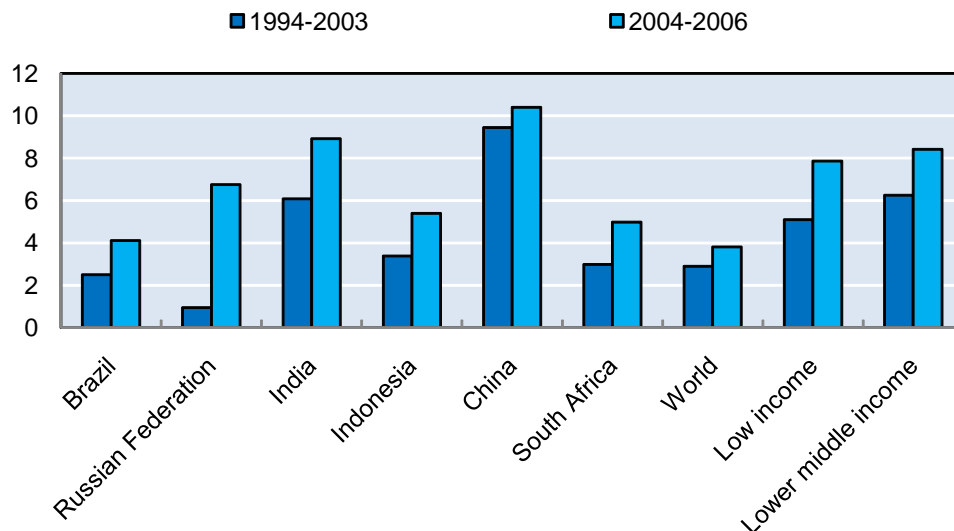
17.   The expansion of South Africa's share of world GDP over the period 2003-2006, if sustained, could mark a break from a downward trend that has been observed since the beginning of 1980s (Figure 2.3). Interestingly, this coincided with an increase in South Africa's share of the value of world exports of goods and services, and services in particular (Figure 2.3). It is argued in OECD (2008) that the increase in South African share of world exports was more of a price effect and that the world market share in volume terms has continued to decrease through 2006. Indeed, South Africa's terms of trade improved considerably over the 2000-2007 period (Figure 2.4) and the prices of exports have been growing more dynamically than export volumes (Figure 2.5) reflecting to a significant extent rising prices of platinum, gold and iron ore. Yet, the concurrent expansion of South Africa's share of world services exports signals that there may be more to the pick-up in South Africa's trade since 2003 than the rising precious metals prices.

Figure 2.3 Share of goods and services in world trade
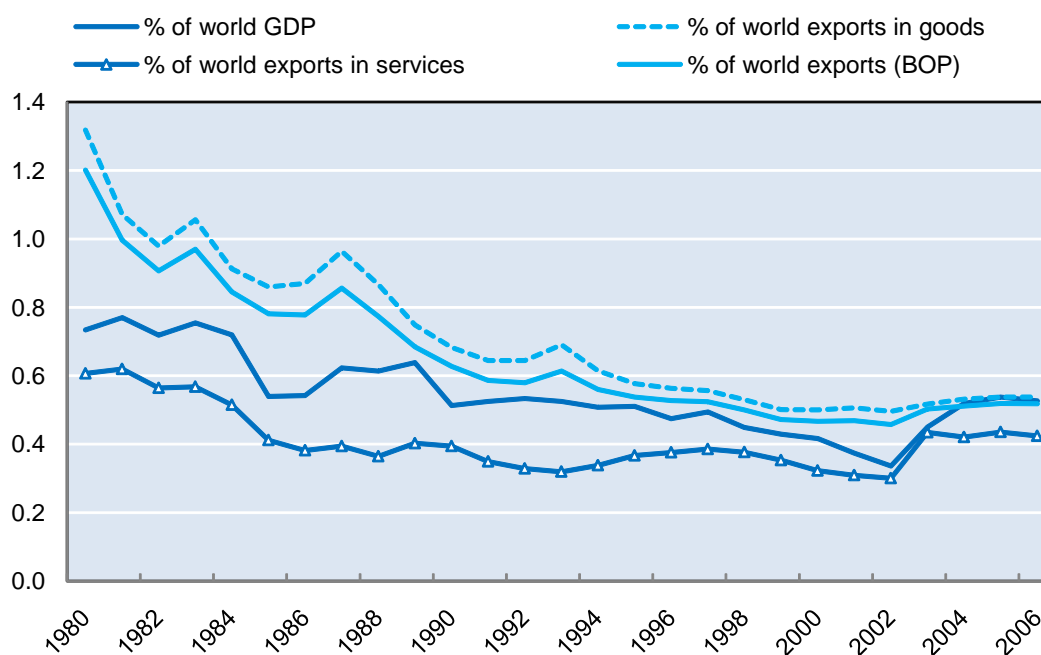
Source: WDI.

Figure 2.4 Terms of trade

2000=100
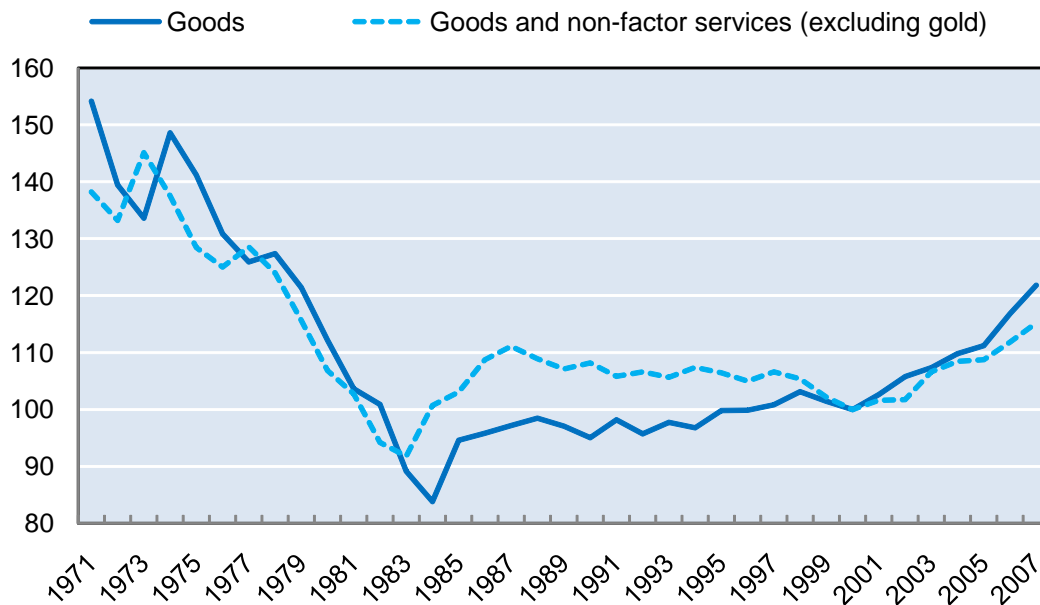
Source: WDI.

Figure 2.5 Volume and prices of exports of goods and non-factor services

2000=100
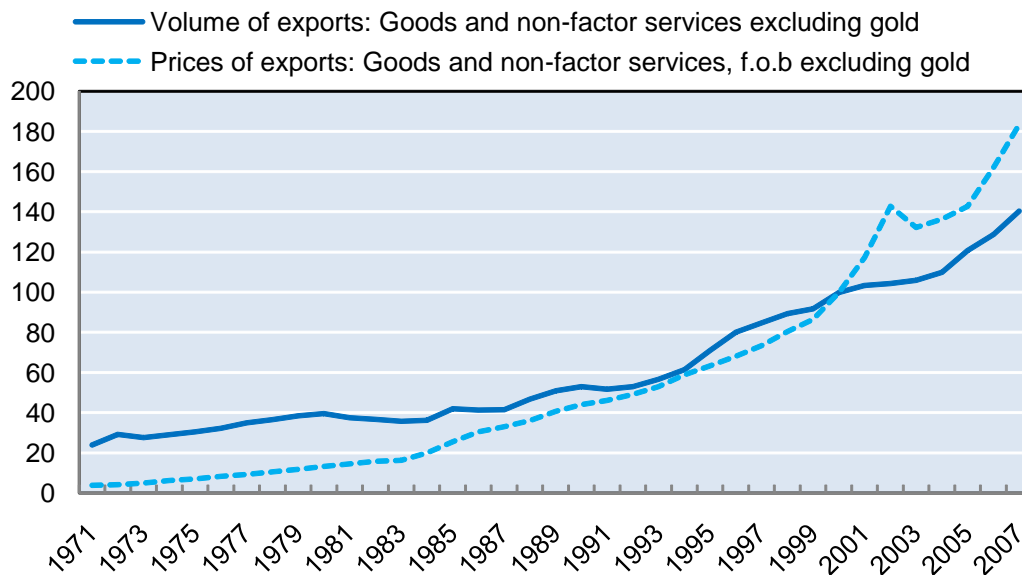
Source: SARB.

18.   With 66% of 2006 value added generated within the services sectors, 31% in industry and 3% in agriculture the structure of South Africa's economy resembles that of a developed economy more than any other of the BRIICS and is somewhere in between the structure of a typical high income and an upper middle income country (see Figure 2.6). Indeed, since the end of the apartheid era the GDP shares of the agricultural and industrial sectors have decreased further from 5 to 3% and from 35 to 31%, respectively.

The share of services has increased from 60 to 66% (Figure 2.7). Annual growth rates of agricultural value added have been very volatile over the 1994-2006 period ranging from -11 to 20% and averaging -0.4% over the 1994-2006 period. With the exception of the 2000-2002 period the growth rates of services value added (4.3% average annual growth) have outstripped those of the industrial sector (2.4% average annual growth).

Figure 2.6 Average contribution to value added, by sector (% of GDP)
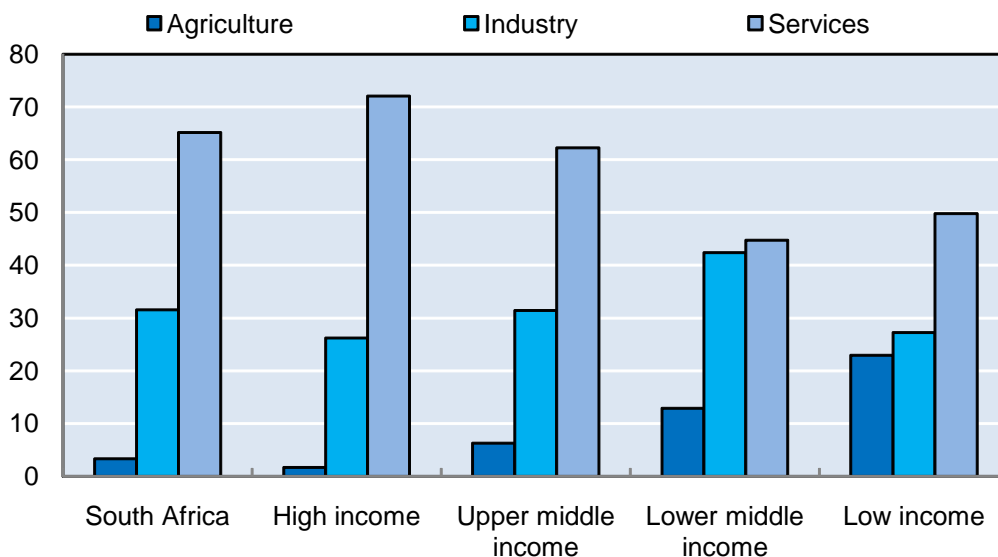
Source: WDI.

Figure 2.7 South Africa: contribution to value added in period 1994-2006
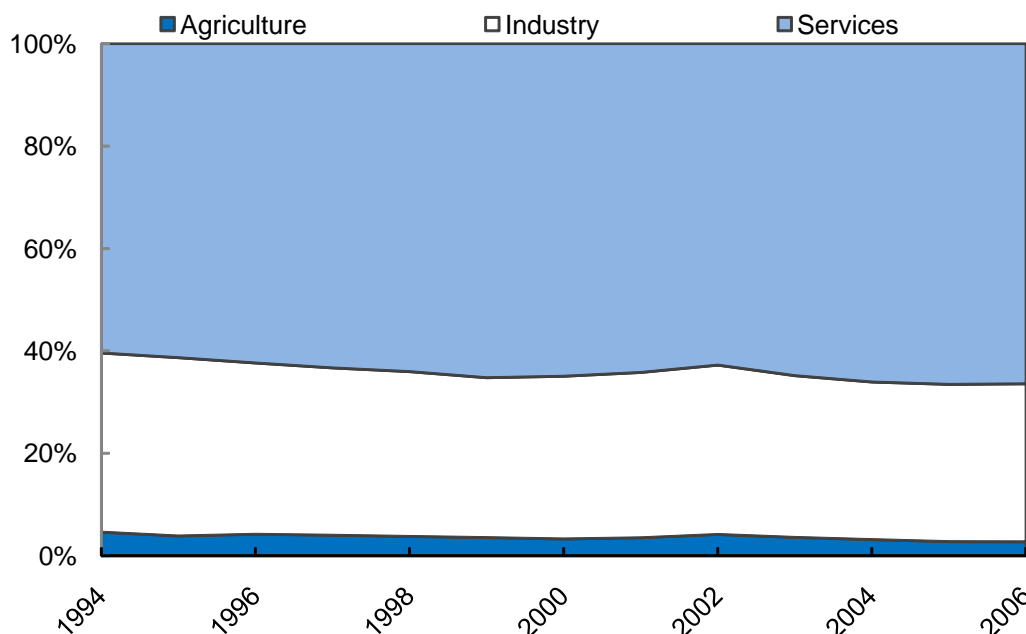
Source: WDI

19.   Indeed, the composition of final output in Table 2.1 indicates that services accounted for the bulk of real output growth in the 1994-2007 period with the *Wholesale and retail trade* sector contributing

approximately 20% of real growth in final output, *Communications* 14% and *Other services* 13%. Manufacturing as a whole contributed approximately 16%, mining 4% and the rest of the primary sector 3%. The highest average annual growth rates have been recorded in a number of mining and manufacturing sectors such as *Other mining*, *Other non-metallic mineral products* and *Radio, TV, instruments, watches and clocks,* which nevertheless had low initial shares in South Africa's final output.

Table 2.1 Final output composition

	Average annual growth rate			Value in 2007 (mln R)	Share in total value of final output in 2007	Approximative contribution to growth 1994-2007
	1994-2007	2000-2007	2004-2007			
A11: Primary [1-2]	2.8	4.2	12.2	109 559	7%	3%
A1121: Coal mining [21]	6.8	4.7	9.7	20 603	1%	1%
A1122: Gold and uranium ore mining [23]	-6.6	-6.2	-8.7	39 918	1%	-3%
A1123: Other mining [22/24/25/29]	67.1	28.7	53.7	12 343	3%	5%
A1210: Food, beverages and tobacco [301-306]	2.7	3.6	3.5	170 760	8%	7%
A1211: Textiles, clothing and leather [311-317]	2.4	1.4	-1.7	19 612	1%	1%
A1212: Wood and paper; publishing and printing [321-326]	4.7	-8.8	-21.4	7 370	0%	0%
A1213: Petroleum products, chemicals, rubber and plastic [331-338]	4.7	-3.7	-15.0	40 189	1%	0%
A1214: Other non-metallic mineral products [341-342]	55.3	22.8	49.5	(5 267)	0%	4%
A1215: Metals, metal products, machinery and equipment [351-359]	0.2	-2.5	-8.4	85 945	2%	0%
A1216: Electrical machinery and apparatus [361-366]	14.5	2.9	3.5	8 332	1%	5%
A1217: Radio, TV, instruments, watches and clocks [371-376]	16.9	14.9	25.6	(15 168)	-1%	-5%
A1218: Transport equipment [381-387]	2.3	3.6	8.8	52 507	2%	1%
A1219: Furniture and other manufacturing [391-392]	3.7	3.8	2.9	46 395	3%	3%
A1221: Electricity, gas and steam [41]	4.6	2.5	1.8	24 660	1%	2%
A1222: Water supply [42]	5.8	6.3	9.0	4 381	0%	0%
A1231: Building construction [51]	4.6	8.6	11.9	82 392	4%	5%
A1232: Civil engineering and other construction [52-53]	6.6	9.8	15.6	66 449	3%	5%
A1311: Wholesale and retail trade [61-63]	5.2	6.9	10.2	220 501	14%	20%
A1312: Catering and accommodation services [64]	3.2	4.5	3.8	24 692	1%	2%
A1321: Transport and storage [71-74]	4.4	6.3	4.9	77 249	5%	7%
A1322: Communication [75]	13.0	10.1	8.7	48 108	3%	14%
A1331: Finance and insurance [81-82]	5.3	5.0	7.5	73 500	5%	8%
A1332: Business services [83-88]	3.1	3.9	4.8	161 936	7%	6%
A1341: Other services [93-96]	7.0	6.1	3.0	112 346	6%	13%
A1342: Other producers [98]	3.0	1.2	2.6	28 313	2%	2%
A1343: General government services [99]	2.5	4.7	5.3	394 430	19%	14%
Total	3.4	4.3	5.5	1 912 052	100%	100%

Note: except for value in 2007 based on final output values in constant 2000 prices.

Source: Quantec database, authors' calculation.

20.   Industrial employment growth rate has picked up in 2004-2007 and averaged 2.1% for total industry (Annex Table 2.1). Again, the biggest increases have been generated by a number of services sectors such as *Wholesale and retail trade* and *Business services* which already account for high shares of employment and which enjoyed robust growth rates throughout the period. A number of manufacturing sectors have been consistently shedding labour over the period but typically their shares in industrial employment are already rather small.

2.2   *General trends in trade performance, current account performance*

21.   The ratio of trade in goods and services to GDP has risen from below 40% in 1993 to over 60% in 2006 indicating that the international exchange of goods and services has been an ever more important element of economic activity in South Africa in the post-apartheid era. Yet, by the same indicator, the current levels of openness are only comparable to levels recorded at the end of the 1970s (Figure 2.8). In other words political difficulties (and perhaps other factors) caused South Africa to turn inwards during the 1980s and early 1990s and they have only recently recovered their earlier degree of outward focus.

Figure 2.8 Trade as percentage of GDP
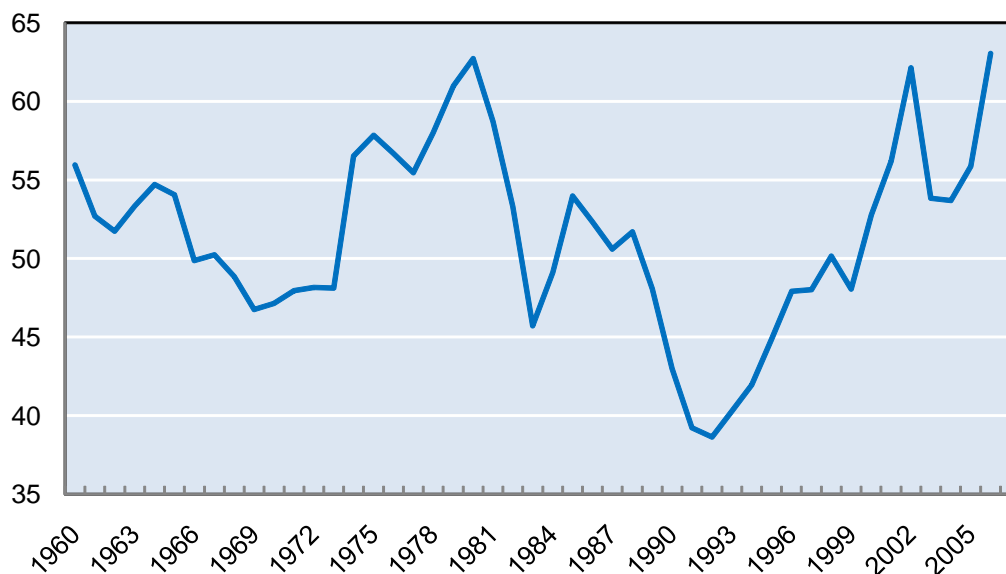
Source: WDI.

22.   Trade reforms had already started to be implemented in the period preceding 1994. This was reflected in robust rates of export and import volumes growth in the 1988-1993 period (Table 2.2). Indeed in the first years of majority rule (1994-1999) the average growth rates of exports were actually slightly lower as compared to the preceding period while import volume growth rates picked up more quickly post 1994 and stayed above those of exports until very recently. Initially, average rates of import prices growth were higher than those for exports but this tendency has reversed more recently.

Table 2.2 Trade of goods and non-factor services (including gold)

Average annual growth rates

	Exports		Imports	
	Volume	Price	volume	Price
1971-1976	0.3	22.9	1.2	18.9
1977-1981	1.6	18.1	3.6	16.3
1982-1987	1.6	15.5	-3.5	13.3
1988-1993	4.0	6.2	4.3	9.2
1994-1999	3.8	8.2	6.7	9.1
2000-2007	5.6	10.5	9.1	8.7

Source: SARB.

23.   These developments contributed to the worsening of South Africa's current account since 2003 which, up until then, was either in moderate surplus or an insignificant (below 2% of GDP) deficit (Figure 2.9). What drove these current account developments was a deteriorating balance on trade in goods which became negative in 2004 for the first time since the beginning of 1980s. Balances on services, income and current transfers have not undergone such significant changes (Figure 2.9), although the balance on services in 2006 has reached its lowest position in the 1994-2006 period (-0.9% of GDP). As far as financing of these deficits is concerned, portfolio investment regained its position on the financial account reaching almost 8% of GDP in 2006 and outperforming the levels from before 2001 (Figure 2.10). Worryingly, direct investment flows have been oscillating around the zero axis with no systematic tendency in one direction or the other.

Figure 2.9 Structure of current account
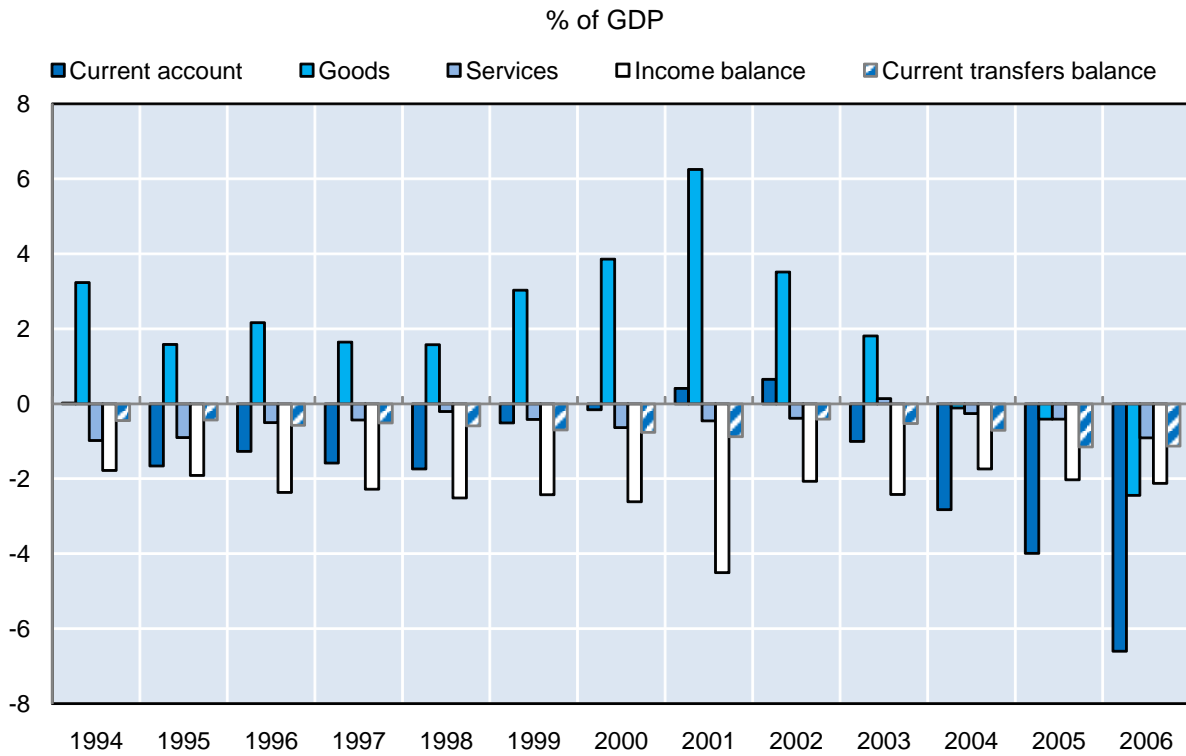
% of GDP

Source: International Financial Statistics, IMF; authors' calculations.

Figure 2.10 Structure of financial account
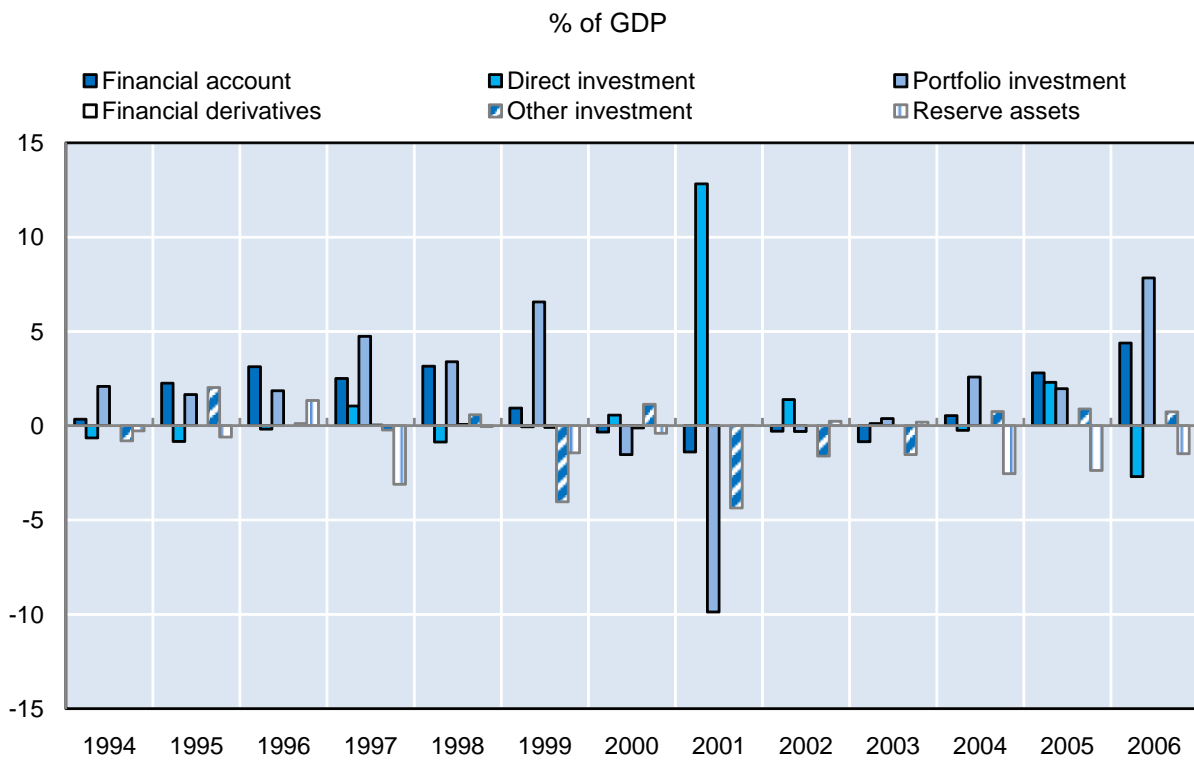
% of GDP

Source: International Financial Statistics, IMF; authors' calculations.

Table 2.3 Balance of payments items 1990-2006

% of GDP

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Current account	**1.37**	**1.15**	**1.62**	**2.24**	**0.02**	**-1.66**	**-1.27**	**-1.58**	**-1.74**	**-0.51**	**-0.16**	**0.41**	**0.65**	**-1.00**	**-2.83**	**-3.99**	**-6.60**
Goods	5.72	4.75	5.16	6.01	3.23	1.58	2.17	1.65	1.57	3.03	3.86	6.25	3.52	1.81	-0.11	-0.41	-2.44
Services	-0.29	-0.52	-0.82	-1.14	-0.98	-0.90	-0.50	-0.43	-0.21	-0.41	-0.64	-0.46	-0.38	0.13	-0.26	-0.41	-0.91
Income balance	-3.77	-2.65	-2.41	-2.12	-1.78	-1.91	-2.36	-2.28	-2.51	-2.43	-2.61	-4.50	-2.07	-2.42	-1.74	-2.02	-2.12
Current transfers balance	-0.28	-0.43	-0.30	-0.51	-0.45	-0.43	-0.57	-0.51	-0.59	-0.70	-0.76	-0.88	-0.41	-0.52	-0.71	-1.15	-1.13
Capital account	**-0.05**	**-0.03**	**-0.03**	**-0.05**	**-0.05**	**-0.03**	**-0.04**	**-0.14**	**-0.04**	**-0.05**	**-0.04**	**-0.04**	**-0.01**	**0.02**	**0.02**	**0.01**	**0.01**
Financial account	**-1.23**	**-1.30**	**-0.62**	**-0.24**	**0.36**	**2.25**	**3.13**	**2.51**	**3.15**	**0.94**	**-0.33**	**-1.39**	**-0.28**	**-0.85**	**0.54**	**2.80**	**4.39**
Direct investment	-0.09	0.04	-1.59	-0.22	-0.65	-0.83	-0.18	1.06	-0.86	-0.06	0.57	12.83	1.39	0.12	-0.24	2.31	-2.69
Portfolio investment	0.01	0.19	1.43	0.60	2.08	1.66	1.85	4.75	3.39	6.57	-1.53	-9.87	-0.31	0.38	2.58	1.97	7.84
Financial derivatives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.08	-0.09	-0.12	0.00	0.00	0.00	0.00	0.00
Other investment	-1.13	-1.47	-0.26	-0.61	-0.80	2.03	0.11	-0.23	0.58	-4.03	1.14	-4.37	-1.61	-1.54	0.75	0.90	0.73
Reserve assets	-0.01	-0.06	-0.20	0.00	-0.27	-0.61	1.33	-3.10	-0.04	-1.45	-0.39	0.03	0.24	0.19	-2.55	-2.37	-1.49
Errors and omissions	**-0.09**	**0.17**	**-0.97**	**-1.95**	**-0.33**	**-0.57**	**-1.82**	**-0.80**	**-1.37**	**-0.38**	**0.53**	**1.02**	**-0.36**	**1.83**	**2.27**	**1.18**	**2.20**

Source: International Financial Statistics, IMF; authors' calculations.

24.   Bearing in mind the intimate relationship between goods, services and financial flows in the balance of payments, it is not unusual for a transition or emerging economy to run a current account deficit in periods when it is importing capital needed for the restructuring of the economy. Yet, as pointed out in OECD (2008), while the recent levels of current account deficit are not extreme (current account deficit amounted to -7.3 of GDP in 2007 and is projected to deepen slightly in 2008), they may expose South Africa to the risk of financial crisis associated with a sudden drop of capital inflows. This may be even more so given the portfolio investment-dominated structure of the financial account and the current situation in the financial markets.

25.   Indeed, the current financial crisis and economic downturn are having a negative impact on international financial flows and thus can negatively impact the financing of South Africa's deepening current account deficits. Another aspect of the current global financial and economic turmoil is the worsening terms of trade for commodity producers, including South Africa. These recent unexpected events have added to already existing economic, social and political problems of the country. Thriving on cheap energy in the past, South Africa's economy has been recently suffering electricity shortages that manifested themselves with full force towards the end of 2007 and at the beginning of 2008. The government has devised a set of measures on both the supply and the demand side of the electricity market that can help in the long run (see OECD 2008) but most likely a combination of power shortages, restrictions on energy use and increasing energy prices is going to continue undermining the competitiveness of South Africa economy in the most immediate future. Inflation has been rising since early 2006 exceeding the South African Reserve Bank target of 3-6% in April 2007 and reaching 13.6% in August 2008. Food and energy prices were the major contributors but inflation expectations have also risen at the time.

26.   These strictly economic concerns are additionally aggravated by a combination of social and political factors. Health, Nutrition and Population (HNP) statistics, for example, place South Africa below most of the corresponding upper middle income countries grouping averages in terms of nutrition, life expectancy and mortality.[5] The country also continues to have one of the world's highest crime rates, which is worsening the business and investment climate, and faces political instability in its immediate neighbourhood. Also, the recent unexpected resignation of President Thabo Mbeki and a part of his cabinet in September 2008 uncovered and perhaps exasperated the divisions within the African National Congress

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[5]   Health, Nutrition and Population (HNP) statistics, World Bank.

and contributed to political uncertainty.[6] All these factors undermine to some extent the confidence with respect to South Africa's future growth and commercial performance.

3.   South Africa's Exports: Structure and Performance

3.1   Composition and Destinations of Trade in Goods

27.   As foreshadowed in the introduction, South Africa is relatively well endowed with agricultural land and high valued minerals like Australia, Canada and Brazil. The skill composition of its labour force is similar to many middle income countries. Accordingly, South Africa's trade is most similar to Australia, Canada and especially Brazil. Its trade is quite dissimilar to other African countries.

28.   The major categories of South African exports and imports are presented in Table 3.1. Nominal merchandise exports rose 188% over the period 1995-2006 while merchandise imports rose 259%—faster than the growth in world trade. South African exports are concentrated in manufactured goods, particularly machinery and equipment items where the country is a net importer. The importance of South African net exports in diamonds and precious metal is not obvious in this Table given the degree of aggregation—it is included in manufactured goods and commodities n.e.s.

29.   Food has represented a declining share of exports and South Africa has maintained a small net export position in food and beverage products over the period. South Africa is also a major exporter of mineral fuels but its net import position has grown steadily.

30.   The export picture becomes clearer by drilling down into the product detail. The major South African merchandise export sectors are listed in Table 3.2. These 43 HS 2-digit sectors are those that produced more than USD 100 million in revenue in 2006. They represent 98% of total merchandise exports. The final column of Table 3.2 gives the import/export ratio for the sector in 2006. South Africa is a net exporter of the product line when this ratio is less than 1.0 and a net importer of the products when it is greater than 1.0. The major export sectors in 2003 were virtually the same as in 2006 and data for the earlier year are also presented in the table.

31.   Not surprisingly, 21% of the nominal USD value of South African exports are concentrated in *pearls, precious stones and metals* (diamonds, gold and the platinum group), up from 17% in 2003. The trade ratio for this sector is 0.1 indicating that the country is a large net exporter of these products. Imports of these products are not zero though because firms find it profitable to aggregate supplies from other sources for further processing and trading requirements. This two-way intra-industry trade is typical of global supply chains where international trade in intermediate products (raw materials, parts and components) can be as important as trade in final consumer goods and capital goods.

32.   Nineteen sectors produced more than 1% of South African exports in 2006. Six of these product lines are essentially primary products with five arising from the mining sector and one from the agricultural sector. The other 13 products are more highly processed (manufactured) goods although *Beverages and spirits* includes a major export in wine. The remaining manufactured export sectors are broadly based and include a number of highly elaborated manufactured products sectors from chapters 8 and 9 of the HS code.

33.   South African export strengths can be viewed in this dataset (Table 3.2) by using a measure of the structural performance of an export sector. One such approach divides export products into four groupings

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[6]   Jacob Zuma, the President of the African National Congress, was elected the President of South Africa by parliament following his party's victory in the 2009 general election.

according to two criteria: i) whether the world market for the product is growing faster or slower than average and ii) whether South Africa's world market share is growing or shrinking. A *star* product for South Africa is one in which the world market is growing faster than average and South Africa's market share is rising. Such products have obviously been performing very well. The polar extreme product type is called a *snail* and often will indicate a sector without solid future growth potential.

Table 3.1 South Africa: Composition of goods trade

Millions USD in bold and percentages

	1995	2002	2003	2004	2005	2006
Total goods	**54 971**	**49 276**	**66 179**	**87 867**	**102 024**	**122 355**
Total export	**28 226**	**23 064**	**31 636**	**40 264**	**46 991**	**53 170**
Food & live animals	6.4	8.3	7.6	6.6	6.5	5.5
Beverages and tobacco	1.3	2.1	2.1	2.0	1.8	1.5
Mineral fuel/lubricants	8.9	12.4	9.8	9.1	10.4	9.5
Animal/veg oil/fat/wax	0.2	0.1	0.1	0.1	0.1	0.1
Chemicals/products n.e.s	7.0	9.3	7.6	7.8	8.4	7.5
Manufactured goods	25.9	29.1	38.1	42.0	39.2	40.9
Machinery/transp equipmt	8.8	22.8	20.7	19.7	20.4	21.5
Miscellaneous manuf arts	3.4	5.2	4.8	4.1	3.4	2.9
Commodities nes	38.2	10.7	9.3	8.5	9.9	10.7
Total import	**26 745**	**26 212**	**34 543**	**47 603**	**55 033**	**69 185**
Food & live animals	4.6	3.5	3.4	3.4	3.2	3.1
Beverages and tobacco	0.6	0.6	0.7	0.7	0.6	0.6
Mineral fuel/lubricants	8.3	12.5	11.9	14.4	14.3	18.3
Animal/veg oil/fat/wax	1.2	0.8	0.8	0.8	0.6	0.6
Chemicals/products n.e.s	12.4	12.1	11.0	10.0	10.0	8.9
Manufactured goods	13.7	12.2	12.1	11.1	11.4	11.1
Machinery/transp equipmt	44.9	37.5	39.4	39.6	39.4	37.8
Miscellaneous manuf arts	8.0	8.5	8.2	8.3	9.0	8.9
Commodities nes	6.2	12.2	12.6	11.7	11.6	10.7

Source: UN ComTrade.

Table 3.2 Major South African Export Sectors, 2003 and 2006

Chapter HS	Sector	Structural Performance 2003	2006	Export 2003	Share % 2006	Trade Ratio M/X 2006
71	Pearls, precious stones and metals etc	star	star	17.0	21.0	0.1
72	Iron and steel	star	traditional	12.0	11.0	0.2
27	Mineral fuels	traditional	traditional	10.0	10.0	2.5
84	Boilers, machinery	emerging	emerging	8.0	9.0	2.4
87	Vehicles other than railway	emerging	emerging	10.0	9.0	1.5
26	Ores etc	snail	traditional	4.0	6.0	0.1
76	Aluminium	snail	star	3.0	4.0	0.1
85	Electrical, electronic equipment	emerging	emerging	2.4	2.3	6.5
8	Edible nuts, fruit	star	emerging	2.8	2.2	0.1
28	Inorganic chemicals	snail	traditional	1.8	2.0	0.9
29	Organic chemicals	star	emerging	1.6	1.8	1.2
73	Iron and steel	emerging	star	1.4	1.6	1.0
22	Beverages and spirits	star	snail	2.0	1.4	0.4
74	Copper, articles of	snail	star	0.5	1.2	0.4
88	Aircraft	emerging	emerging	0.3	1.1	1.4
39	Plastics	star	traditional	1.3	1.1	2.7
38	Misc. chemical products	traditional	emerging	1.0	1.1	1.4
48	Paper, paperboard	emerging	snail	1.5	1.0	1.4
94	Furniture, lighting, prefab buildings	emerging	snail	1.8	1.0	1.0
44	Wood, articles	emerging	snail	1.4	0.8	0.8
47	Wood pulp	emerging	snail	1.2	0.8	0.2
17	Sugars	snail	snail	0.8	0.8	0.2
3	Fish	emerging	snail	1.2	0.7	0.3
40	Rubber	star	traditional	0.9	0.6	2.3
20	Vegetables, fruit, nuts	star	snail	0.9	0.6	0.3
75	Nickel	star	star	0.3	0.6	1.8
90	Optical. photo, techical etc equipment	star	star	0.6	0.6	7.1
33	Essential oils, pefumes, cosmetics etc	traditional	snail	0.5	0.4	1.4
51	Wool, animal hair	emerging	emerging	0.6	0.4	0.1
68	Stone, plaster etc.	snail	star	0.3	0.4	0.9
86	Railways	traditional	traditional	0.5	0.4	0.7
24	Tobacco	na	emerging	na	0.4	0.6
41	Raw hides	snail	snail	0.5	0.4	0.5
25	Salt, sulphur etc.	snail	snail	0.5	0.3	0.8
31	Fertiliser	traditional	traditional	0.5	0.3	1.8
32	Tanning, dying	emerging	emerging	0.4	0.3	2.1
10	Cereals	snail	snail	0.5	0.3	2.2
81	Other base metals	na	star	na	0.3	0.4
30	Pharmaceuticals	na	traditional	na	0.2	11.0
21	Misc. edible products	na	emerging	na	0.2	1.5
49	Printed books	na	emerging	na	0.2	2.4
82	Tools, implements	emerging	snail	0.3	0.2	3.1
34	Soaps, waxes etc.	na	snail	na	0.2	1.4
	Share of total merchandise exports			94.3	98.2	

Column 2: names of sectors with import/export ratios less than one are shaded; Column 4: star and traditional sectors with growing country market shares in both 2003 and 2006 are shaded.
Source: International Trade Centre UNCTAD/WTO, Geneva.

34.   South African exports represent approximately 0.5% of world merchandise exports. Accordingly, the other two categories of products may also reflect potential. If world trade growth is below average but the country has a rising world market share, the product is called a *traditional* product in the table. Such products may represent niches for small and medium sized countries. The fourth type of product may be called an *emerging* product: the world market is growing faster than average but the country's world

market share is declining. To have a declining world market share in a fast growing world market that China participates in strongly is not necessarily a bad omen for a country. This is the case of *Electrical and electronic equipment* (HS 85). This sector has been the basis of Chinese trade growth over the last decade and China's output and exports have grown at spectacular rates. It is a sector with high levels of intra-industry trade and long complex supply chains that provide a number of niches for other countries. So, while China is a major exporter of final goods from this sector, it is also a net importer of *Electrical and electronic equipment*. This sector is an emerging one for South Africa so while the country is a large net importer of this sector's products, the sector is showing some promise with over 2% of exports in these products in 2003 and 2006.

35.   The *Pearls, precious stones and metals* sector was a star performer for South Africa in both years. The star nature of this sector also indicates the strategic importance of South Africa to the world economy and probably explains why global trade links were able to recover so quickly in the early 1990s (see discussion in the Introduction). However, there are risks associated with a country having a large resource-intensive export sector in the star category—so-called Dutch Disease events. That is, any volatility in real export prices in these products has a major effect on the positioning of tradeable sector resources—high product prices can quickly bid up the exchange rate, real wages expectations and the rental value of capital goods while mobilising large factor flows towards the sector. Low prices have the opposite effects. This can have destabilising effects on the rest of the tradable sector. The broad sectoral coverage of export sectors shown in Table 3.1 is some evidence that Dutch Disease effects are not obviously burdensome in South Africa.

36.   The 2006 star performers are spread throughout this list of larger export sectors. Their contribution to employment can be gauged by comparing Table 3.2 with the capital/labour ratio given in the last column of Annex Table 5.1. The mineral and metal star performers (HS chapters 71, 76, 73, 74, 75, 68 and 91) have average or somewhat higher than average capital/labour ratios. Other mining and non-ferrous metals (aluminium, copper and nickel) are much more capital intensive than average. On the other hand, electronic and other equipment are very labour intensive in South Africa relative to the economy-wide average. There are 14 snail sectors in the list for 2006. These unpreferred sectors are not prevalent towards the top of the list – they tend to be clustered in the middle and at the bottom.

37.   A number of the top 2-digit export sectors tend to involve capital intensive production. For example, 6 of the top 10 tend to have that characteristic (71, 72, 27, 26, 76 and 28). On the other hand, there are a number of emerging and traditional export sectors that can involve labour intensive operations.

38.   Slightly over half of these larger export sectors have import/export ratios greater than one (names of sectors with import/export ratios less than one are shaded). This provides some evidence of intra-industry trade in parts and components and accordingly, good South African interconnections into global supply chains. While international developments tend to promote globalisation, South Africa can further integrate itself into these supply chains efficiently but only if it can match the trade liberalisation efforts of other countries. On the one hand, the exportable sector has to be able to obtain parts, components and capital equipment at the lowest possible import price and it has to be able to export components and final goods of international quality at internationally competitive prices.

39.   The structural status of these sectors in terms of the star/snail classification has changed between 2003 and 2006. One interesting dimension of these changes focuses on sectors where South Africa's world market share is increasing—regardless of the world market growth position. Star and traditional sectors involve growing country market shares and where this applies to both 2003 and 2006, the sector has been shaded in column 4 of Table 3.2. The first three sectors (71, 72 and 27) all fall into this category – South Africa's market share was growing in both periods. There are fourteen such sectors in the 43 sectors listed – their export performance has been very positive in recent years.

40.   South Africa's top performing exporter sectors probably also include a number of sectors where South Africa's world market share is falling as mentioned above. Sectors 84, 87 and 85 fall into this group. Emerging markets have greatly expanded exports in these products recently and South Africa's falling world market shares may still represent good performance.

41.   There are a number of sectors which have not performed well on these measures. *Beverages and spirits* (22) and *Vegetables, fruit and nuts* (20) are examples where the sector has moved from star status in 2003 to a snail in 2006 – South Africa's world market share has fallen (and world market growth has fallen below average). The first sector's performance may reflect recent over-supply problems in the world wine market. South Africa's export share in *Beverages and spirits* has fallen from 2% in 2003 to 1.4% in 2006.

42.   An alternative measure of international competitive strength is revealed comparative advantage[7] (Annex Table 3.1). As one would expect, South Africa had a revealed comparative advantage (RCA index greater than 1.0) in 2006 in the broad range of products towards the top of the major export sector list in Table 3.1. However, there are major differences to the order in which they appear in the RCA list and the top export list. This points to trade and industry policy distortions. For example, five agricultural and aquaculture HS2 sectors have a revealed comparative advantage (03, 08, 17, 20, 22 and 51) but they do not all appear in the major exporter list. South Africa has a revealed comparative advantage in a range of chemicals and forestry products (28, 31, 36 and 47). Again, unsurprisingly, the RCA indices are highest for mineral products (HS chapter 7).

43.   South Africa also has a revealed comparative advantage in machinery and equipment items (86 and 87), although the indices are not high. These products are, however, towards the top of the major export list (Table 3.2). Furthermore, sectors 84 and 85 are amongst the top 10 exports and South Africa has a revealed comparative disadvantage in these products, though in the case of sector 86 the RCA index has been rising at 6.4% per year over the last decade. This is evidence that the two sectors are receiving industry protection, OECD (2008), which would bias the RCA index upwards. Likewise, the true comparative advantage index for the motor vehicle industry (HS87) is accordingly very likely to be less than 1.0 indicating a comparative disadvantage.

44.   On the other hand, the situation for some agricultural products appears to be the reverse – there are fewer agricultural products in the major export list than one might expect from the RCA data. This suggests that industry and trade policy in South Africa is taxing the agricultural sector in some way. Anderson *et al.* (2007) confirm this conjecture. They estimate that the relative rate of agricultural to non-agricultural assistance was -5% over the period 2000-2005. That is, policy assistance to non-agricultural tradable sectors has increased relative to South African agricultural sectors. Furthermore, this implicit export tax on agricultural products has grown in recent years—from a relatively neutral position prior to 2000. In this environment resources will move from the agricultural sector to the non-agricultural sectors and exports originating in the non-agricultural sectors will tend to grow faster than from the agricultural sectors.

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[7]   Revealed comparative advantage indices are defined as the ratio of a country's exports of a product to that country's total exports, divided by the ratio of world exports of the product to total world exports. The value of the index ranges from 0 (strong revealed comparative disadvantage) to a very large number. An index greater than (less than) 1.0 indicates a comparative advantage (disadvantage) in that product. RCA indices are very crude measures of true comparative advantage in some ways. RCA indices are not adjusted for a wide range of policy distortions that affect trade. The concept of true comparative advantage connotes a degree of competitiveness with no industry or trade policy intervention.

45.   Most of the 2-digit sectors listed in Annex Table 3.1 have RCA indices in 2006 that are less than 1.0 – indicating a comparative disadvantage. From a low-skill employment perspective, the labour intensive chapter 5 and 6 products are less than 1.0, as is sector 85, just referred to.

46.   The RCA indices for many products have changed significantly over the period 1996-2006. The RCA index of chapter 86 has experienced a 11.1% annual decline while the index of chapter 87 has grown at 12.8% per year over the decade. The footwear, clothing and textile sectors have generally experienced rapid declines in revealed comparative advantage. These changes are part of the global changes in patterns of comparative advantage in recent decades. The changes are related in general to the rapid dispersion in economic activity globally and they require equally rapid adaptation on the part of firms and governments to select new competitive niches. Where countries have been able to do that the RCA indices in particular sectors remain high but the component or product composition changes.

Figure 3.1 Evolution of South Africa's export mix according to skill intensity (based on SITC classification), 1996-2006

Percentages
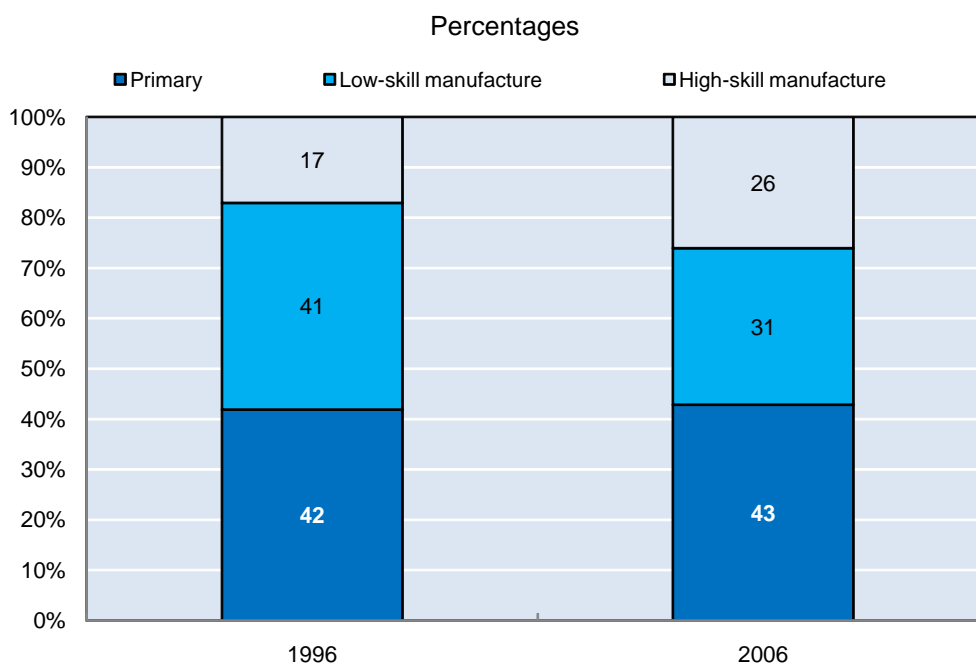
Source: UN ComTrade.

47.   Figure 3.1 provides a picture of the evolution of South African goods exports by skill intensity. The notable feature of this figure is the decline in the proportion of low-skill manufactures in the mix since 1996. If this decline is an accurate depiction of a rising skill intensity in the export mix then it shows a lack of congruence with the low-skill endowment of the workforce as a whole and the slow progress in raising skill levels over the last decade, OECD (2008). However, some caution is required in interpreting this data as the classification system may not be fine enough to truly represent South African export production systems.

48.   The main destinations for South African exports of goods are the EU, Japan, US, China, Switzerland and Australia (Figure 3.2). Overall, it is a tripolar pattern of Europe, Asia-Pacific and Africa. The biggest changes over the decade from 1996 have been with respect to EU (down 2 percentage points), Japan (up 4 percentage points), US (up 4 percentage points) and Zimbabwe (down 3 percentage points). The concentration of exports in higher income countries reflects in part the industrial demand for precious metals and minerals by producers of high tech components and final goods.

49.   South Africa's shares in export markets are, of course, highest in African countries (Table 3.3). Some emerging economies are also included for comparison. Its market share amongst BRIIC importers has trended differently. Interestingly, South Africa's market share in Brazil has been increasing in spite of the fact raised earlier that the two countries have a very high trade similarity index. Its share in China is also rising but falling in India where South Africa has had a 2% market share.

Figure 3.2 Top 10 destinations of goods exports of South Africa in 1996 and 2006

Percentages

A. 1996

B. 2006
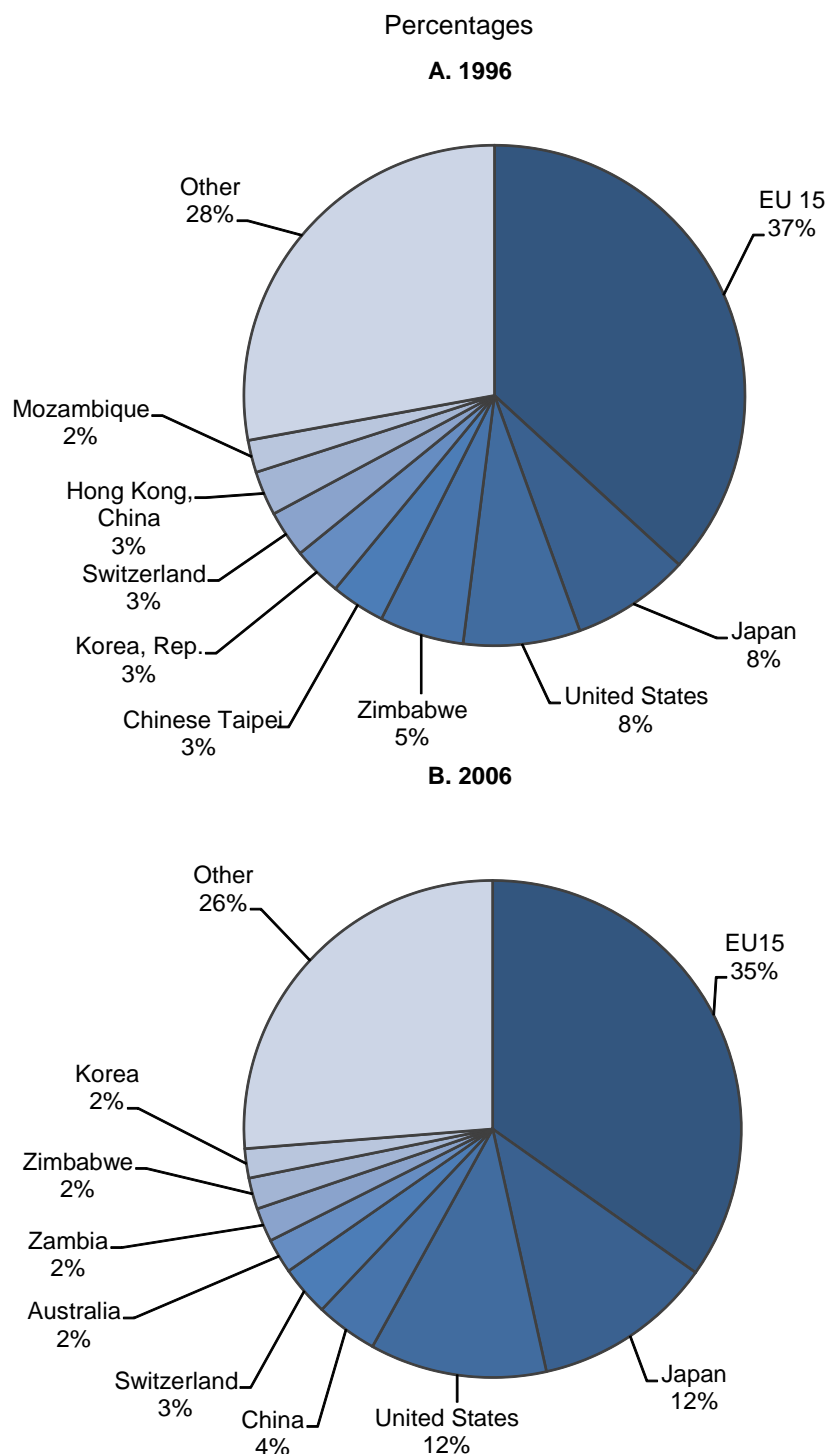
Source: UN ComTrade.

Table 3.3 Evolution of South Africa's market share in key markets

Percentages

	2000	2006	Annual growth rate
Brazil	0.41	0.47	2.48
China	0.32	0.45	5.99
EU15	0.59	0.56	-0.85
India	2.06	1.35	-6.80
Indonesia	0.54	0.37	-6.17
Israel	0.81	0.25	-17.72
Japan	0.82	1.16	5.93
Kenya	7.77	6.50	-2.94
Korea, Rep.	0.60	0.45	-4.88
Madagascar	3.60	5.75	8.10
Tanzania	12.14	12.32	0.24
Uganda	6.91	6.12	-2.00
Zambia	55.60	47.83	-2.48

Source: UN ComTrade.

50.   Trade intensity indices (Table 3.3) [8] provide another dimension on export market shares. Here South Africa's trade is examined with respect to a group of emerging economies and a group of African trading partners. The critical value for trade intensity is 1.0. South Africa trades much more intensively with a range of African countries than one would expect based on the global exports to these countries – the trade intensity indices for the countries from Guinea to Zimbabwe towards the bottom of the table are much greater than 1.0. However, the trade intensity with these African partners is generally weakening somewhat either because they are tending to source imports away from South Africa or because South Africa is tending to increasingly explore export markets away from Africa. This is not surprising given the rapid dispersion of economic activity globally in recent years and changing patterns of comparative advantages in goods and services that have resulted.

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[8]   The trade intensity index (T) is used to determine whether the value of trade between two countries is greater or smaller than would be expected on the basis of their importance in world trade. It is defined as the share of one country's exports going to a partner divided by the share of world exports going to the partner. It is calculated as: $T_{ij} = (x_{ij}/X_{it})/ (x_{wj}/X_{wt})$; where x_{ij} and x_{wj} are the values of country i's exports and of world exports to country j and where X_{it} and X_{wt} are country i's total exports and total world exports respectively. An index of more (less) than one indicates a bilateral trade flow that is larger (smaller) than expected given the partner country's importance in world trade.

Table 3.3 Merchandise trade intensities, selected partners

	2000	2001	2002	2003	2004	2005	2006
Brazil	1.00	1.23	1.00	0.85	0.89	0.94	0.97
Russia	0.19	0.14	0.20	0.23	0.21	0.12	0.14
India	2.49	2.52	2.24	1.47	1.77	2.30	1.31
Indonesia	0.98	0.84	0.90	0.70	0.56	0.67	0.56
China	0.44	0.53	0.47	0.56	0.49	0.52	0.68
EU25	1.02	0.78	1.01	0.91	0.93	0.95	0.93
Japan	1.16	1.08	1.40	2.20	2.48	2.35	2.78
United States	0.56	0.49	0.60	0.74	0.75	0.68	0.77
Guinea	3.00	1.96	3.74	11.70	9.72	6.28	6.28
Israel	4.42	4.50	4.97	3.95	3.70	3.96	3.32
Kenya	26.50	18.26	24.49	20.67	24.19	17.57	15.18
Madagascar	15.15	13.38	17.75	19.01	15.60	13.93	12.75
Mauritius	42.85	27.67	39.22	30.39	23.73	27.48	18.45
Mozambique	151.32	132.80	109.15	114.61	98.02	89.92	92.45
Seychelles	31.30	12.11	31.97	25.06	20.71	29.31	23.55
Tanzania	42.80	28.97	36.15	29.13	32.14	27.64	26.42
Zambia	163.94	151.95	128.27	135.62	125.05	123.16	125.57
Zimbabwe	127.83	125.14	146.95	132.32	119.50	127.33	117.84

Source: UN ComTrade.

51.   South Africa also trades intensively with India, Japan and Israel but while trade intensity with India and Israel is falling, it is rising sharply for Japan. Trade intensity is low for China but rising fairly rapidly. The EU is South Africa's major trading partner and the index has declined slightly but has tended to hover around 1.0 in recent years.

3.2   A Dynamic Analysis of Past Export Goods Performance

52.   The view of South African and world trade through selected groups of HS6-digit products provides an opportunity to more closely relate changes in trade, to market and firm level changes in innovation, strategy and performance, and in relation to government policy changes that are often implemented at this micro level (*e.g.* with trade policy settings). Hausmann and Rodrik (2003) have promoted this approach as a potentially effective predictive tool for identifying comparative advantage. This is because, at this level of disaggregation, countries with very similar patterns of gross factor proportions (mineral resources, unskilled labour, agricultural land and capital ratios, for example) have quite different export product specialties. In part, this is due to difficulties in disaggregating factors of production finely enough, but it is also due to the impacts of past decisions by domestic and foreign firms to successfully specialise in particular products in particular global locations. Accordingly, micro trade categories might prove to be a valuable complement to factor proportions theory in understanding changes in comparative advantage.

53.   There are approximately 6500 HS6-digit product codes. The top 25 export (import) product codes for individual countries are highly likely to comprise the set in which the country has a very high level of comparative advantage (disadvantage). Credence is given to this view by the fact that a surprisingly high proportion of world and country exports are encompassed by the top 25 HS6 products. It is certainly possible that government support policy is an important driver of export supply and/or import demand. Finally there is the question of the effects that South African trade policies are having on imports and exports in goods. This question is taken up in Section 5 of this report. Overall, however, it is likely that given the firm structure of the tradable industries, a product in the top 25 products would exhibit a comparative advantage without government support.

54.   The top 25 HS6-digit products traded globally in 2006 encompassed only a few markets and they comprised 29% of world merchandise exports. They included:

*   energy products (oil, gas and coal), 10% of world trade

*   consumer electronics goods and their components, 11%

*   pharmaceuticals, 2%

*   cars and components, 6%

*   aircraft components, 0.4%

55.   If focus is shifted to the top 50 HS6-digit products a number of additional markets come into view. Other key groupings include other minerals (diamonds, gold and copper), jewellery products, other machinery and equipment (ships, trucks, excavators and valves), plastic products and chemicals. No agricultural or food products are currently in this top 50 grouping.

56.   The fastest growing Top 50 HS6-digit goods on world markets over the period 1996-2006 are given in Annex Table 3.2. These fifty products represented around 45% of world trade growth over the period. The list is very similar to the Top 50 export products in 2006. The dark blue commodities are the ten energy and mineral products. The light blue products are the nineteen consumer electronics components and products that increasing dominated world trade in the decade.

57.   South Africa's Top 25 HS6 exports in 1996 and in 2006 are given in Annex Table 3.3. An overall feature of the Top 25 is the increase in export (and import) concentration. The Top 25 product coverage rose from 39% in 1996 to 52% in 2006, a level much higher than in a typical developed economy where one would normally expect the export mix to be more diversified (Hausmann and Rodrik, 2003). For example, countries like Germany have only 30% or so of their exports in the Top 25 HS6 products.

58.   The Top 25 are dominated by the valuable mineral products South Africa is noted for. However, their composition changed significantly over the decade. In 1996, they included diamonds, chromium, gold, nickel, manganese, zirconium and copper. In 2006, platinum replaces diamonds at the top and rhodium and palladium replaces titanium, manganese and zirconium. The specific platinum, rhodium and palladium export products listed here were virtually zero in 1996. Coal, aluminium, oil and iron ore all retained their high ranking in 2006. All these mineral-based products are coded blue in Table 3.4. There were 16 colour coded products in 1996 and 17 in 2006, virtually the same. However, there were some major changes in composition amongst the precious metals, special metals and oil exports.

59.   Amongst other products, wine retained its high ranking as did parts of seats (940190). Gas filtering machinery (842139) exports have increased a great deal over the decade. Copper cathodes dropped off the list in 2006, in favour of waste copper, which had become part of the worldwide rise in recycled materials over the decade. Other agricultural products like maize, sugar cane and ethanol dropped out of the list. Non-agriculturally based manufactures like cargo containers, construction equipment and gas filtering machinery also dropped. However, these were replaced by new entrants, mid-sized automobiles (1500-3000cc) and diesel trucks. In summary there are a number of specific growth poles in exports of what might be referred to as non-traditional South African exports and a number of areas where competitiveness seems to have declined over the decade.

60.   The Top 25 South African import products are given in Annex Table 3.4. Again, the Top 25 products are concentrating—from 25% of total merchandise imports in 1996 to 37% in 2006. It is not clear how to interpret this concentration of imports. Given that trade is in inputs as well as final products it may well reflect imported inputs, like aluminium oxide, required to produce expanding exports of aluminium

products. The large increase in automobile imports may reflect lower import barriers in these products and falling competitiveness in the domestic automobile assembly industry. In a number of areas consumer demand in South Africa follows global trends. The rapid growth in transmission apparatus (cell phones), televisions and videos and computers (digital automatic data processing machinery) and their components are cases in point. The rapid growth in these consumer electronics products reflects global consumer demand fragmentation associated with higher real incomes. Health equipment and especially medicaments have also been subject to rapidly growing trends (especially in Africa).

Table 3.4 Top 25 Export Growth Products 1994/96 to 2004/06, value terms, with exports exceeding USD50 million in 2006

Rank	Product	Product_Name	Value Growth %
1	711019	Platinum in other semi-manufactured	670 107 487
2	711011	Platinum unwrought or in powder form	580 953 720
3	711031	Rhodium unwrought or in powder form	246 679 447
4	711021	Palladium unwrought or in powder form	104 677 185
5	711039	Rhodium in other semi-manufactured	91 089 273
6	711029	Palladium in other semi-manufacture	71 251 081
7	711041	Iridium, osmium and ruthenium unwrought	38 277 940
8	720292	Ferro-vanadium	7 648 933
9	261590	Niobium, tantalum and vanadium ores	1 615 154
10	750610	Plates, sheet, strip and foil, nickel	550 157
11	260400	Nickel ores and concentrates	493 496
12	291612	Esters of acrylic acid	260 965
13	271000	Petroleum oils, etc, (excl. crude)	229 532
14	290513	Butan-1-ol (n-butyl alcohol)	184 971
15	240310	Smoking tobacco	112 506
16	480419	Kraftliner, uncoated	32 822
17	740811	Wire of refined copper	25 148
18	854140	Photosensitive semiconductor device	22 911
19	852721	Radio receivers	16 076
20	840820	Engines, diesel	14 555
21	721331	Bars/rods,i/nas,hr,in irreg wnd coils	13 305
22	721931	Flat rolled prod, stainless steel,	13 003
23	870332	Automobiles with diesel engine disp	11 588
24	760820	Tubes and pipe, aluminium alloy	9 424
25	870850	Drive axles with differential	6 358

Source: UN ComTrade.

61.   If we maintain the HS6-digit product focus the growth in the value of exports provides an interesting picture for South Africa and affirms a number of points raised with respect to Annex Table 3.3. The Top 25 fastest growing South African exports are listed in Table 3.4. These products tend to be ones that were hardly exported at all in 1996 but are important exports in 2006. Not unexpectedly, the top half of the table reflects the fast growing exports in the platinum group of metals used in the manufacture of catalysts and principally in the automotive industry—platinum, rhodium, palladium, indium, osmium and ruthenium. The fastest growing list includes a number of other metal products of copper, steel, nickel and aluminium.

62.   Outside these metals are a disparate group of products, tobacco, industrial chemicals, paper and two electronics products. Three automotive products are included, diesel powered automobiles, diesel engines, and drive axles for vehicles. Refined oils (271 000) are included reflecting a niche South Africa appears to have in oil refining in spite of the fact that the country is not self-sufficient in crude oil.

3.3 Composition and Destinations of Trade in Services

63.   South African services exports represent around 18% of current account credits. Services exports are heavily concentrated in travel services (65.6% in 2006) and their importance has risen 50%[9] since the trade embargo was lifted (Table 3.5). In absolute terms the rise is more dramatic—exports of travel services rose from USD 2.1 billion in 1995 to USD 7.9 billion in 2006. Figure 3.3 illustrates that the post mid-1990s expansion of services exports of South Africa can be attributed almost entirely to exports of travel services. In fact, the ratios of transport and other commercial services exports to GDP have been stagnant in the considered period. Figure 3.5 demonstrates that South Africa seems to have developed a strong advantage in travel services as its share of world travel services trade has gone up dramatically starting in 2003 and now stands above South Africa's share of world GDP (Figure 3.4). These developments point to the important endowments the country has in tourist attractions. This is a valuable set of resources in balance of payments terms and also because the provision of tourism services is usually very intensive in its employment of low-skilled labour.

64.   In a similar way travel exports have dominated services exports, transport dominated services imports and they now corresponds to close to 3% of GDP (Figure 3.3). Transport services amount to nearly fifty percent (46.4%) of South African imports of services as compared to 12.4% services exports of transport services. This reflects both large distances to major markets (see Table 1.1 in the Introduction), economic and political instability in South Africa's neighboring countries and the relative use of foreign carriers.[10] Imports of travel services, on the other hand, are much less than exports.

65.   South Africa is a net importer of other services reflecting relatively large imports of foreign patents and licenses and insurance services. The business services deficit is less marked, however, and South Africa exports of business services represent 7.2% of total services exports in 2006. However, business services exports have tended to trend down in percentage terms since 1995 while imports of business services have tended to trend upwards in the same terms.

66.   South Africa's export performance in the services trade is illustrated in Figure 3.5 using the `star' performance indicator discussed earlier. The *star* performers (world services trade growing faster than average and South Africa's market share increasing) are computer and information services, insurance, financial services and communications services. The fact that the travel sector is not considered a star performer shows limitations of the given methodology; this is the case only because the share of this sector in total services trade has gone down globally. The only *snail* service is transportation. The general pattern of these structure performance indicators reflects future potential in service sector trade performance though development of transportation services should be seen as a priority.

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[9]   From 46% of USD 4.6 billion in 1995 to 65.6% of USD 12 billion in 2006.

[10]   Statistics concerning trade of transport services are subject to large fluctuations of costs of shipping.

Figure 3.3 South Africa's services trade (as a % of GDP)
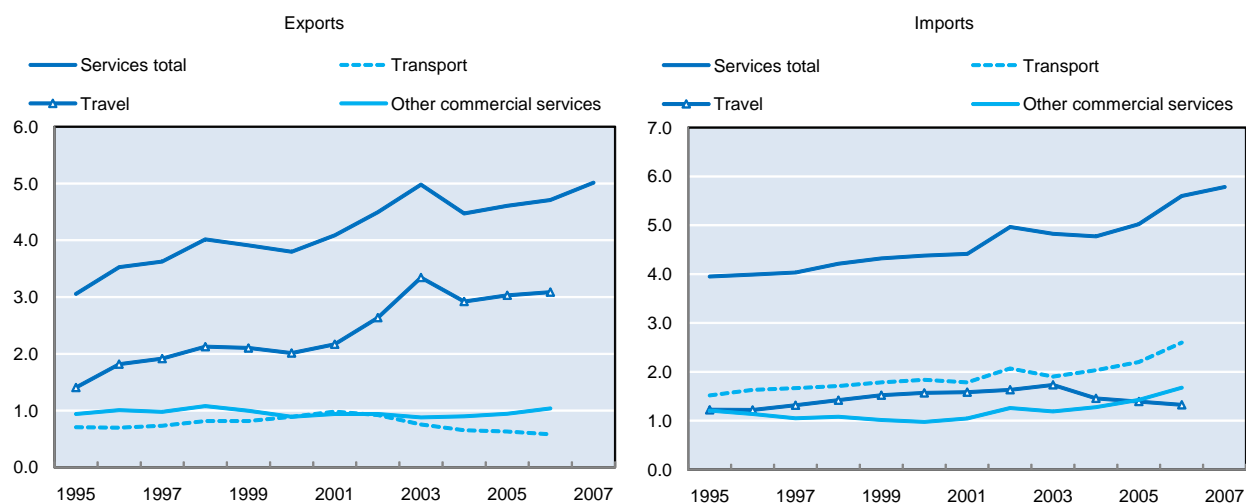
Source: WTI (2008).

Table 3.5 Composition of services and trade

Million USD and percentages

SERVICES	1990	1995	2002	2003	2004	2005	2006
	-331	**-1 352**	**-519**	**254**	**-646**	**-998**	**-2 276**
Total export	**3 407**	**4 619**	**4 985**	**8 298**	**9 682**	**11 157**	**12 014**
Transportation services	20.8	23.2	20.5	15.2	14.6	13.7	12.4
Travel	53.9	46.0	58.6	67.1	65.3	65.7	65.6
Other services	25.3	30.8	20.9	17.7	20.1	20.5	22.1
Communications	*1.5*	*0.9*	*1.9*	*1.6*	*1.9*	*2.1*	*2.5*
Construction	*..*	*..*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*
Insurance	*10.4*	*9.5*	*1.1*	*0.9*	*1.1*	*1.1*	*1.3*
Financial	*..*	*..*	*4.5*	*3.6*	*4.4*	*4.8*	*5.9*
Computer and information	*..*	*..*	*0.9*	*0.8*	*0.9*	*1.0*	*1.1*
Royalties and licence fees	*0.6*	*1.0*	*0.4*	*0.3*	*0.4*	*0.4*	*0.4*
Other business services	*9.5*	*15.0*	*8.6*	*7.3*	*7.7*	*7.5*	*7.2*
Personal, cultural, and recreational	*..*	*..*	*0.8*	*0.7*	*0.9*	*1.0*	*0.9*
Government, n.i.e.	*3.4*	*4.4*	*2.5*	*2.2*	*2.5*	*2.3*	*2.5*
Total import	**3 738**	**5 971**	**5 504**	**8 045**	**10 328**	**12 155**	**14 291**
Transportation services	38.6	38.5	41.7	39.5	42.6	43.8	46.4
Travel	30.3	31.0	32.9	35.9	30.6	27.8	23.7
Other services	31.1	30.6	25.4	24.6	26.8	28.4	29.9
Communications	*2.5*	*2.1*	*1.3*	*1.2*	*1.4*	*1.6*	*1.7*
Construction	*..*	*..*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*
Insurance	*11.2*	*13.6*	*4.1*	*3.7*	*3.8*	*3.9*	*4.1*
Financial	*..*	*..*	*1.4*	*1.3*	*1.4*	*1.5*	*1.2*
Computer and information	*..*	*..*	*0.8*	*0.7*	*0.8*	*0.9*	*0.9*
Royalties and licence fees	*3.5*	*4.9*	*8.1*	*7.7*	*8.6*	*8.8*	*9.0*
Other business services	*10.1*	*6.4*	*7.4*	*7.5*	*8.1*	*9.1*	*10.5*
Personal, cultural, and recreational	*..*	*..*	*0.1*	*0.0*	*0.0*	*0.1*	*0.1*
Government, n.i.e.	*3.8*	*3.6*	*2.3*	*2.5*	*2.6*	*2.4*	*2.4*

Source: IMF BOP (2008).

Figure 3.4 South Africa's services exports (as a % of world trade)
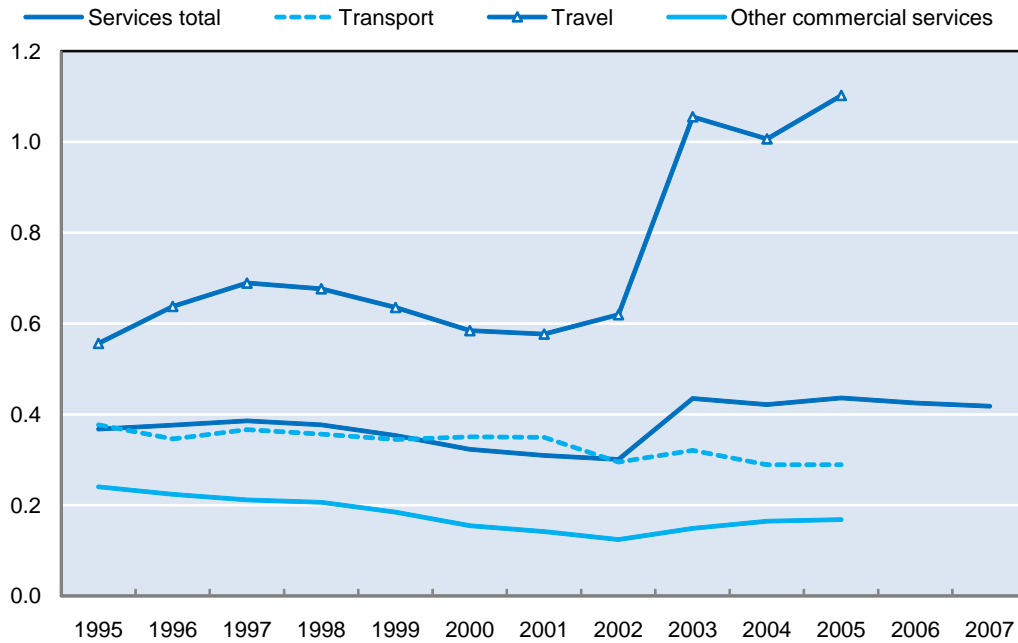
Source: WTI (2008).

Figure 3.5 South Africa's export performance: services trade, 2001-2006
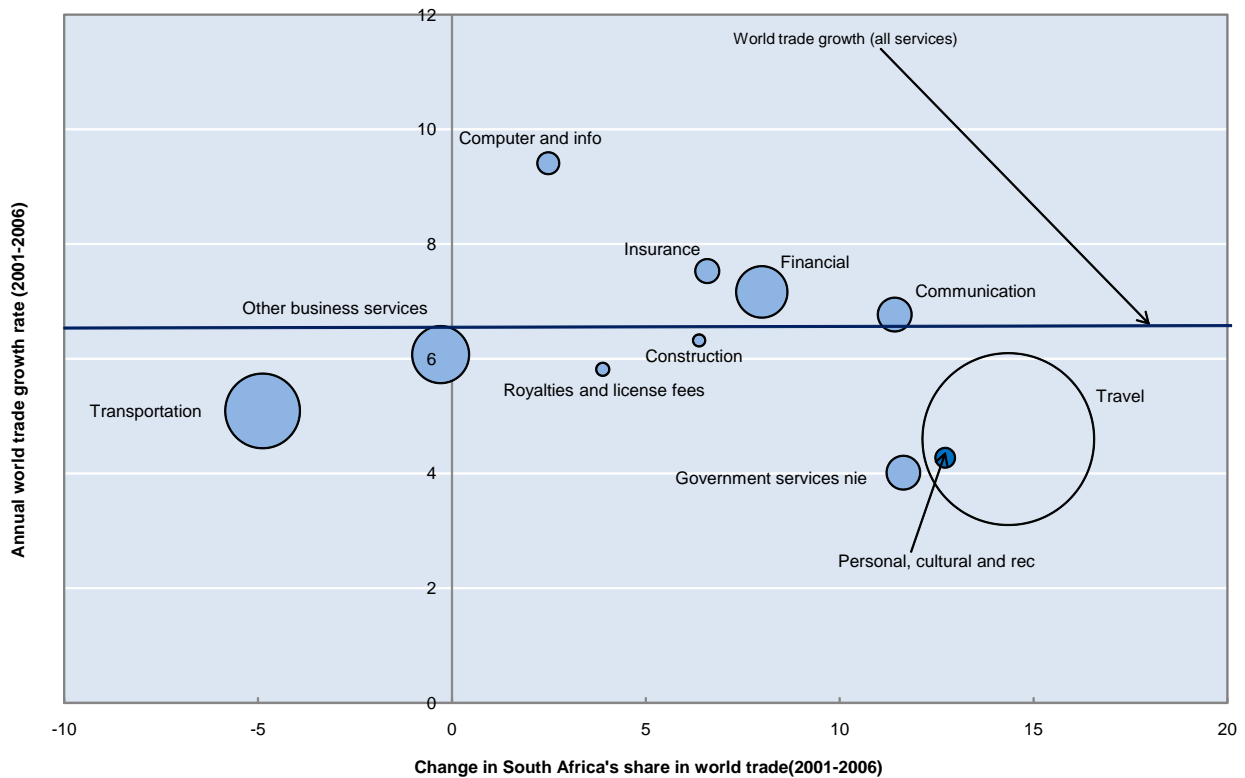
Source: IMF BOP (2008).

4. South Africa's comparative trade performance—a gravity model analysis

67. So far this report has dealt with the main macroeconomic and structural trade developments focusing on South Africa alone but not focusing on South Africa's trade performance relative to its trading partners and to the broader global trading environment. Such an approach runs an obvious risk of attributing to South Africa's trade performance some of the global or trading partners' influences. For example South Africa's export performance is determined by its own competitiveness and policies but also by demand and policy developments in its trading partners. Similarly, South African imports will not only be affected by its own trade barriers but also by the developments in the supplying countries, such as their competitiveness and policy. Also, certain factors, such as South Africa's significant remoteness from major trading partners in Europe and North America (see Table 1.1) or its historical and cultural links to certain countries are likely to affect the nature of its bilateral trade relationships. Finally, it is worth knowing to what extent a country's exports or imports are driven by the sheer expansion of its (and its trading partners') income and to what extent they may be driven by trade and other policy reforms.

68. To assess South Africa's trade performance in a comparative framework, an econometric model based on the gravity model of international trade has been developed.[11] The version of gravity equation from which we depart in this analysis is based on the original derivation by Anderson & Van Wincoop (2003, 2004). A similar approach was taken earlier in the context of South-South trade by Kowalski and Shepherd (2006), in the context of Brazil's trade performance by Lattimore and Kowalski (2008) and in the context of BRIICS trade by Kowalski (2008). To save on space and focus on results, the details of the methodology are laid out in the Annex to the report.

69. The approach allows us to rigorously decompose historical trade trends into a number of distinct components such as:

- Year-specific effects that may be common to all trading partners (*e.g.* years of global slowdown of world trade).

- Country pair-specific time-invariant fixed effects reflecting time-invariant bilateral and geographical factors (*e.g.* distance, common language, colonial relationship etc.).

- The fixed effects for exporting and importing countries that vary in time (*e.g.* compound effects of country-specific developments and policies that influence trade of a given country with all other partners, MFN liberalisation or improvements in competition policy for instance).

- Time-invariant fixed effects for exporting and importing country that capture permanent factors that influence trade of a given country.

- Residuals that capture the part of variation in bilateral trade flows that is not explained by any of the explicitly specified fixed effects.

70. The results of this analysis focus on South Africa's trade performance in relation to the BRIICS (Brazil, Russia, India, Indonesia and China). The 46 country dataset used in this analysis generally encompasses the period 1985-2006 and includes bilateral trade data for all the OECD countries, the BRIICS and a number of other countries that are significant players in world trade or are important trading partners of any of the BRIICS. The model is estimated for total merchandise exports and imports and for capital goods, consumption goods, raw materials and intermediate goods as defined in the World Integrated Trade Solution (WITS) database.

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[11]   The full derivation of the model is described in Kowalski (2008).

4.1   South Africa's comparative trade performance

71.   To enhance the comparative nature of this exercise and, specifically, to ensure comparability of the estimated trade equation coefficients across various trading country pairs, it is convenient to express the explanatory variable in the model not as a value of bilateral exports but as a value of exports relative to the combined (multiplicative) GDP of the two trading partners.[12] This dependant variable can be interpreted as a measure of trade intensity that accounts for the economic sizes of trading countries and is more comparable across country pairs. This leads to comparability in the estimated regression coefficients.[13]

72.   The estimated fixed effects in this approach are coefficients on binary variables that represent the various components that are thought to determine bilateral trade flows. The regressions include a constant term that necessitates dropping some country fixed effects—one out of forty six effects needs to be dropped. One of the years also needs to be dropped. We choose to drop a binary variable for the first year in the database (1988) and chose the United States to be the reference exporter and importer for fixed effects that are constant over time and for exporter and importer fixed effects that vary over time. This implies that the actual values of estimated fixed effects are specific to the US and that, because of the common benchmark the results can be compared across all the non-reference countries in the sample.

73.   Estimation results for terms that isolate the specific increases in US total trade over time are presented graphically in Figure 4.1, including the range of the estimated 95% confidence intervals. In all figures that follow the scale of the vertical axis measures the logarithm of the relative value of trade. Missing fixed effects should be interpreted as those dropped from the estimation because of missing observations.

74.   The estimated US fixed effects in Figure 4.1 suggest that, despite the gently negative trend in point estimates, on average the US's relative trade with its trading partners was not significantly different between 1988 and 2001. In 2001 a significant and gradually falling trend most likely reflects the slowdown in US commerce following 11th September 2001 events.

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[12] $\log \left(\dfrac{X_{ij}^{k}}{Y_{i}^{k} Y_{j}^{k}} \right)$ instead of *logXij*

[13]   This formulation has also been advocated in the literature as a way of dealing with the criticism that GDP is endogenous.

Figure 4.1 Year fixed effects
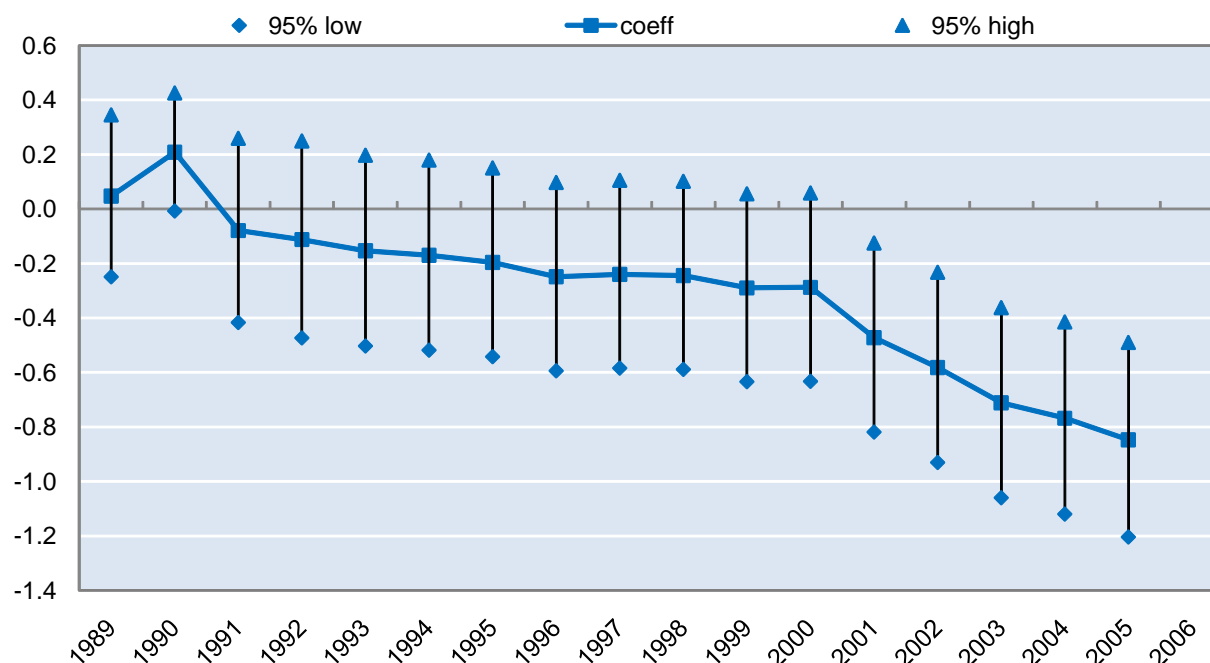
Source: Authors' calculations.

75.   The terms that pick up time-invariant fixed effects for exporting and importing countries ($\hat{\delta}^{E}{}_{i}$ and $\hat{\delta}^{I}{}_{j}$ in the Annex) indicate whether the value of exports relative to the combined GDP of the two trading partners has been on average (over the investigated period) higher or lower for a given country as compared to the US. South Africa belongs to a group of countries that imported more intensively than the US (controlling for the sizes of exporting and importing country, see Annex Figure 4.1). Japan, Canada and Australia, for example, have been importing less intensively than the US. The negative time-invariant fixed effect estimated for South Africa as an exporter indicates that South Africa has been exporting less intensely than the US. This is also the case for Indonesia, Russia and China (see Annex Figure 4.2).

Figure 4.2 Time varying fixed effects of BRIICS as exporters
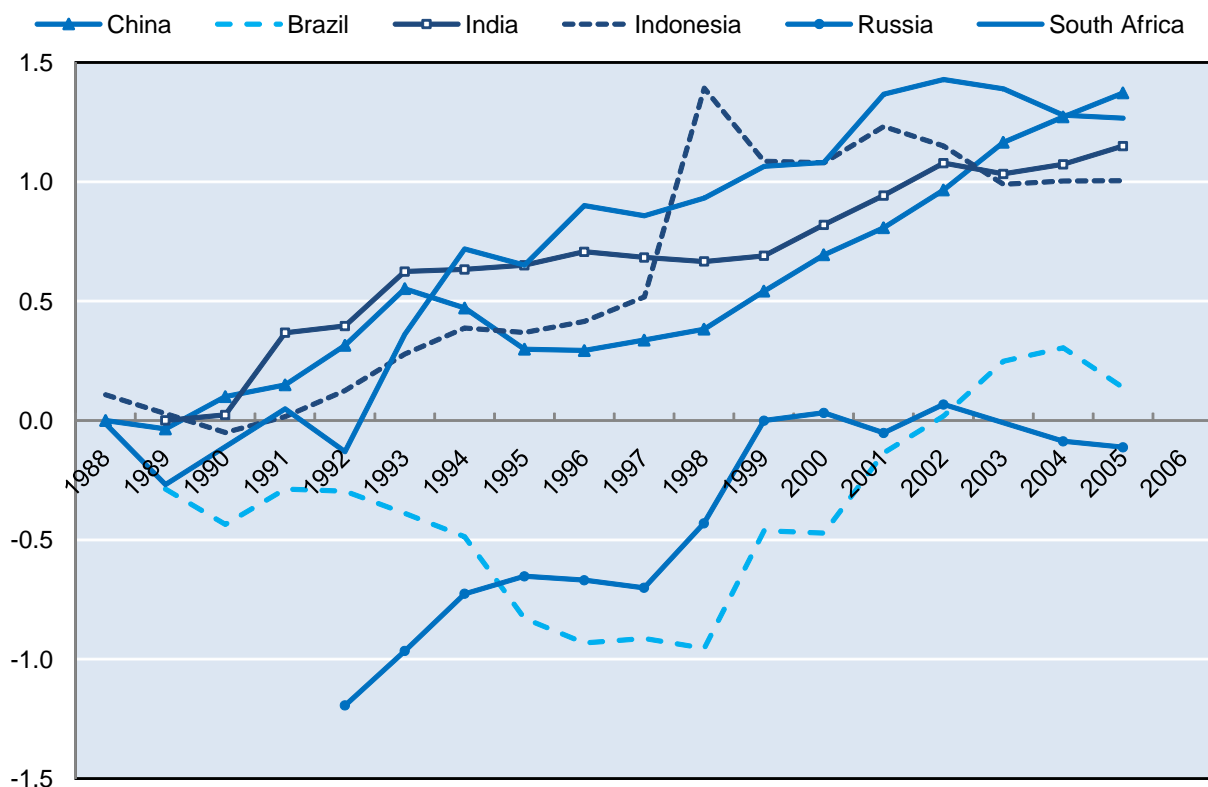
Source: Authors' calculations.

76. The time-varying fixed effects ($\hat{\delta}^E{}_{it}$ and $\hat{\delta}^I{}_{jt}$ in the Annex) are of most interest in the current analysis. For exporting countries they pick up the relative price effects along with time-varying factors specific to an exporting country such as the supply side effects of opening up to trade on an MFN basis or trade effects of country-specific reforms and policies (*e.g.* product and factor market reforms). Similarly, for importing countries the time-varying fixed effects pick up the effects of import liberalisation policies, effects of other country-specific reforms as well as terms of trade effects. Because differences in these fixed effects with respect to time are indicators of the average change in export or import intensity across all trading partners (net of the equivalent change for the US) they can be compared across countries as a measure of export or import performance over time.[14]

77. Figure 4.2 shows that South Africa is one of the BRIICS countries that have been expanding their relative exports much faster than the US (i.e. by comparison with the zero axis), especially since early 1990s. Even more surprisingly, while China's estimated strong performance is in line with newspaper headlines concerning its increasing presence in world markets, South Africa is in the group of countries like India, Indonesia and Russia that have been performing at least as well as China. In fact South Africa surpassed China's performance in certain years. On the import side, South Africa's performance was weaker than that of the US in the first half of the 1990s but was not statistically different from the US in the second part of the 1990s and after 2000 (Figure 4.3).

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14   If we want to say something about the state of trade integration (relative to the US), these fixed effects have to be taken into account together with the time-invariant fixed effect discussed above.

Figure 4.3 Time varying fixed effects of BRIICS as importers
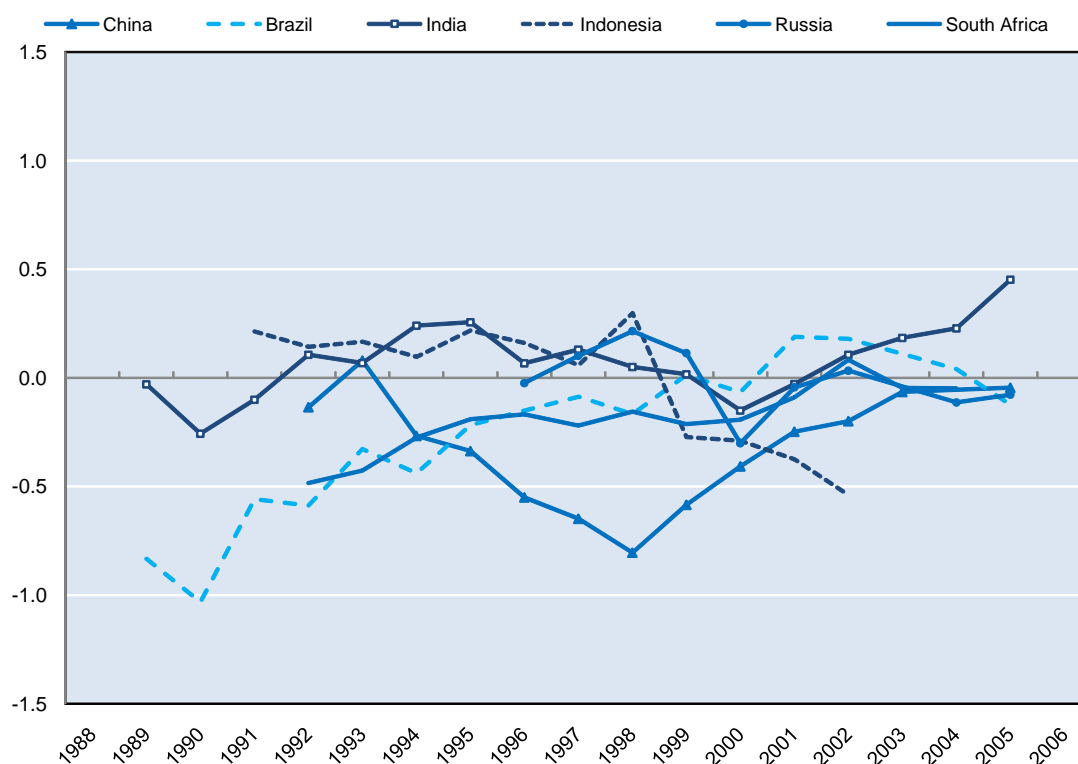
Source: Authors' calculations.

78.   Table 4.1 summarises the trends in estimated fixed effects in the form of average annual changes. These measures are telling us which countries have had the most dynamic trade integration for exports and imports. As already mentioned, South Africa is a relatively strong export performer and an even stronger import performer. It is the strongest BRIICS performer in terms of relative exports of consumption goods and is the second best performer in terms of exports of intermediate goods. As far as relative imports are concerned South African was second, after Brazil, as the fastest growing import destination.

79.   As far as BRIICS as a group are concerned, the biggest changes over time are observed for capital goods were Indonesia comes out as the strongest relative export performer; followed closely by China, India and South Africa. This expansion of capital goods exports is accompanied by equally strong imports although Indonesia has been actually decreasing import integration in this category of goods. As far as raw materials are concerned, China is an outlier. It is the only country that has not been increasing its export presence in this category of goods over time. This is hardly surprising given its rapid economic growth and its relative resource endowments. All other BRIICS have been increasing their export presence in raw materials over time, and in a remarkably uniform fashion. On the import side, China has been the most dynamic destination market for raw materials. This is consistent with its export performance and with the needs of a rapidly industrializing economy.

Table 4.1 Summary of average annual change in exporter and importer fixed effects (%)

	China	Brazil	India	Indonesia	Russia	South Africa
Exporter						
Total trade	8	3	7	7	11	6
Consumption goods	6	2	9	6	11	12
Raw materials	0	8	7	7	9	8
Capital goods	22	7	13	28	3	11
Intermediate goods	5	1	6	7	12	9
Importer						
Total trade	1	6	3	-7	1	4
Consumption goods	3	12	4	-2	-2	4
Raw materials	6	2	5	0	-4	1
Capital goods	9	9	7	-9	2	5
Intermediate goods	-1	6	5	-6	8	0

Note: based on point estimates of fixed effects.

Source: Authors calculations based on estimation results.

5. Trade policy & developments

5.1 *Overview of trade policy developments*

80. Up to the 1970s South Africa's trade policy was broadly geared towards import substitution with an aim to enhance growth, diversify economic activity and make it less dependent on gold and other natural resources (see *e.g.* Mabugu and Chitiga, 2007; Edwards, 2005). The import substitution policy and embargoes facilitated a development of domestically-oriented manufacturing sector under a highly protective structure of tariffs and quantitative restrictions. Figure 5.1 plots the evolution of export-output and import-domestic demand ratios across broad sectors and illustrates the progressive outward orientation of the mining and quarrying sector and the inward orientation of manufacturing and agriculture in 1970s and 1980s that was only reversed at the beginning of 1990s.

Figure 5.1   Export-output ratio, by industry
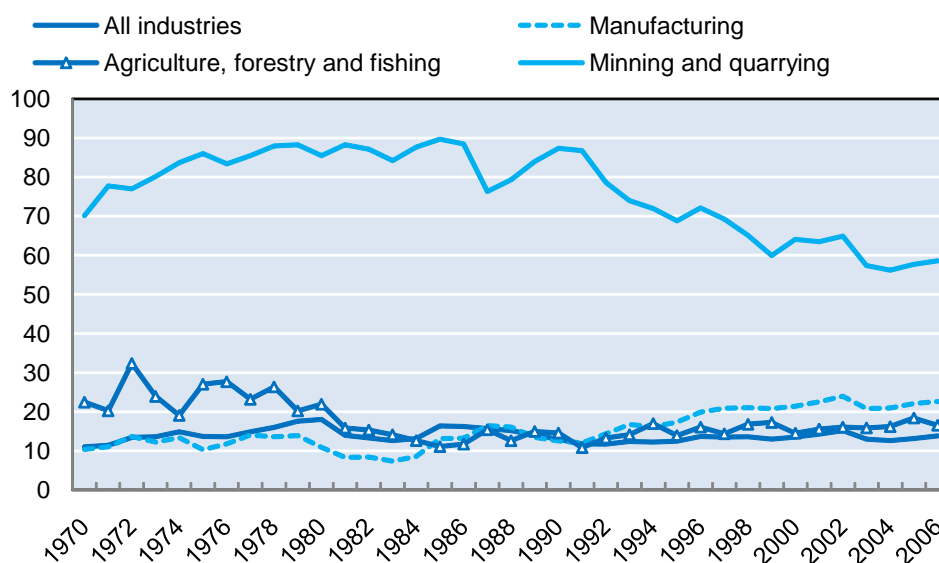
Source: Quantec database, authors' calculation.

Import-domestic demand ratio, by industry
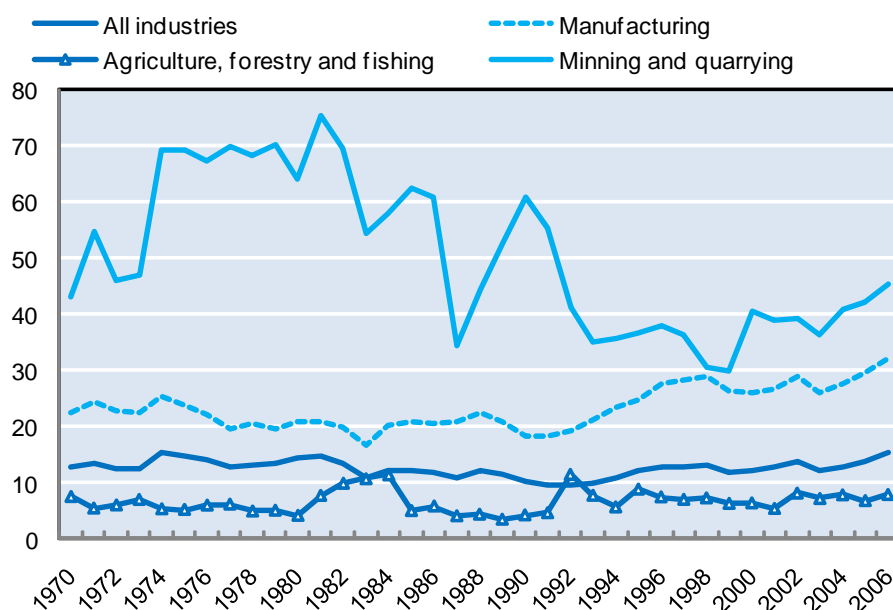
Source: Quantec database, authors' calculation.

81.   The failure of the import substitution policy to achieve the stated objectives became apparent in the late 1960s. The beginning of 1970s saw a gradual reorientation of policy towards freer trade, first through the stimulation of exports during the 1970s and 1980s and later through a broader approach to trade liberalisation (Thurlow, 2006). Notwithstanding the gradual opening up, the 1980s and early 1990s ended up being highly protective in part as a result of imposition of surcharges from 1985 in response to the debt crisis and increased calls for protection by the industry during the times of economic slowdown of the late 1980s (Bell, 1992). According to Belli *et al*. (1993) by the end of the 1980s South Africa had the highest tariff rates and the second highest level of tariff dispersion compared to a range of developing countries.

82.   The embargoes that started in the 1960s, and tightened in the later part of the apartheid era, put additional constraints on South Africa's integration with the world markets. The embargoes did not apply with a uniform strength throughout the period or across economic sectors, nor where they uniformly imposed by all South Africa's trading partners. Typically they have been intensifying in the immediate aftermaths of the riots in black townships in 1970s and 1980s and relaxing in calmer times. The relatively toughest restrictions applied to South Africa's arms trade (exports and imports) but at times the embargoes have taken forms of broader restrictions on oil exports to South Africa, establishment, investment and export financing restrictions on foreign companies conducting business in or with South Africa, restrictions of banking services provision to South African companies and government and price limits on imports of South African gold etc. Certain countries imposed complete embargoes on trade with South Africa while others applied only limited restrictions.

83.   Overall, South Africa entered the post-apartheid era with a complex system of quantitative restrictions and relatively high tariffs (17% simple average tariff in 1993, Table 5.2), which were also highly dispersed (standard deviation of 22%). At that time, in contrast to most other developing countries, South Africa's tariff structure was characterised by relatively high tariffs on consumer products and lower tariffs on imported machinery and capital goods, resulting in relatively high effective rates of protection (Table 5.1). Such a protection pattern was also symptomatic of the country's established dependence on exports as a means of financing imported investment goods (Thurlow, 2006).

84.   1990 saw the release of Nelson Mandela and the beginning of a process of lifting of trade embargoes that was largely completed by the end of 1994. The same period brought about reviews of macroeconomic and industrial policies, including the introduction of export subsidies under the General Export Incentive Scheme (GEIS) in 1990, and an initiation of fully fledged trade liberalisation which involved such policy measures as tariff reductions, reduction of quantitative restrictions and, more broadly, simplification of the trade regime.

85.   In 1994 South Africa signed the Marrakech Agreement under the Uruguay Round (UR) of the GATT where it committed to a significant liberalisation and simplification of its trade regime including a binding of 98% of tariff lines, reducing the number of tariff rates to six, rationalising the over 12,000 tariff lines and the replacement of quantitative restrictions on agriculture by tariff equivalents (see *e.g.* Edwards, 2005). Mabugu and Chitiga (2007) report that by 2004 significant progress on implementation of these commitments has been reported in that the number of tariff lines, the number of tariff lines with formula, specific and non-ad valorem duties had been reduced. Bell (1997) reports that South Africa's tariff reductions actually exceeded its UR commitments. Yet, several post 1994 assessments indicated that there was a need for further simplification of trade policy instruments (Mabugu and Chitiga, 2007; WTO, 1998; WTO, 2003). The 2003 Trade Policy Review of SACU (and South Africa as its core member) indicated that progress since 1994 on the application of formula duties, the imposition of non-ad valorem duties and the dispersion and escalation of applied MFN duties could hardly had ensured compliance with the WTO commitments.

5.2   *Merchandise trade liberalisation of the 1990s and current policy stance*

86.   The extent of trade liberalisation in the 1990s and the scope for further liberalisation in South Africa have been fiercely debated since mid 1990s. Edwards (2005) summarized this debate and pointed to a number of methodological and data issues that underlined the differences in opinion. He also developed a coherent set of industry level tariff rates, including collection duty rates, scheduled rates and effective rates of protection, for the period 1988-2004.[15] Importantly, he accounted for the surcharges applied in various periods for the balance of payments reasons, which, as he demonstrates, had a marked effect on the levels of protection.

87.   Table 5.1 reports the scheduled rates and the estimates of effective rates of protection by sector calculated by Edwards (2005) for 1994 and 2003. The time evolution of some of these ERPs is discussed in more detail in Section 6 which deals with the impact of protection on labour and total factor productivity. The estimates suggest that effective protection has been reduced significantly over the 1990s, particularly when surcharges are taken into account. Edwards (2005) reports that the average rate of protection in manufacturing sector as a whole fell from 48% in 1993 to 12.7% in 2004 based on the scheduled rates and including surcharges and from 30.8% to 8% between 1993 and 2003 according to collection rates.

88.   The highest rates of protection in 1994 were recorded for a number of traditionally labour-intensive manufacturing sectors such as *Textiles*, *Wearing apparel*, *Leather products*, *Footwear* and *Furniture* (though *Motor vehicles* and *Chemicals* also had high rates of protection). Low or negative rates were recorded in the *Primary sector* (agriculture and mining), *Machinery and equipment*, *Professional and scientific equipment* and *Other transport products*.

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[15]   Effective rates of protection aim to capture the extent of protection on value added as opposed to protection on final output. Effective rates of protection are calculated according to the following formula: $ERP_j = \frac{(V_j^* - V_j)}{V_j} = \frac{t_j - \sum_i a_{ij} t_i}{1 - \sum_i a_{ij}}$ where V_j^* is the domestic value added to final product j at tariff distorted prices, V_j is the value added under free trade, t_j is the tariff on outputs, t_i is the tariff on inputs and a_{ij} is the quantity of intermediate input *i* used in the production of one unit of *j,* Lawrence (2005).

89. Over the 1994-2003 period protection inclusive of surcharges fell in all sectors.[16] The largest percentage reductions in ERPs were recorded in the initially highly protected manufacturing sectors such as *Textiles*, *Wearing apparel*, *Leather products* and *Footwear* but also for *Other manufacturing* and *Communication equipment*. Significant decreases of more than 10% were observed in a number of other sectors. In 2003, the last year for which the effective rates of protection data are available at this stage, the most protected sectors were *Tobacco* (ERP of 315%), *Textiles* (85%), *Wearing apparel* (97%), *Footwear* (51%), *Furniture* (46%), *Food* (26%), *Motor vehicles* (33%), *Rubber and plastic products* (33 and 20%, respectively), *Beverages* (25%) and *Leather products* (19%).

Table 5.1 Effective rates of protection and scheduled tariff rates in the manufacturing sector

Based on scheduled rates

	ERP based on collection rates				% change in ERP 94-03		Scheduled tariff rates				% change in scheduled tariff 94-03	
	Excluding surcharges		Including surcharges		Excluding Surcharges	Including Surcharges	Excluding surcharges		Including surcharges		Excluding Surcharges	Including Surcharges
	1994	2003	1994	2003			1994	2003	1994	2003		
Agriculture, forestry & fishing	1.8	5.4	7.3	5.4	3.5	-1.7	5.1	5.4	8.9	5.4	0.3	-3.2
Coal mining	-4.3	-2.4	-5.5	-2.4	2.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0
Gold & uranium mining	12.7	-2.2	11.4	-2.2	-13.3	-12.2	10.0	0.0	10.0	0.0	-9.1	-9.1
Other mining	2.4	0.4	1.7	0.4	-2.0	-1.3	2.8	1.0	2.9	1.0	-1.8	-1.8
Food	35.2	36.4	55.3	36.4	0.9	-12.2	11.9	11.8	18.8	11.8	-0.1	-5.9
Beverages	6.2	25.3	51.9	25.3	18.0	-17.5	6.5	14.3	29.3	14.3	7.3	-11.6
Tobacco	239.0	315.4	340.5	315.4	22.5	-5.7	29.2	36.0	41.7	36.0	5.3	-4.0
Textiles	140.9	85.3	149.7	85.3	-23.1	-25.8	38.1	22.6	41.3	22.6	-11.3	-13.2
Wearing apparel	176.2	96.7	218.4	96.7	-28.8	-38.2	62.5	35.0	75.1	35.0	-16.9	-22.9
Leather products	37.0	19.2	59.7	19.2	-13.0	-25.4	16.7	11.6	25.9	11.6	-4.4	-11.4
Footwear	82.8	50.7	106.0	50.7	-17.6	-26.9	36.8	22.7	48.0	22.7	-10.3	-17.1
Wood products	17.5	14.8	21.7	14.8	-2.3	-5.7	11.0	9.1	14.5	9.1	-1.7	-4.7
Paper products	14.7	10.1	15.8	10.1	-4.0	-4.9	9.8	6.2	11.3	6.2	-3.2	-4.6
Printing & publishing	10.5	4.7	22.2	4.7	-5.2	-14.3	9.5	4.8	16.1	4.8	-4.3	-9.8
Coke & petroleum	10.4	8.0	10.0	8.0	-2.2	-1.8	5.1	3.3	5.1	3.3	-1.7	-1.8
Basic chemicals	15.1	1.4	14.4	1.4	-11.9	-11.4	8.0	1.7	8.1	1.7	-5.9	-5.9
Other chemicals	21.3	7.4	32.3	7.4	-11.4	-18.8	11.6	4.5	16.2	4.5	-6.4	-10.1
Rubber products	42.4	33.3	46.6	33.3	-6.4	-9.1	16.5	11.4	18.6	11.4	-4.4	-6.0
Plastic products	31.7	20.2	36.2	20.2	-8.7	-11.7	17.5	9.8	19.8	9.8	-6.6	-8.4
Glass products	17.3	14.3	32.1	14.3	-2.5	-13.4	10.1	7.7	17.2	7.7	-2.2	-8.1
Non-metallic minerals	21.8	10.8	29.9	10.8	-9.0	-14.7	11.3	5.6	15.0	5.6	-5.1	-8.2
Basic iron & steel	19.9	11.0	20.1	11.0	-7.4	-7.5	8.2	4.3	8.8	4.3	-3.6	-4.1
Non-ferrous metals	17.4	3.1	17.9	3.1	-12.1	-12.5	10.4	2.2	10.8	2.2	-7.4	-7.7
Metal products	24.7	16.6	36.7	16.6	-6.5	-14.7	13.6	8.1	18.3	8.1	-4.8	-8.6
Machinery & equipment	6.6	3.0	11.9	3.0	-3.4	-8.0	7.4	3.7	10.4	3.7	-3.5	-6.1
Electrical machinery	21.6	15.2	33.0	15.2	-5.2	-13.4	13.5	7.7	18.3	7.7	-5.1	-8.9
Communication equipment	19.6	1.3	35.5	1.3	-15.4	-25.3	14.6	3.1	24.2	3.1	-10.1	-17.0
Professional & scientific	-0.4	-6.3	9.5	-6.3	-6.0	-14.5	5.7	0.3	12.2	0.3	-5.1	-10.6
Motor vehicles	45.9	32.7	45.1	32.7	-9.1	-8.6	24.1	15.7	25.9	15.7	-6.8	-8.1
Other transport	5.4	-3.3	14.9	-3.3	-8.2	-15.8	7.0	0.9	12.3	0.9	-5.7	-10.2
Furniture	49.6	46.3	82.6	46.3	-2.2	-19.9	21.5	17.7	32.1	17.7	-3.1	-10.9
Other manufacturing	45.8	17.3	96.5	17.3	-19.5	-40.3	15.1	6.0	26.5	6.0	-7.9	-16.2

Note: % change in ERP (or tariff rate) is calculated as $\Delta ERP/(1+ERP_0)$ (or $\Delta t/(1+t_0)$).
Source: Lawrence (2005).

90. The outlined ERP structure may seem rational from the point of view of broadly protecting 'traditional' labour-intensive sectors. Indeed, the 2003 ERPs seem to be higher in sectors where the ratios of fixed capital to formal employment are quite low (see Annex Table 5.1 and Panel A in Figure 5.2), though it should also be noted that tariff declines tended to be larger in those more protected labour-intensive sectors. Yet, at the same time these are also the sectors where the shares of unskilled employment are not obviously high (see Annex Table 5.1 and Panel B in Figure 5.2). The latter tendency may be seen as an unintended consequence since, as many recent assessments emphasise, unemployment is particularly severe in the unskilled segments of the labour force (Banerjee *et al*. 2006; OECD, 2008). Additionally, high TFP rates correlate negatively with firm concentration and levels of competition across industries

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[16]   Positive percentage change is calculated for coal mining but that means only that the sector became less disadvantaged.

(OECD, 2008) and with the productivity performance across these sectors discussed in Section 6 of this report.

91. Evidence for link between trade liberalisation and labour markets in South Africa is provided by Dunne and Edwards (2007), who give an account of a standard pattern of falling output and employment in import-competing industries and rising output and employment in the export-oriented sectors. The authors find evidence of strong export growth in capital-intensive, resource based and chemical products sectors that created employment opportunities through their backward linkages to other more labour-intensive sectors. Labour-intensive sectors are reported to have been affected negatively by declining protection in the period 1994-2003, and competition from China and India in particular, with the negative affects biased towards lower skill industries. However, the overall net effect of trade on employment between 1994 and 2003 estimated by Dunne and Edwards (2007) is close to zero.

Figure 5.2 Effective rates of protection and labour intensity by sector

Panel A

Panel B
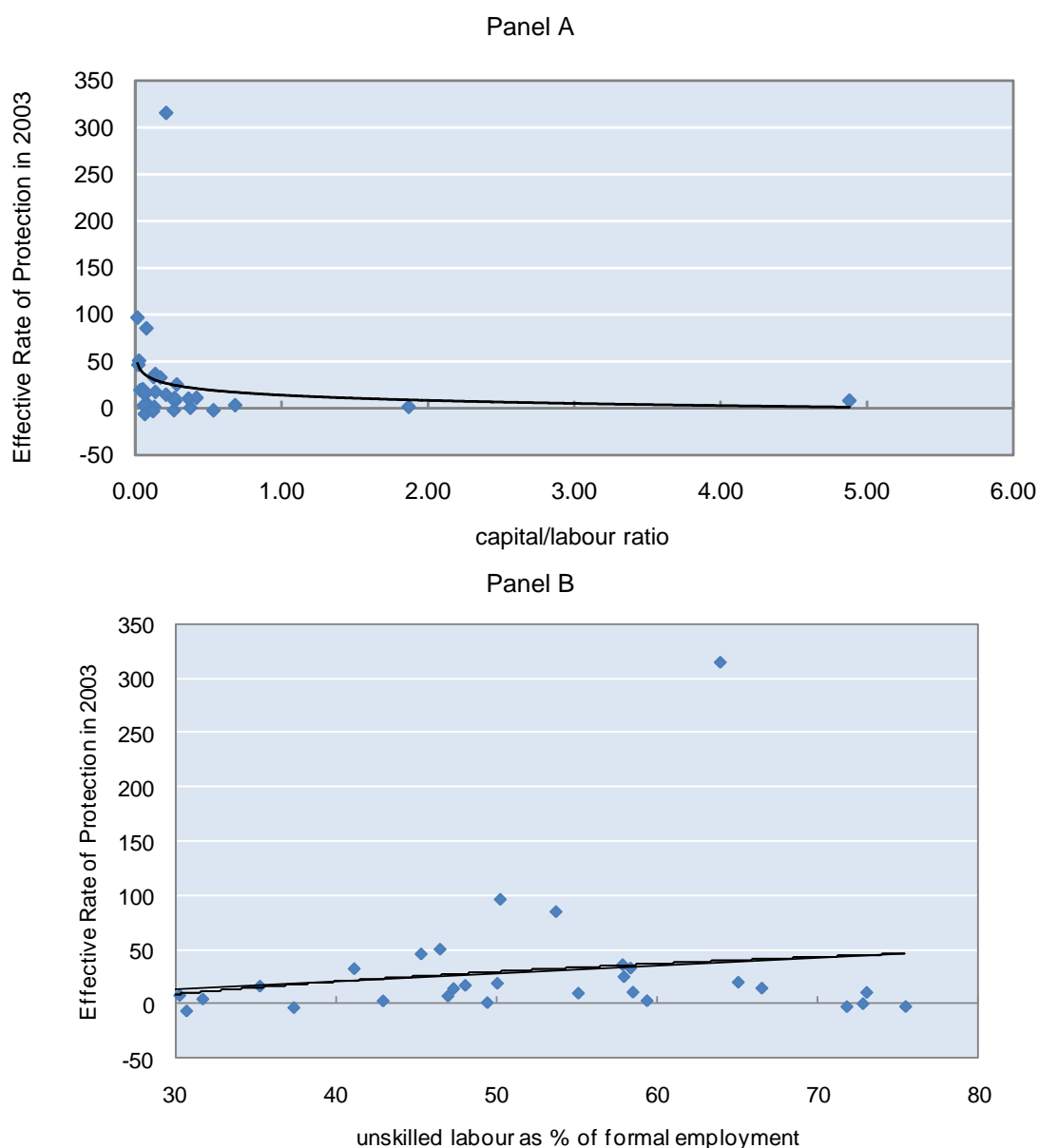
Source: Quantec database, author's calculations, logarithmic trendlines.

92.   Importantly, several indicators suggest that that the process of liberalisation has largely stalled in recent years. The decline in average tariff seems to have stopped or even have been reversed since 2000 (see Table 5.2). Similarly, tax revenue on international trade and transactions expressed as percentage of imports, revenue or GDP has increased noticeably in 2004-2007 (Figure 5.3). Table 5.3 indicates that this was driven by increasing duties on consumer goods though, with respect to 1999, small increases have been recorded also in intermediate products and raw materials categories.

93.   Annex Table 5.2 provides yet more detailed information on the evolution of tariff protection by SIC sector in the years 2001-2007. Most products record small or insignificant decreases in average or maximum tariffs or their standard deviation. Exceptions are *Leather and leather products*, *Livestock and livestock products* and *Lumber and wood products* which record a small increase in tariff protection from 2001 to 2007. Some explanation of this tendency are provided by IMF (2007) who report on the consultations with South African government authorities who "saw some merit in further liberalization, but argued that moves in this area needed to be informed by developments in ongoing multilateral and regional trade negotiations and the emerging industrial policy strategy, which seems to call for maintaining tariff protection on certain sectors, while reducing tariffs on selected inputs".

Table 5.2 South Africa's tariff structure

	Agricultural Products			Non Agricultural Products			Maximum Rate
	Simple Average	Weighted Average	Standard Deviation	Simple Average	Weighted Average	Standard Deviation	
1988	8.35	4.11	10.39	11.66	12.07	11.85	100
1990	7.61	3.42	10.14	10.59	10.77	11.31	110
1991	8.94	3.48	12.18	10.25	11.54	11.73	110
1993	9.82	6.93	12.37	16.80	13.76	22.33	100
1996	10.79	7.68	12.55	14.67	8.69	23.89	83
1997	8.95	6.30	12.17	6.85	5.14	10.67	78
1999	8.33	5.28	11.80	5.58	4.39	9.64	55
2001	8.82	7.13	11.68	7.77	4.90	11.57	60
2004	8.98	7.76	12.00	7.91	5.39	10.99	96
2005	7.35	7.27	10.03	7.86	5.90	10.88	55
2006	7.36	7.75	10.06	7.83	5.67	10.87	55
2007	9.00	7.70	11.61	7.69	5.78	10.92	60

Source: UN TRAINS.

Table 5.3 Simple average tariff by production stage

	Capital goods	Consumer goods	Intermediate goods	Raw materials
1988	5.85	18.11	10.74	3.80
1990	5.83	16.22	9.92	3.69
1991	6.02	15.85	9.59	4.34
1993	6.19	27.89	14.55	5.61
1996	2.83	27.15	11.80	6.28
1997	4.27	12.93	5.21	5.65
1999	2.35	11.34	4.49	4.47
2001	2.17	15.24	6.10	5.22
2004	2.05	15.18	6.18	4.09
2005	2.03	14.95	6.11	2.86
2006	2.01	14.93	6.08	2.86
2007	2.06	15.28	5.64	4.19

Source: UN TRAINS.

Figure 5.3 Taxes on international trade and transactions
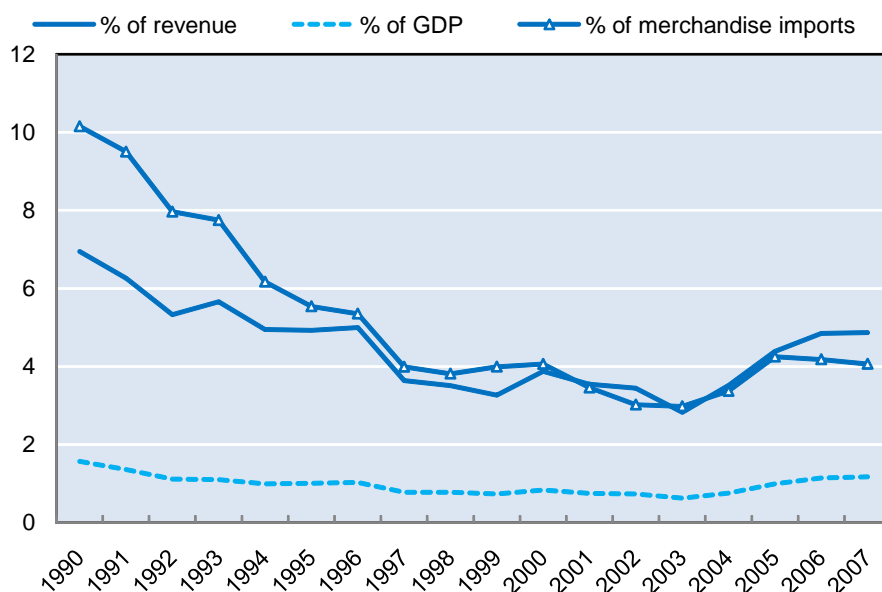
Source: SARB, authors' calculations

94.   Doing business indicators compiled by the World Bank (Table 5.4) indicate also that while doing business in South Africa is generally relatively easy as compared to other BRIIC countries, in terms of trading across borders South African firms are more disadvantaged as compared to all BRIIC but Russian Federation. While to a large extent this is likely to do with South Africa's geographical location, improved customs procedures as well as other trade facilitation measures might have a large potential of improving South Africa's integration with the world markets.

Table 5.4 Doing business, selected indicators, 2008

		South Africa	Brazil	China	India	Indonesia	Russia
Overall indicator		**35**	**122**	**83**	**120**	**123**	**106**
Starting a Business	Cost (% of income per capita)	7.1	10.4	8.4	74.6	12	3.7
Dealing with Licenses	Procedures (number)	17	18	37	20	19	54
	Time (days)	174	411	336	224	196	704
	Cost (% of income per capita)	30.4	59.4	840.2	519.4	286.8	3,788.4
Trading Across Borders	Time for export (days)	30	18	21	18	21	36
	Cost to export (US$ per container)	1,087	1,090	390	820	667	2,050
	Time for import (days)	35	22	24	21	27	36
	Cost to import (US$ per container)	1,195	1,240	430	910	623	2,050
Registering Property	Procedures (number)	6	14	4	6	7	6
	Time (days)	24	45	29	62	42	52
	Cost (% of property value)	8.8	2.8	3.6	7.7	10.5	0.3
Enforcing Contracts	Procedures (number)	30	45	35	46	39	37
	Time (days)	600	616	406	1,420	570	281
	Cost (% of debt)	33.2	16.5	8.8	39.6	122.7	13.4
Employing Workers	Difficulty of Hiring Index	56	78	11	0	72	33
	Difficulty of Firing Index	30	0	40	70	60	40
	Rigidity of Employment Index	42	46	24	30	44	44
	Nonwage labor cost (% of salary)	4	37	44	17	10	31
Closing a Business	Time (years)	2	4	1.7	10	5.5	3.8
	Cost (% of estate)	18	12	22	9	18	9
	Recovery rate (cents on the dollar)	33.2	14.6	35.9	11.6	12.6	29

Source: The World Bank Group, Doing business indicators.

5.3 South Africa's preferential trade agreements

95.   In addition to pursuing trade liberalisation in the multilateral context, South Africa has been engaging in a number of important regional and bilateral initiatives and is already an important regional hub for African commerce. It is a core member of the South African Customs Union (SACU) between South Africa, Botswana, Lesotho, Namibia and Swaziland. It has two significant bilateral FTAs: Southern Africa Development Corporation (SADC)[17] (operational as of 1996) and the SA-EU Trade Development and Cooperation Agreement (TDCA) (entered into force in January 2000). As a member of SACU South Africa participates in SACU-EFTA FTA (entered into force in May 2008), SACU-Mercosur PTA (concluded in April 2008) and SACU-USA Trade, Investment and Development Cooperative Agreement with the United States (concluded in April 2008 and signed into force in July 2008). Other bilateral preferential trade talks are also under way including the Economic Partnership Agreements initiative that has an objective of creating a free trade area between the European Union and the ACP countries and SACU-India PTA negotiations. The country is also a beneficiary of a number other preferential trading schemes such as the Generalized System of Preferences and the US's African Growth and Opportunity Act.

96.   SACU was initially established in 1969 as a replacement of the Customs Union Agreement of 1910 but its roots go as far back as the establishment of the 1899 Customs Union Convention amongst a number of South African colonies, making it the oldest customs union in the world. The new 2002 SACU Agreement contains provisions that go beyond the original facilitation of intra-SACU trade and the application and revenue sharing of a common external tariff with the aim of encouraging greater regional economic integration among the SACU members. These include provisions for deeper integration such as creation of egalitarian SACU institutions to facilitate joint decision making process[18]; equitable trade benefits to members; promotion of fair competition in the common customs area; facilitation of investment in the common customs area; enhancement of economic development, diversification and competitiveness and an equitable revenue sharing formula as well as the development of common policies and strategies.

97.   In practical terms, intra-SACU trade is free of duties and quantitative restrictions except in exceptional circumstances. SACU members apply customs, excise, sales and anti-dumping duties as well as rebates and duty drawbacks as decided by the SACU Council of Ministers. In this respect the process is more egalitarian than it was under the 1969 SACU Agreement when members followed South Africa's trade policy as now all participants to the agreement are suppose to take part in the decision making, which has the positive effect of minimising the potential for trade diversion in bilateral trade among SACU members. It is not clear whether the 2002 agreement is more constraining on South Africa with respect to any unilateral reform initiatives it might want to have, or in the WTO context. On the one hand, similarly to the earlier SACU Agreement, South Africa can negotiate and enter into new preferential trade agreements with third parties or amend existing agreements as long as it has the consent of other Member States. [19] On the other hand the country is no longer the sole decision making power over customs and

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[17]   SADC consists of: Angola, Botswana, Dem. Rep. of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

[18]   Prior to the 2002 SACU Agreement South Africa had the sole decision-making power over customs and excise policies in SACU. It was administered on a part-time basis by annual meetings of the Customs Union Commission and there were no effective procedures to ensure compliance or resolve disputes. The 2002 SACU Agreement established an independent SACU Secretariat and a number of key decision making institutions including a Council of Ministers, a Customs Union Commission, Technical Liaison Committees, a SACU Tribunal and a SACU Tariff Board. (Source: SACU Secretariat website www.sacu.int)

[19]   Art. 31 of 2002 SACU Agreement.

excise policies of SACU and the new agreement makes provisions for establishing a common negotiating mechanism for the purpose of undertaking negotiations with third parties.[20]

98.   SACU is also known for its revenue sharing formula whereby all customs and excise duties collected by members are pooled in a common revenue fund and redistributed according to a formula that takes into account trade, economic size and development criteria.[21] The 2002 Agreement also established a dispute settlement mechanism for dealing with problems in the interpretation and application of the agreement. It called for the simplification and harmonisation of trade documentation and procedures across members, albeit only in general terms.

99.   South Africa is also the core member of the Common Monetary Area (CMA) which provides for free flows of capital within the area and assures the stability of bilateral nominal exchange rates by pegging the national currencies of Lesotho, Swaziland and Namibia to the South African rand.

100.   Membership of the Southern African Development Community includes the five SACU members as well as Angola, the Democratic Republic of Congo, Madagascar, Malawi, Mauritius, Mozambique, Seychelles, Tanzania, Zambia and Zimbabwe. The SADC Treaty provides a framework to coordinate and jointly develop policies aimed at sustainable development of the region. The Trade Protocol of SADC signed in 1996 and ratified in 2000 by eleven SADC members[22] is aimed at establishing a SADC free-trade area. In the Trade Protocol, SADC countries agreed on a classification of all traded products into three groups: one (consisting mostly of capital goods and equipment) that was liberalised in the first year of Treaty's existence; a second group to be liberalised gradually by 2008 and a third group of sensitive products (such as sugar, textiles and clothing but limited to 15% of each members total merchandise trade) are to be liberalised by 2012. Products not eligible for preferential treatment within the SADC are estimated to amount to approximately 2% of SADC merchandise trade by 2012. The Protocol identified also some non-tariff measures to be eliminated (*e.g.* import quotas, export subsidies) but excluded some other barriers such as local content requirements or import and export licensing. In the future, SADC intends to extend trade liberalisation to services. It is worth mentioning that in 2008 SADC agreed to establish a Free Trade Zone with the East Africa Community (EAC) and the Common Market of Eastern and Southern Africa (COMESA), which would allow South African exports greater market penetration into these areas.

101.   South Africa is also a member of a yet more inclusive regional initiative, the African Union, launched in 2001. Its aim is to promote integration and harmonisation throughout the African continent[23] through, among other means, the establishment of a pan-African economic and monetary union over a period of 34 years.

102.   The available trade data make it hard to judge how important SACU and SADC are for South Africa. For example the UN Comtrade database reports no data on South Africa's exports to any of the

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[20]   This common negotiating mechanism has not yet been agreed although SACU Executive Secretary Ms. Tswelopele Moremi reported that drafting and consultations are under way. She also revealed that now the SACU Secretariat has a negotiating team that negotiates on behalf of SACU as a whole. This is reported to have been the case in the SACU-Mercosur negotiations. (Source: interview with SACU Executive Secretary Ms. Tswelopele Moremi accessed at http://www.sacu.int/docs/pr/2008/interview.pdf).

[21]   Customs duties are distributed proportionally to intra-SACU imports (customs component) and excise proportionally to the share of a member in total SACU GDP (excise component) and inversely proportionally to the GDP per capita (development component). For a precise explanation of how the share is calculated see Box II.1 in WTO (2003).

[22]   Exceptions are Angola, Democratic Republic of Congo and Seychelles.

[23]   All African countries except Morocco are members of the AU.

other SACU members (Table 5.5). Imports from SACU are reported but in 2006 they accounted for merely 1.2% of total South Africa's imports. Such a low number suggests that at least some trade flows within SACU are not being reported. For other SACU members reporting seems better and the data indicate that the customs union accounts for 80 to 90% of their imports and for 7 to 75% of their exports. Data for SADC (Table 5.6) are also likely to suffer from the problem of no data on South Africa-SACU flows but it is clear that in terms of trade shares SADC is an important initiative for most other SADC members.

Table 5.5 Importance of SACU trade for South Africa and other SACU members, 2006

	Imports from SACU as % of total imports		Exports to SACU as % of total exports	
	Value	Share	Value	Share
South Africa	799.7	1.2	..	..
Botswana	2 640.4	86.5	301.5	6.7
Lesotho	1 094.4	78.2	173.9	18.0
Namibia	2 317.9	82.9	845.9	25.1
Swaziland	1 460.6	88.3	1 175.2	74.9

a) 2004 for Lesotho and Zimbabwe, 2005 for Swaziland
Source: UN ComTrade.

Table 5.6 Importance of SADC trade for South Africa and other SADC Trade Protocol members, 2006a

	Imports from SADC as % of total imports		Exports to SADC as % of total exports	
	Value (million USD)	Share (%)	Value (million USD)	Share (%)
South Africa	1 978.3	2.9	4 110.6	7.8
Botswana	2 710.0	88.8	575.7	12.8
Lesotho	1 095.3	78.3	174.5	18.0
Namibia	2 338.7	83.6	878.1	26.0
Swaziland	1 475.2	89.2	1 296.7	82.6
Malawi	720.8	59.6	208.8	31.2
Mauritius	298.6	8.2	53.0	2.4
Mozambique	1 167.3	40.7	453.8	19.1
Tanzania	666.1	13.6	290.2	17.2
Zambia	1 739.7	56.6	574.9	15.2
Zimbabwe	1 481.3	63.4	766.8	55.0

a) 2004 for Lesotho and Zimbabwe, 2005 for Swaziland
Source: UN ComTrade.

Bilateral agreements

103.   South Africa is also a party to a number of bilateral agreements either as an individual country or as a member of SACU. The 1999 Trade, Development and Cooperation Agreement (TDCA) between South Africa and the EU, historically the most important trading partner of South Africa, provides for trade liberalisation to the form of a free trade area by 2012. It is projected that by this date the EU will have liberalised (fully or partially) approximately 95% (61.4% and 99.9% of agricultural and industrial products respectively) of its imports from South Africa while South Africa liberalises approximately 86% (83% in agriculture and 86.5% of industrial products). The liberalisation by the EU will be accomplished within the first 3-6 years (WTO, 2003). The TDCA gives South African firms a competitive edge in access to EU markets as compared with its SACU or SADC partners but TDCA does not have discriminatory impact in

terms of access to South Africa's market as, according to the SADC Agreement, South Africa had to extend all the concessions granted to the EU to all SADC members.

104.   South Africa is also a negotiating party to the Economic Partnership Agreements initiative that has an objective of creating a free trade area between the European Union and the ACP countries. ACP countries are expected to enter the EPAs in regional groupings, in the case of South Africa the SADC which consists of all the members of SACU plus Angola, Mozambique and Tanzania. For South Africa the EPA negotiations are to be streamlined with the review of the existing TDCA which has been interpreted as an indication that the TDCA will be submerged in the EPA negotiations and that the eventual EPA will replace TDCA trade provisions at the date of its entry into force.[24] Towards the end of 2007 an Interim EPA (IEPA) was initialled by Botswana, Lesotho, Swaziland, Namibia and Mozambique to ensure that the SADC EPA member states did not lose preferential access to the EU market after expiry of the Cotonou agreement on 31 December 2007. South Africa and Angola have not yet initialled the agreement due to concerns with the Interim agreement text and the TDCA remains the legal framework for South Africa's trade with the EU. It is expected that negotiations towards a full EC and SADC EPA agreement will be concluded in December 2008.

105.   The recently approved (June 2008) SACU-Mercosur Preferential Trade Agreement that replaces the earlier agreement signed in 2004 and specifies, among other provisions, tariff concessions covering around 1000 products with preference margins between 10 and 100%. The SACU-EFTA Free Trade Area (signed in 2006 and entered into force in May 2008) and the three associated bilateral agreements between SACU and the three individual EFTA members covering agricultural trade offer SACU fully duty and quota free access for industrial products and a limited but enhanced access to the EFTA agricultural markets. SACU concessions to EFTA largely mimic those offered to the EU under the TDCA on both agriculture and industrial products.[25] Trade, Investment and Cooperation Agreement (TIDCA) between SACU and the US and the SACU concluded in April 2008 makes provisions for a consultative process aimed at dealing with any matter relating to trade and investment between the two sides and possibly leading to future enhancements of agreements between the two sides. Negotiations are currently being held on SACU-India Preferential Trade Agreement (PTA). Sources have also reported on considerations of a trilateral free trade agreement (T-FTA) between SACU, India and Mercosur and of a bilateral agreement with China.[26]

5.4   Services trade

106.   As Section 2 of this report indicated, services seem to be the main driver of South Africa's recent economic growth and this sector is a very important and dynamically growing employer. This is especially the case for *Wholesale and retail trade* and *Communication* and *Business services*—these sectors were responsible for over 40% of final output growth over the 1994-2007 period and accounted for over 46% of employment (Table 2.1 and Annex Table 2.1). Other evidence presented in sections 2 and 3, however, indicates that trade in services may be seen as not as important as trade in goods. For example, in 2006 the value of total South African exports of services did not exceed one fifth of the value of exports of goods (a slightly larger ratio holds for services imports) and since early 1990s South Africa has consistently recorded a deficit on services trade that nonetheless never exceeded one percent of GDP.

107.   However, there are also several reasons to think that trade in services does offer South Africa a considerable growth potential. First, the current low levels of services trade may quite simply indicate a

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[24]   See discussion by Paul Kruger of TRALAC at http://epa.tralac.org/scripts/content.php?id=6241 .

[25]   Some adjustments were made taking into account BLNS sensitivities and errors made in the TDCA. This is based on information provided by the SACU Secretariat. Some adjustments were made taking into account BLNS sensitivities and errors made in the TDCA.

[26]   Source: www.bilaterals.org

large potential for the future. Second, exports of travel services are in fact an important source of export revenue that amounts to over 3% of South Africa GDP and imports of transports services seem indispensable reaching similar magnitudes. Third, existing balance of payments services trade data on which the analysis presented so far is based do not adequately account for the extent of services trade according to the current WTO typology as they merely capture two modes of services trade: cross-border trade (mode 1) and consumption abroad (mode 2). They do not, for example, account for sales of foreign affiliates in South Africa or sales of South African affiliates abroad (mode 3), nor do they account for services provided by temporary workers (mode 4). Fourth, the extent of services trade indicated by the currently available data is affected by existing services trade barriers, data on which is very elusive (see below). Finally, the effects of certain forms of services trade are different from those of merchandise trade. For example, a foreign company based in South Africa sells its output domestically and influences local market structure and competition. It may also be a source of technology or skill transfer. The difference with goods trade is that goods can be shipped from abroad without local presence.

108.   Foreign direct investment performance of South Africa, which can be considered a proxy for mode 3 of services trade, is mixed. FDI inflows expressed as a percentage of GDP have grown considerably but are lower than in China, Brazil or the Russian Federation (Figure 5.4). When expressed as a share of total FDI into low and middle income economies grouping this share is growing very slowly and is currently smaller than in any other of the BRIICS apart from Indonesia. This mixed FDI performance is somewhat puzzling given the apparent relative openness of South Africa's services trade regime.

109.   For the time being widely available indicators of restrictiveness of services trade with a broad sectoral coverage or with a broad coverage of different modes of services trade are scarce. Three pieces of currently available OECD research in this area include Dihel and Shepherd (2007), Koyama and Golub (2006) and certain components of the product market regulation indicators assembled by the OECD Economics Department (OECD, 2005).[27] The message of these pieces of analysis is quite similar: South Africa's services trade regime seems relatively liberal as compared to other emerging and developing economies as well as the OECD. In Dihel and Shepherd (2007), for example, South Africa is reported to have the least restrictive barriers to distribution trade (considering all modes of supply) across the sample of emerging countries covered in the analysis (see Figure 5.5 and Dihel and Shepherd, 2007). In Koyama and Golub (2006) the restrictiveness of South Africa foreign direct investment regime (mode 3) seems to be lower than those of China, India or the Russian Federation (see Figure 5.6). The analysis of Koyama and Golub (2006) indicates that barriers to actual operations of foreign companies have a disproportionately large contribution to the index as opposed to foreign equity or screening requirements. One component of the 2003 OECD product market regulation (PMR) indicators[28] indicates that restrictiveness of South African foreign ownership barriers (mode 3) is situated somewhere between the least and most open OECD economies. In the context of BRIICS foreign ownership restrictiveness is a little higher than Brazil's and a little lower than India's (see Table 2.1 in OECD, 2008).

110.   It is worth pointing out that Dihel and Shepherd (2007) and OECD (2005) constructed their services trade restrictiveness indices on the basis of measures actually applied[29] while the FDI restrictiveness index of Koyama and Golub (2006) reflected de jure but not the facto situation. The approach of the World Bank World Trade Indicators database (WTI, 2008) is instead based on the GATS commitments. In fact, WTI (2008) contains the only currently available comparative database of trade restrictiveness indices based on

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[27]   The OECD Trade and Agriculture Directorate is currently working on methodology and collecting data to develop a comparable services trade restrictiveness index, though the first stages of this work will concentrate on current OECD members.

[28]   These indicators are currently being updated.

[29]   GATS commitments were only used wherever the information on actually applied measures could not be obtained.

a broad sectoral coverage of GATS commitments.[30] The overall GATS commitment indices presented in Figure 5.7 confirm the relatively open nature of South Africa's services commitments. In fact, South African index is higher (reflecting more liberal regime) than those of a number of OECD countries and other regions across a number of services sectors (see WTI, 2008 for details). The most recent underlying sectoral scores are: 52 for Business Services; 45 for Communication Services; 50 for Construction and Engineering; 73 for Distribution Services; 75 for Environmental Services; 29 for Financial Services; 69 for Tourism Services; 6 for Transport Services; and 50 for other miscellaneous services. Education and Health Services as well as Recreational and Cultural services have all received a score of 0, reflecting lack of commitments (WTI, 2008).

111.   At this stage of work on South Africa's trade and growth the Secretariat has not been able to gather and analyse more data on the importance of services trade and services trade barriers for South Africa's economy although the structure of recent economic growth suggests that they may be of key importance. It is therefore suggested that this theme be taken up as a priority in future work on South Africa and on services trade.

Figure 5.4 FDI inflows into BRIICS
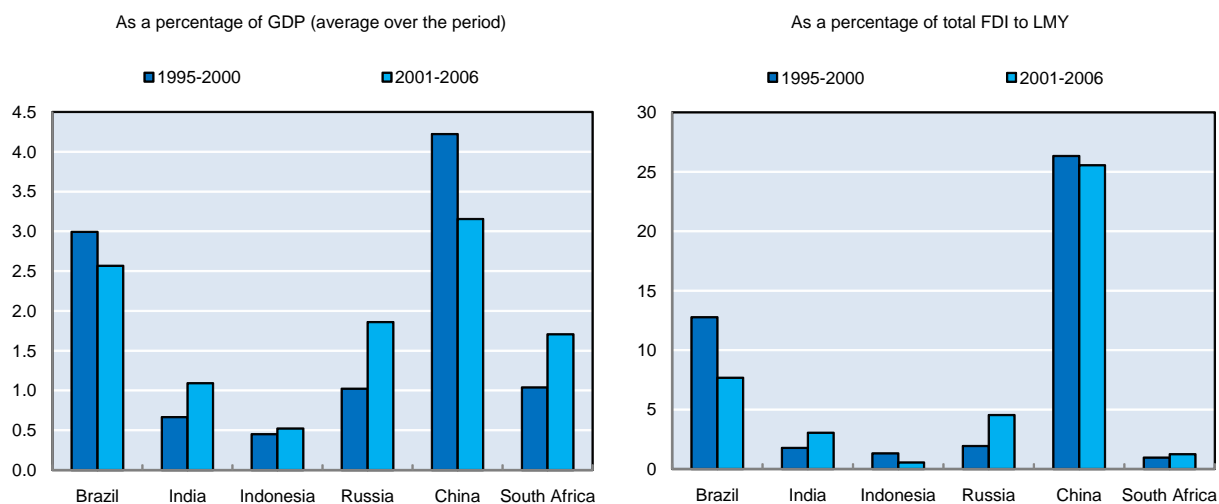
Source: WTI.

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[30]   This approach is reported to follow the methodology of Hoekman (1997) and Eschenbach and Hoekman (2006).

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Figure 5.5 Services Trade Restrictiveness Index in Distribution Services[1]
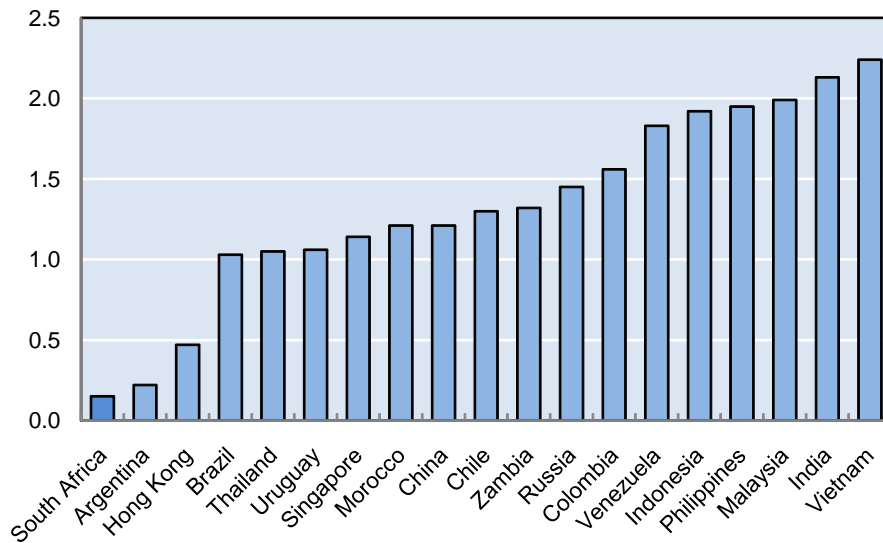
1) The index encompasses all modes of services trade

Source: Dihel and Shepherd (2007)

Figure 5.6 Figure FDI restrictiveness index[1]
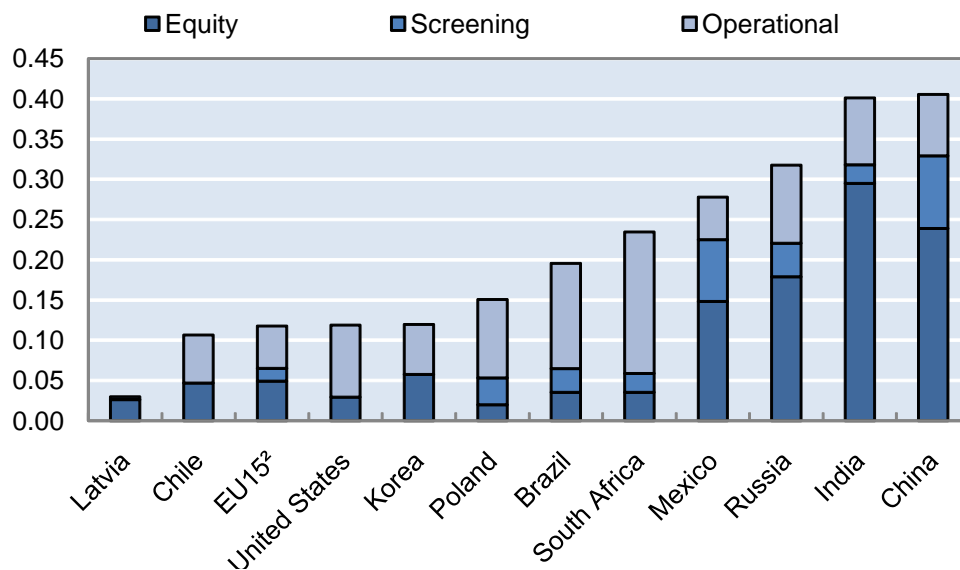
1) This aggregated Index covers the following sectors and sub-sectors: Business (legal, accounting, architectural, and engineering services), Telecommunications (fixed line telephony and mobile telephony), Construction, Distribution, Finance (insurance and banking), Tourism, Transport (air transport, maritime transport and road transport), Electricity and Manufacturing.

2) Except Luxembourg.

Source: Koyama T. and S. Golub (2006).

Figure 5.7 South Africa's overall GATS commitment index compared with other countries and regions
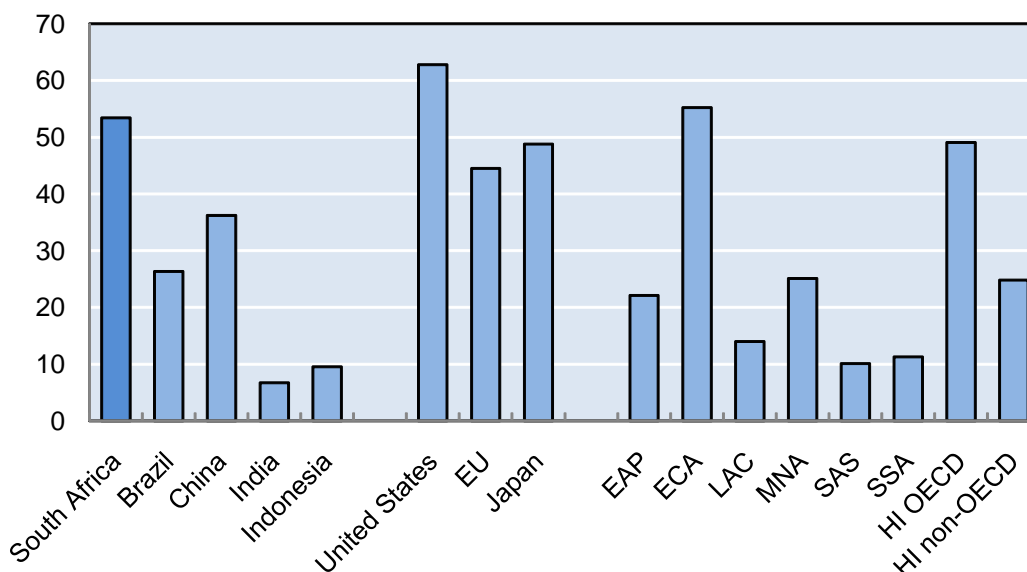
Note: This index encompasses all services sectors

Source: WTI (2008)

6. Did trade liberalisation affect productivity growth in South Africa's manufacturing?

6.1 Openness and productivity growth debate

112. The last decade witnessed an intense debate on to what extent trade liberalization impacts upon economic growth. A recent OECD study (Nordas *et al*. 2006) analysed and summarised the various arguments of the debate. The analysis of the trade/openness-growth link essentially boils down to the analysis of trade/openness-productivity link as productivity growth is the only long term source of growth in the neo-classical growth framework. This is due to the fact that under the assumption of diminishing marginal returns, an increase in capital while holding labour input constant increases output, but at a diminishing rate as the stock of capital per worker increases. Eventually the capital stock reaches a level where investors will only replace depreciating capital in the absence of technological progress.

113. There are many channels through which openness could affect either the level or the rate of change of productivity. The two are often distinguished because the economic theory seems clearer about how openness could affect productivity levels than about how it could affect productivity growth rates. Also, econometric modelling of productivity and its determinants necessarily makes a distinction between the two concepts. The level and growth rate concepts, however, admittedly are less distinguishable in day-to-day economic reality since a one-off step upgrade of productivity will imply a change in productivity growth rate over the transitional period. Similarly, a change in productivity growth rate is presumably composed of a number of step changes in productivity levels.

114. Keeping this distinction in mind, Nordas *et al.* (2006), argue that from a theoretical point of view openness could cause shifts in the average productivity level (or its growth rate) for the economy as a whole when it leads to a shift of labour and capital towards the sectors with the highest productivity levels (or growth rates). In such a case the productivity level (or growth rates) of individual sectors need not even be affected. Alternatively, liberalisation could result in a shift in the productivity level (or growth rates) in individual sectors, especially when it leads to deeper specialization, capital deepening, improved scale economies or faster innovation. In such a case, the least protected or most rapidly liberalising sectors

would normally be expected to have highest productivity growth rates, although the proponents of infant industry arguments could argue the opposite.

115. Even though the theoretical possibilities of a positive impact of liberalisation on growth are numerous the empirical support for them is rather mixed. A review of existing literature by Nordas *et al.* (2006) makes a distinction between openness and trade liberalisation[31] and concludes that a consensus seems to have emerged that openness, income and levels of productivity are positively and strongly correlated and that the direction of causality most likely goes from trade to income levels. The same literature furnished no conclusive evidence of a positive and causal link between trade liberalization and productivity levels or productivity growth. Similarly, there is no evidence of a positive link between protection and productivity growth or productivity levels.

116. Nordas *et al.* (2006) argue that the lack of evidence of a link between trade liberalization and productivity growth boils down to the sheer complexity of the growth process which makes it difficult to pin down a robust and causal relationship between any single policy variable and aggregate productivity growth. Indeed, many of the empirical studies that formed an integral part of the liberalisation-growth debate were conducted as large cross-country or as panel data studies (*e.g.* Dollar, 1992; Sachs and Warner, 1995; Edwards, 1998) which prevented any analysis of the link at an adequate level of product disaggregation or in a specific country and institutional context.

6.2 *Openness and productivity growth in South Africa*

117. The remainder of this section follows the body of country-specific studies and attempts to shed light on whether the merchandise trade liberalisation observed in South Africa since early 1990s affected productivity growth across its industrial sectors. South Africa's manufacturing sector is an interesting case study as it experienced a varied pattern of liberalisation over the 1988-2003 period as well as a varied pattern in TFP growth rates. In initial years (88-93) average protection across manufacturing sectors actually increased somewhat. This was followed by a period of liberalisation (94-99) and period of continued, but much slower, liberalisation over the period 00-03.

118. TFP was on average declining over the 88-93 period, growing moderately over the 94-99 period and accelerating remarkably faster over the 00-03 period. This broad pattern does not provide a crystal clear picture of the correlation between liberalisation periods and periods of faster TFP growth, though a positive link could certainly be argued if one assumes time lags between policy reforms and industry responses. However, a casual analysis of this type does not control for any of the possible confounding factors and cannot shed light on the actual causality between protection and TFP growth. Also, the information on heterogeneity in trends across individual sectors is not exploited. An econometric analysis of the relationship between protection and TFP growth by industrial sector and year presented in the remainder of this section attempts to overcome these shortcomings and to estimate the magnitude and statistical significance of this relationship.

119. An early (and to our knowledge the only existing) assessment of the effects of South Africa's liberalisation on total factor productivity over the period was conducted by Jonsson and Subramanian (2000) for the period 1990-1998. Their cross-section analysis was based on the pooled data for the years 1990-94 and 1994-98 for 24 manufacturing industries at the ISIC 3-digit level and tariff rates for 1990, 1994 and 1998, inclusive of surcharges. Their results indicated that there was a significant negative relationship between changes in tariffs and TFP growth across manufacturing sectors and that the result was robust to the inclusion of other determinants of TFP growth (in particular indicators of openness and

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[31] Trade policies and thus trade liberalisation are but one factor determining the degree of a country's openness.

R&D investment). They have also confirmed their cross-section result with a time series study of determinants of aggregate TFP growth.

120.   The current assessment extends the existing evidence by employing a more comprehensive dataset on changes in tariffs, effective rates of protection, TFP growth, labour productivity, employment by skill, capital stock and openness by sector and over a longer and more recent period 1988-2003. One major improvement is the use of effective rates of protection calculated by Edwards (2005)[32] that account for protection of final output as well as intermediate inputs. The importance of effective rates of protection boils down to the fact that South Africa's tariff structure has traditionally been, and still is, characterised by relatively high tariffs on final products and lower tariffs on intermediate inputs and capital goods (Table 5.3), resulting in relatively high effective rates of protection (Table 5.1). For this reason the analysis in the remainder of this section and the results of econometric modelling focus on this policy variable, instead of simple tariff rates.

121.   Three digit SIC data used in the assessment come from the Quantec Standardised Industry Indicators data set[33] which assembles information from a number of national data sources such as the Department of Labour (manpower surveys), the South African Reserve Bank (national accounts, balance of payments and public sector), The South African Revenue Service (international trade data, etc.), the National Treasury (government expenditures/revenue) and Statistics South Africa (sectoral value added, input-output tables, detailed sectoral remuneration and gross operating surplus, price and output, gross domestic fixed investment, employment).

122.   Two measures of productivity growth that are available in the Quantec Standardised Industry Indicators data set are considered. Labour productivity is calculated as the ratio between output and total number of workers employed, inclusive of the informal sector. TFP is a measure of the growth in output that is not explained by the growth in the quantity of inputs. It includes technical progress, improvements in the workforce, improvements in management practices, and economies of scale.[34]

Liberalisation of manufacturing trade

123.   As already discussed in more detail in Section 5 of this report, South Africa intensified the trade-liberalisation process during the 1990s after decades of protectionist trade policy and import controls that

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[32]   See Section 5 for more details.

[33]   For more information, see www.quantec.co.za

[34]   This is calculated on the basis of the following formula:

$$A(t) = \frac{Q(t)}{[(WL(t) * L(t)) + (WK(t) * K(t))]}$$

where: $Q(t)$ is the real output at time t; $WL(t)$ is the labour's income share at time t calculated as the remuneration of employees divided by total income at time t; $L(t)$ is the real labour input at time t; $WK(t)$ is the capital's income share at time t calculated as the gross operating surplus divided by total income at time t; $K(t)$ is the real capital input at time t.

Our assessment follows the growth accounting approach to measurement of TFP. The alternative econometric approach, that is often used as a complimentary method, specifies a stochastic production function and involves estimating its parameters, such as for example labour's and capital's shares. The econometric approach has some advantages such as greater flexibility and, possibly, greater accuracy of estimates of TFP but it comes as a cost of dealing with estimation issues that may themselves call into question the robustness of results. In this iteration of work on South African TFP we stick to the growth accounting approach because of its simplicity. Extension to complimentary measures could be implemented in future revisions of the report.

characterised the apartheid era. The programme of simplifying the complex and distorted tariff regime was a part of the government's national development strategy and the process was boosted by the conclusion of Uruguay Round of trade negotiation and accession to the World Trade Organisation (WTO) in January 1995.

124. Table 6.1 reports average sectoral effective rates of protection from Edwards (2005) at the end of each of the sub periods 1988 -1993, 1994-1999 and 2000-2003 and their average annual rates of change over those sub-periods. Data reveal that on average effective protection actually went up over 1988-1993 (average annual growth rate of 0.8% across all sectors) and then was significantly reduced over the period 1994-1999 (average annual growth rate of -2.9%) and to a much lesser extent over the period 2000-2003 (average annual growth rate of -0.4%). At the end of 2003 the average effective rate of protection was 32% though there was a good deal of variation across individual sectors.

125. *Tobacco* was, and remains, the most protected sector followed by such traditional sectors as *Textiles*, *Wearing apparel*, *Footwear*, *Furniture* or *Other manufacturing*. Interestingly, the extent of liberalisation in these highly protected sectors over the period 1988-2003 has generally been much less than average (average annual growth rate over the period lower than -1%), with the exception of *Furniture* (-1.4%). *Other manufacturing* (-2.9%), *Leather and leather products* (-1.5%), *Rubber products* (-1.5%), *Plastic products* (-1.5), *Glass and glass products* (-1.3%) were initially relatively highly protected but also experienced significant liberalisation. Yet, there is also considerable variation over time with certain sectors initially experiencing increasing protection over the 1988-1993 period and then liberalisation over the two next sub-periods. A number of sectors experienced liberalisation throughout all three sub periods (Table 6.1).

Table 6.1 Evolution of effective rates or protection

	Effective Rate of Protection (%)			Average annual growth rate over the period				Δ%
	1988	1994	2003	1988-1993	1994-1999	2000-2003	1988-2003	1988-2003
Food	51.4	55.3	36.4	1.1	-2.4	-0.1	-0.6	-9.9
Beverages	43.1	52.0	25.3	1.9	-3.8	1.4	-0.5	-12.4
Tobacco	410.9	340.5	315.4	5.4	-5.4	2.3	0.3	-18.7
Textiles	95.3	149.7	85.3	8.3	-4.1	-3.5	0.2	-5.1
Wearing apparel	101.9	218.4	96.7	11.5	-4.4	-6.0	0.5	-2.6
Leather and leather products	52.4	59.7	19.2	0.2	-3.2	-1.1	-1.5	-21.8
Footwear	77.3	106.0	50.7	2.8	-4.0	-0.9	-0.9	-15.0
Wood and wood products	25.9	21.7	14.8	0.3	-1.8	0.2	-0.6	-8.9
Paper and paper products	12.4	15.8	10.1	0.8	-0.7	-0.4	-0.1	-2.0
Printing, publishing and recorded media	28.7	22.2	4.7	-0.7	-2.8	0.1	-1.3	-18.7
Coke and refined petroleum products	10.5	10.0	8.0	0.0	0.2	-0.9	-0.1	-2.2
Basic chemicals	15.6	14.4	1.4	-0.3	-1.9	0.0	-0.9	-12.3
Other chemicals and man-made fibers	33.6	32.3	7.5	0.0	-3.3	-0.2	-1.4	-19.6
Rubber products	68.0	46.6	33.3	-1.9	-1.9	-0.5	-1.5	-20.7
Plastic products	51.0	36.2	20.2	-1.1	-2.1	-1.0	-1.5	-20.4
Glass and glass products	40.7	32.1	14.3	-0.7	-2.9	0.1	-1.3	-18.7
Non-metallic minerals	34.6	29.9	10.8	-0.4	-3.0	0.2	-1.3	-17.7
Basic iron and steel	24.6	20.1	11.1	-0.4	-1.5	0.0	-0.7	-10.9
Basic non-ferrous metals	16.4	17.9	3.1	-0.2	-1.7	-0.1	-0.8	-11.4
Metal products excluding machinery	46.4	36.7	16.6	-0.6	-3.2	0.1	-1.5	-20.3
Machinery and equipment	22.0	11.9	3.0	-0.8	-2.0	-0.1	-1.1	-15.6
Television, radio and communication equipment	33.6	35.5	1.3	0.3	-4.4	-0.1	-1.7	-24.2
Professional and scientific equipment	13.3	9.5	-6.3	-0.4	-2.9	0.2	-1.2	-17.3
Motor vehicles, parts and accessories	58.1	45.1	32.7	-1.4	-0.9	-1.0	-1.1	-16.1
Other transport equipment	21.3	14.9	-3.3	-1.0	-2.7	-0.2	-1.5	-20.2
Furniture	83.8	82.6	46.3	-0.6	-3.2	0.4	-1.4	-20.4
Other manufacturing	95.8	96.5	17.3	0.4	-7.6	-0.1	-2.9	-40.1
Average across sectors	58.1	59.8	32.4	0.8	-2.9	-0.4	-1.0	-15.7

Note: % change in ERP (or tariff rate) is calculated as (ΔERP/(100+ERP_0))*100, where ERP is expressed as a % rate (*e.g.* 20%).

Source: Edwards (2005), authors' calculation.

Output and TFP developments

126.   Table 6.2 presents the developments in output and TFP over the investigated period. TFP is clearly a major determinant of output developments. Averaging across sectors, annual TFP growth rates were negative in the pre-liberalisation 1988-1993 period (average annual rate of change -1.45%). Over the same period output grew on average by a mere 1.3% per year. Beginning in 1994 and coinciding with an intensification of the trade liberalisation process, productivity growth rates turned positive (average annual rate of change 0.9%) and output growth accelerated to 3.4% per year. This was still, however, a period when the TFP growth rates remained low and unstable (Table 6.2). Finally, during the early 2000s productivity started increasing at a faster pace (average annual rate of growth of 4.3%) and this coincided with a much stronger output growth (average annual rate of growth of 7%). Not unusually for an economy undergoing a major structural change, the employment growth rates have been consistently negative throughout the 1988-2003 period (especially after 1996). This, however, contributed to the current labour market difficulties. Across manufacturing there were some exceptions to these general trends. High TFP growth rates coincided with positive employment growth rates in, for example, *Furniture*, *Other manufacturing* and *Professional and scientific equipment* (see Table 6.3).

Table 6.2 Evolution of output and TFP

	Average annual output growth rate				Annual average TFP growth rate			
	1988-1993	1994-1999	2000-2003	1988-2003	1988-1993	1994-1999	2000-2003	1988-2003
Food	2.83	0.41	5.51	2.59	1.27	-1.90	5.88	1.23
Beverages	0.26	1.39	2.86	1.33	-3.89	-0.29	2.37	-0.97
Tobacco	0.36	-0.08	1.17	0.40	-7.86	4.41	3.46	-0.43
Textiles	-1.81	1.67	6.72	1.63	-3.40	-0.15	2.80	-0.63
Wearing apparel	1.44	1.00	2.43	1.52	2.45	-1.92	3.36	1.04
Leather and leather products	1.53	5.76	12.17	5.78	-1.14	1.30	12.73	3.24
Footwear	1.07	-1.67	0.14	-0.19	-2.65	-1.30	7.02	0.27
Wood and wood products	0.54	4.80	7.50	3.88	0.96	0.70	1.63	1.03
Paper and paper products	-0.39	4.42	5.98	3.00	-0.88	0.68	2.82	0.63
Printing, publishing and recorded media	2.24	-0.69	-0.36	0.49	-0.34	-3.52	-1.22	-1.75
Coke and refined petroleum products	3.11	11.19	7.13	7.15	-8.94	9.78	1.75	0.75
Basic chemicals	0.86	8.74	8.74	5.78	3.75	4.14	3.80	3.91
Other chemicals and man-made fibers	2.91	8.02	7.28	5.92	3.95	7.54	4.43	5.42
Rubber products	2.77	3.63	4.44	3.51	-3.76	0.29	3.54	-0.42
Plastic products	4.65	4.43	8.07	5.42	3.19	-0.50	7.57	2.90
Glass and glass products	-0.69	2.81	10.79	3.49	1.88	1.15	9.72	3.56
Non-metallic minerals	0.05	0.14	6.62	1.72	-0.09	0.36	5.23	1.41
Basic iron and steel	0.19	5.82	12.72	5.44	0.31	5.05	13.67	5.43
Basic non-ferrous metals	0.65	13.23	3.77	6.15	-3.96	6.16	1.70	1.25
Metal products excluding machinery	-0.21	2.21	3.15	1.54	-4.95	0.00	4.19	-0.81
Machinery and equipment	2.25	2.18	5.09	2.93	-1.81	-1.50	2.64	-0.58
Television, radio and communication equipment	-5.06	1.48	4.24	-0.28	2.44	-0.84	4.53	1.73
Professional and scientific equipment	1.83	-4.84	17.62	3.28	-7.42	-8.46	1.40	-5.61
Motor vehicles, parts and accessories	4.32	9.33	12.92	8.35	2.82	1.38	2.07	2.09
Other transport equipment	-5.44	-0.88	22.94	3.37	-6.78	-0.98	0.75	-2.72
Furniture	3.77	5.85	5.84	5.07	-0.89	4.94	13.48	4.89
Other manufacturing	11.97	1.08	4.57	6.03	-3.43	-1.88	-5.98	-3.49
Average across sectors	1.33	3.39	7.04	3.53	-1.45	0.91	4.27	0.87

Source: Quantec database and author's calculations.

Table 6.3 Evolution of employment

	average annual growth rate over the period		
	1988-1993	1994-1999	2000-2003
Food	0.55	-1.52	-2.61
Beverages	-0.16	-1.59	-2.04
Tobacco	-1.98	-0.03	-1.45
Textiles	-3.89	-1.69	-0.87
Wearing apparel	-1.09	2.28	-2.35
Leather and leather products	0.69	1.69	-7.03
Footwear	-2.12	-3.29	-11.30
Wood and wood products	-0.61	2.36	0.51
Paper and paper products	2.49	-1.74	-1.25
Printing, publishing and recorded media	1.43	0.87	0.83
Coke and refined petroleum products	-2.08	-5.65	1.65
Basic chemicals	-1.34	-0.94	-3.80
Other chemicals and man-made fibers	-1.01	-2.13	-0.07
Rubber products	1.09	-0.16	-1.72
Plastic products	2.64	1.76	-0.51
Glass and glass products	1.13	-3.26	-1.76
Non-metallic minerals	2.74	-3.50	-5.88
Basic iron and steel	-3.56	-6.93	-1.29
Basic non-ferrous metals	-2.27	-3.53	-2.46
Metal products excluding machinery	-0.16	0.32	-0.69
Machinery and equipment	-2.76	2.56	1.55
Television, radio and communication equipm	4.18	0.92	-9.94
Professional and scientific equipment	4.46	0.15	4.38
Motor vehicles, parts and accessories	-0.63	2.39	0.93
Other transport equipment	-3.05	-5.54	3.94
Furniture	1.36	0.33	0.30
Other manufacturing	8.80	4.80	3.89
Average across sectors	0.18	-0.78	-1.45

Source: Quantec database and author's calculations.

6.3 *Methodology and results*

127. The previous section highlights a broadly positive correlation of trade liberalisation efforts and productivity developments. However, as already foreshadowed, the descriptive analysis of trends does not fully use the information on variation in the trends by sector and time, nor does it control for any of the possible confounding factors such as other structural and macroeconomic policies or institutional changes over the 1988-2003 period. For example the progressive transition towards democratic governance and the end of the apartheid regime that are briefly covered in Section 5 could have been important determinants of productivity growth. At the same time the productivity improvements could have been linked to sector-specific features that are less well discernible in the context of broad policy developments described in this report.

128. In order to examine all these possibilities, we study the relationship between trade liberalisation and productivity growth using econometric techniques. Indeed, this approach allows us to capture the impact of decline in effective rates of protection on productivity growth while controlling for other variables that could have impacted on the sectors' performance. In line with the literature, we estimate the following model:

$$dprod_{it} = \alpha_i + \sigma_t + \beta Z_{it} + \gamma C_{it} + \epsilon_{it}$$ i = 1…..27 and t = 1988….2003

where $dprod_{it}$ is the growth of productivity (either labour productivity or TFP) in sector i and year t, α_i is the industry-specific fixed effect, Z_{it} are variables used as proxies for trade liberalisation, σ_t is a vector of time dummies, C_{it} is a set of control variables and ϵ_{it} is the error term.

129.   Terms α_i and σ_t capture, respectively, the unobserved time-invariant sector specific features and the macroeconomic-institutional changes common to all sectors but evolving in time. The term Z_{it} represents a set of trade liberalisation proxies. It includes the effective rate of protection inclusive of surcharges ($ERP\_incl\_s_{it}$, see Annex Table 6.1). $import\_share_{it}$ is the imports/output ratio, $intermediate\_imports\_share_{it}$ is the share of imported intermediate inputs and $import\_final\_g_{it}$ and $import\_interm\_g_{it}$ are, respectively, measures of final and intermediate imports growth. As suggested by Coe *et al*. 1997, all these indicators may be considered as distinct measures of trade openness as well as indirect measures of technology adoption. Importing intermediates, for example, may enhance productivity by providing firms with better inputs. This indicator is also often used also as a proxy for 'inshoring' (Feenstra and Hanson, 1995) or technological change (Ekholm and Hakkala, 2006).

130.   Overall, while we would expect a positive impact of intermediate imports on productivity, the effect of imports of final goods on productivity is less clear. In the latter case a positive effect would be expected on the basis of 'pro-competitive' and innovation-stimulating effects of imports, especially if the local industry remains competitive and is not driven out of the market.

131.   The term C_{it} is a set of control variables that capture time-evolving sector characteristics. First of all we control for a sectors' export orientation, using the export/output ratio (exp_share_{it}) and the export growth rate ($export\_g_{it}$). The literature suggests that export orientation might boost productivity and favour knowledge spillovers (Bernard and Jensen, 1999; Wagner, 2002; and Girma *et al.* 2003). Secondly, we control for capital intensity and labour force composition impact on productivity growth. Capital intensity[35] ($K\_labour\_ratio_{it}$) is computed as the share of capital per worker. The investment rate ($investment_{it}$) is computed as the growth rate of the fixed capital stock at constant prices. The labour force composition[36] is measured as the ratio of skilled to unskilled workers ($skill\_unskill_{it}$). We would expect a positive link between capital intensity, investment, skill intensity and productivity growth.

132.   Inflation is another control in our regressions. The negative impact of inflation on growth is well documented in the literature (Fisher, 1993). It increases uncertainty and can discourage investment with a concomitant negative effect on productivity. We control for both local inflation ($local\_\pi_{it}$) -computed as the rate of change in the final goods price for the sector and for imported-inflation ($import\_\pi_{it}$), computed as the rate of change in import price.

133.   Finally, we control for the market structure, labour costs and the sector dimension. As a proxy for the type of market structure ($markup_{it}$), we use mark-up computed as the net operating surplus of an industry as a percentage of total intermediate inputs plus labour remuneration and the consumption of capital for that industry, excluding all net indirect taxes. As the literature suggest, more competitive sectors (with lower mark-ups) present higher productivity growth, and hence we would expect a negative coefficient in our regressions on the mark-up variable. At the same time, higher mark-up could be associated with a better exploitation of economies of scale or higher R&D investment rates, making the overall influence of mark-up on productivity growth uncertain.

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[35]   See Abramovitz, 1979; Solow, 1988 and Wolff, 1991 for a review of the impact of capital intensity on productivity.

[36]   See Acemoglu, 1996; Hellrstein, 1999 and Moretti, 2004 for a review on the impact of skills on productivity.

134. As a proxy for wages, we adopt the growth in unit labour costs (*unit_labour_cost$_{it}$*) and we expect that an increase in labour costs impacts negatively on productivity at least in the short run. Sector size is measured as the share of total employment in sector *i* in total manufacturing employment (*empl_share$_{it}$*). One would expect that larger sectors have more inertia, grow slower, innovate less frequently and consequently present lower TFP growth rate (Pavit, 1984).

135. The literature has highlighted that the type of analysis being suggested here may suffer from endogeneity problems. Indeed, the political economy literature suggests that a less productive industry might be more likely to receive protection, biasing the estimated productivity impact of trade liberalisation. However, the preceding analysis broadly suggests that a number of sectors that were relatively highly protected in South Africa in 1988 often experienced deeper than average reductions in ERPs over the 1988-2003 period. We interpret this as evidence against the existence of endogeneity in our sample.

136. Annex Table 6.1 presents the results of the estimation using TFP growth as dependent variable.[37] As far as the control indicators are concerned, the results suggest that while the outward trade orientation does not significantly impact on productivity growth, the use of imported intermediates does. There is also some evidence that an increase in imports of final goods has a negative productivity impact. Higher capital intensity seems to be positively associated with TFP growth but, contrary to our expectations, an increase in investment has a negative impact on productivity. Skill intensity does not seem to be an important determinant of productivity growth. In line with our expectations, an increase in inflation, both domestic and imported, reduces TFP growth, though the impact of domestic inflation is larger. Labour costs are significant only when we control for export and import growth and thus we conclude they cannot be classified as a significant determinant of TFP growth on the basis of these estimates. The positive coefficients on the mark-up variable support the economies of scale and R&D hypothesis but their statistical significance is not robust to alternative specifications. Finally, as expected, larger sectors tend to have lower TFP growth rates.[38]

137. Turning to the effects of trade liberalisation, the estimated effect of the effective rate of protection on total factor productivity is negative, significant and consistently robust with respect to the different sets of control variables.[39] It means that, after controlling for sector-specific features and time-evolving effects, trade liberalisation exerts a positive impact on productivity. In particular, it can be calculated that if effective rate of protection decreases by 1%, the TFP growth increases by 1.50-2.20%. Alternatively, it can be estimated that the decrease in the effective rate of protection observed over the whole period implies an increase of the annual TFP growth rate by up to 1 percentage point. This is equivalent to more than the average annual TFP growth rate observed over the 1994-1999 sub period, 23% of the annual TFP growth rate observed over the high growth sub period of 2000-2003 and more than 100% of average annual TFP growth rate observed over the whole 1988-2003 period (see Table 6.2). These results suggest that trade liberalisation was indeed an important contributor to TFP growth and to general output growth across South African manufacturing sectors.

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[37] The results don't change significantly if we use labour productivity instead of TFP as a dependent variable Regression results available upon request.

[38] However, the sector size and mark-up turn out to be insignificant if added contemporaneously in the same specification. Indeed, the correlation analysis suggests that larger sectors present also higher mark-ups and the results on these variables may suffer from multicollinearity.

[39] However, if we use change in ERP instead of level, the coefficient is almost never significant, suggesting that what matters for performance is the liberalisation process and not its acceleration. This result can also be associated with the time lags with which the industry reacts to liberalisation.

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GRAVITY MODEL ANALYSIS ANNEX

We start from the version of the gravity model developed by Anderson & Van Wincoop (2003, 2004).

$$(1)\ \log(X_{ij}) = \log(Y_j) + \log(Y_i) - \log(Y) + (1-\sigma)\log(t_{ij}) - (1-\sigma)\log(P_j) - (1-\sigma)\log(\Pi_i) + \varepsilon_{ij}$$

where time subscripts are excluded for the time being to save on notation and:

X_{ij} = exports from country i to country j
Y_i = GDP of country i
Y_j = GDP of country j
Y = aggregate (world) GDP
σ = elasticity of substitution
t_{ij} = trade costs facing exports from country i to country j

$$P_j^{1-\sigma} = \sum_{i=1}^{N} \Pi_i^{\sigma-1} \omega_i t_{ij}^{1-\sigma}$$

$$\Pi_i^{1-\sigma} = \sum_{j=1}^{N} P_j^{\sigma-1} \omega_j t_{ij}^{1-\sigma}$$

ω_i = country i's expenditure share

ε_{ij} = random error term

While in principle it is possible to estimate (1) directly using non-linear methods (Anderson & Van Wincoop, 2003), it is far simpler to use exporter and importer fixed effects. Such an approach still produces consistent and unbiased estimates and this is the approach taken here, leading to equation (5) (with the deltas indicating fixed effects):

$$(2)\ \log\left(\frac{X_{ijt}}{Y_{it}Y_{jt}}\right) = \mu + \sum_{t=1}^{T}\lambda_t + \sum_{i=1}^{N}\delta_i + \sum_{j=N+1}^{2N}\delta_j + \sum_{p=1}^{(N^2-N)/2}\delta_{ij} + \sum_{i=1}^{N}\delta_{it} + \sum_{j=N+1}^{2N}\delta_{jt} + \varepsilon_{ijt}$$

Specified in this way, the model allows one to distinguish between various types of factors underlying trade. $\sum_{t=1}^{T}\lambda_t$ terms isolate the time effects that are common to all trading country pairs. One example might be the worldwide dip in trading intensity observed after 9/11 or inventions on a global scale that affect trade such as for example the development of the internet.

$\sum_{i=1}^{N} \delta_i$ and $\sum_{j=N+1}^{2N} \delta_j$ pick up time-invariant fixed effects for exporting and importing countries, respectively. $\sum_{p=1}^{(N^2-N)} \delta_{ij}$ are country pair-specific time-invariant fixed effects that account for factors such as the time-invariant bilateral trading costs (i.e. those associated with bilateral distance) or long-standing cultural or political ties.

$\sum_{i=1}^{N} \delta_{it}$ and $\sum_{j=N+1}^{2N} \delta_{jt}$ are the time-variant importer and exporter-specific fixed effects that pick up the GDP and country-specific price effects along with time-varying factors specific to an exporting or importing country such as opening up to trade on an MFN basis or country-specific reforms and policies. These types of fixed effects tell us how the propensity of a country to export or import has been evolving over time. Additionally, their magnitude relative to the magnitude of other time-invariant fixed effects may be indicative of the permanent and evolving factors underlying trading relations.

ε_{ijt} is the error term which picks up all trade unexplained by the previously mentioned factors, including bilateral and time-varying trade policies and random factors affecting trade. In particular, none of the above specified fixed effects captures bilateral effects that vary over time.

Ordinary least squares with Huber/White heteroskedasticity adjusted standard errors are used to estimate (2) for total trade and a similar specification for the disaggregated commodities. The estimated fixed effect models explain over 90% of the variation in trade flows in adjusted terms.

FIGURES AND TABLES ANNEX

Annex Figure 2.1 GDP per capita
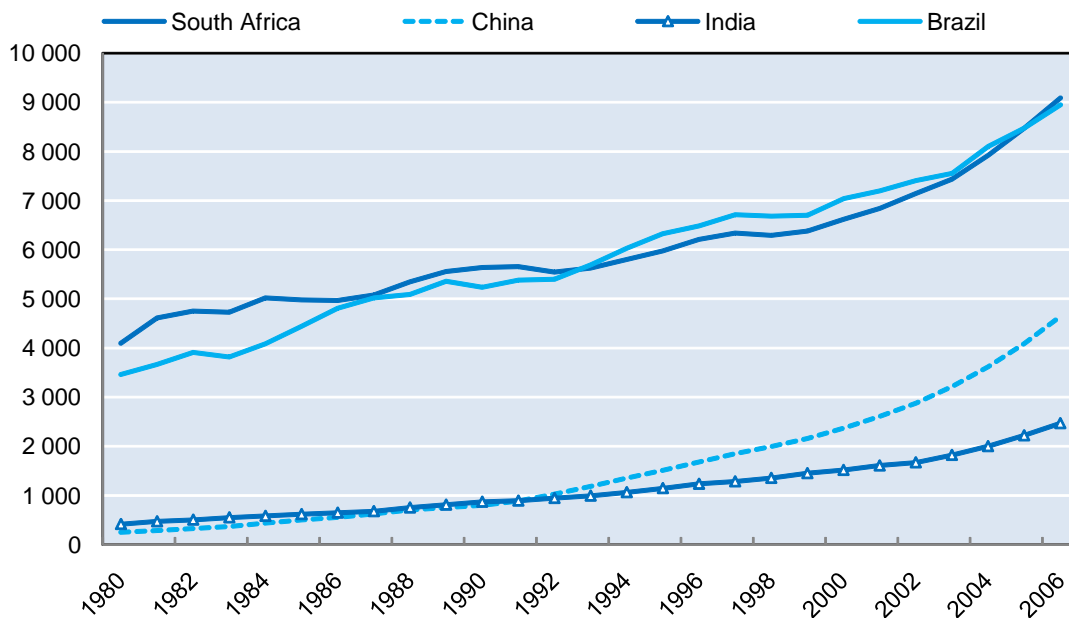
Source: WDI.

Annex Figure 2.2 Share in world GDP

Source: WDI.

66
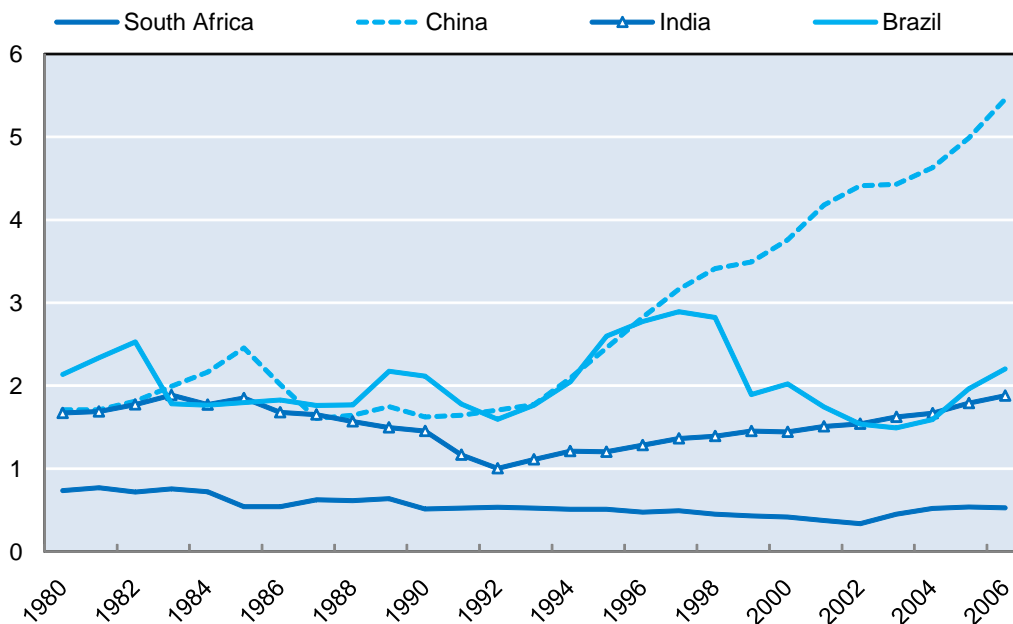
Annex Figure 2.3 Share in world trade
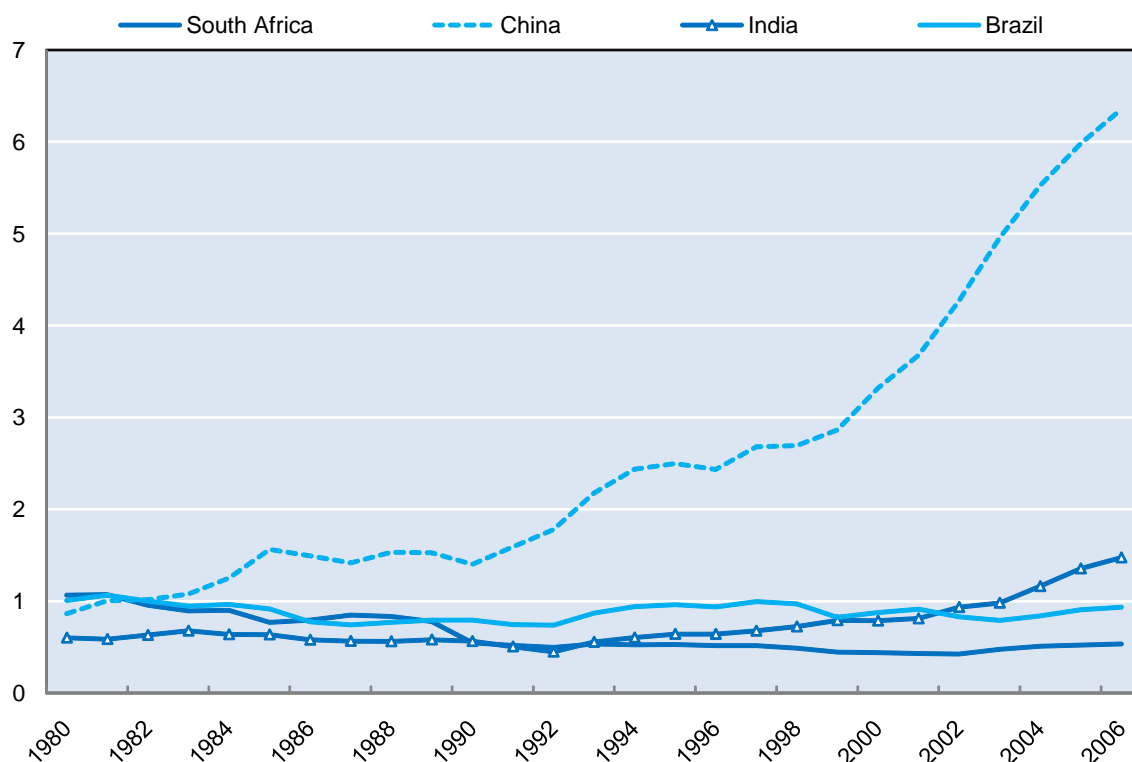
Source: WDI.

Annex Figure 2.4 Exchange rates
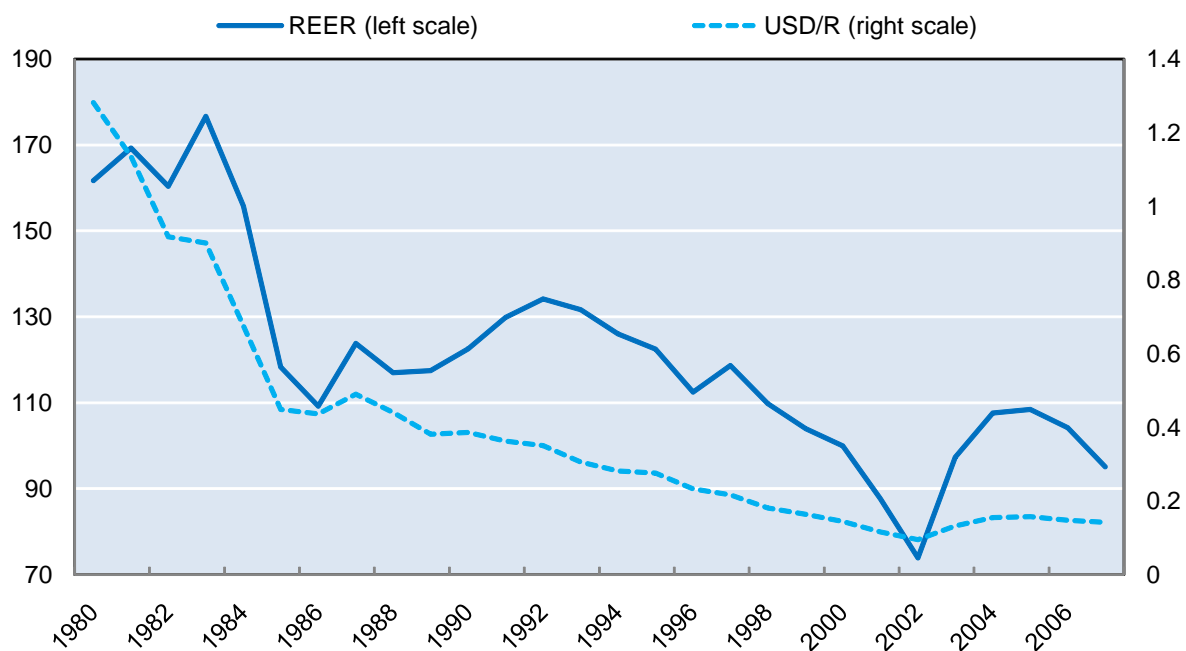
Source: IMF IFS and South African Reserve Bank.

Annex Table 2.1 Employment by industrial sector (formal and informal)

	Total in 2007	Share	Average annual growth rate		
			1994-2007	2000-2007	2004-2007
A1121: Coal mining [21]	59 873	0.5	-0.1	1.6	5.9
A1122: Gold and uranium ore mining [23]	172 588	1.6	-5.8	-4.2	-2.7
A1123: Other mining [22/24/25/29]	262 381	2.4	4.2	8.4	9.0
A12101: Food [301-304]	170 730	1.5	-1.6	-1.7	-0.8
A12102: Beverages [305]	58 972	0.5	0.8	2.6	7.3
A12103: Tobacco [306]	2 913	0.0	-0.3	-0.5	0.4
A12111: Textiles [311-312]	64 826	0.6	-2.1	-2.4	-3.9
A12112: Wearing apparel [313-315]	110 182	1.0	-1.3	-4.0	-5.6
A12113: Leather and leather products [316]	7 864	0.1	-2.4	-5.5	-4.0
A12114: Footwear [317]	12 031	0.1	-5.6	-7.3	-3.2
A12121: Wood and wood products [321-322]	82 718	0.7	1.5	0.8	1.1
A12122: Paper and paper products [323]	34 177	0.3	-2.3	-2.8	-4.3
A12123: Printing, publishing and recorded media [324-326]	55 794	0.5	0.9	0.9	1.0
A12131: Coke and refined petroleum products [331-333]	16 927	0.2	-1.3	1.9	2.2
A12132: Basic chemicals [334]	21 063	0.2	-1.4	-1.7	0.5
A12133: Other chemicals and man-made fibers [335-336]	49 043	0.4	-0.2	1.3	2.7
A12134: Rubber products [337]	14 252	0.1	-1.7	-2.9	-4.1
A12135: Plastic products [338]	39 214	0.4	0.2	-1.0	-1.5
A12141: Glass and glass products [341]	11 310	0.1	-0.7	1.3	4.3
A12142: Non-metallic minerals [342]	75 822	0.7	-2.9	-2.5	0.9
A12151: Basic iron and steel [351]	51 680	0.5	-3.4	-0.7	-0.1
A12152: Basic non-ferrous metals [352]	25 812	0.2	-0.6	1.6	5.6
A12153: Metal products excluding machinery [353-355]	147 805	1.3	0.2	0.1	0.8
A12154: Machinery and equipment [356-359]	116 284	1.0	2.8	2.9	4.3
A1216: Electrical machinery and apparatus [361-366]	43 471	0.4	-3.5	-2.0	1.6
A12171: Television, radio and communication equipment [371-373]	8 180	0.1	-3.3	-6.5	-3.0
A12172: Professional and scientific equipment [374-376]	9 109	0.1	1.3	2.2	0.0
A12181: Motor vehicles, parts and accessories [381-383]	130 746	1.2	1.4	0.7	0.5
A12182: Other transport equipment [384-387]	13 106	0.1	-1.2	2.1	0.2
A12191: Furniture [391]	47 749	0.4	0.5	0.5	0.8
A12193: Other manufacturing [392-393]	89 395	0.8	3.4	2.3	0.7
A1221: Electricity, gas and steam [41]	39 274	0.4	-1.5	-1.0	2.1
A1222: Water supply [42]	15 156	0.1	-0.5	1.8	4.9
A1231: Building construction [51]	454 768	4.1	-2.2	-1.2	3.7
A1232: Civil engineering and other construction [52-53]	294 170	2.6	1.2	-0.6	3.5
A1311: Wholesale and retail trade [61-63]	2 482 158	22.3	3.6	2.6	3.7
A1312: Catering and accommodation services [64]	289 174	2.6	-1.8	-3.5	-0.2
A1321: Transport and storage [71-74]	397 970	3.6	-0.3	1.4	4.5
A1322: Communication [75]	84 484	0.8	-1.2	1.3	0.6
A1331: Finance and insurance [81-82]	459 270	4.1	2.7	0.6	-0.5
A1332: Business services [83-88]	1 471 783	13.3	6.9	5.5	2.9
A13411: Medical, dental and veterinary services [93]	221 525	2.0	5.6	4.2	1.4
A13412: Excluding medical, dental and veterinary services [94-96]	79 767	0.7	0.1	-0.8	-0.8
A1342: Other producers [98]	1 174 059	10.6	0.6	0.4	-0.7
A1343: General government services [99]	1 638 122	14.7	0.3	1.0	3.2
Total	11 107 692	100.0	1.2	1.3	2.1

Source: Quantec database, authors' calculation.

Annex Table 2.2 Growth rates of goods and services trade- Selected countries and regions, 1994-
2004

Percentages

	Goods exports	Services exports
World	9.05	8.29
South Africa	*7.68*	*10.19*
Brazil	*9.94*	*12.16*
China	*20.59*	*15.33*
India	*14.05*	*23.41*
Russia	*13.38*	*11.45*
Industrial Countries	7.04	7.67
Emerging & Developing Economies	12.29	9.85
	Goods imports	Services imports
All Countries	9.15	7.81
South Africa	*10.18*	*8.99*
Brazil	*8.79*	*9.09*
China	*18.79*	*16.40*
India	*16.26*	*16.14*
Russia	*10.36*	*9.27*
Industrial Countries	8.27	7.07
Emerging & Developing Economies	10.74	9.42

a)   1994-2003 for India.
Source: IMF BOP (2006).

TAD/TC/WP(2008)16/FINAL

Annex Table 3.1 Revealed comparative advantages indices, HS 2 digits

		1996	2006	Annual average growth rate
01	Live animals	0.123	0.191	4.5
02	Meat and edible meat offal	0.377	0.200	-6.1
03	Fish & crustacean, mollusc & other	1.090	1.378	2.4
04	Dairy prod; birds' eggs; natural ho	0.320	0.149	-7.3
05	Products of animal origin, nes or	0.464	0.726	4.6
06	Live tree & other plant; bulb, root	0.908	0.797	-1.3
07	Edible vegetables and certain roots	1.212	0.261	-14.2
08	Edible fruit and nuts; peel of citr	3.695	5.016	3.1
09	Coffee, tea, matï and spices.	0.283	0.371	2.7
10	Cereals	1.883	0.713	-9.3
11	Prod.mill.indust; malt; starches;	2.650	0.736	-12.0
12	Oil seed, oleagi fruits; miscell gr	0.507	0.426	-1.7
13	Lac; gums, resins & other vegetable	0.300	0.405	3.0
14	Vegetable plaiting materials; veget	0.418	0.287	-3.7
15	Animal/veg fats & oils & their clea	0.555	0.187	-10.3
16	Prep of meat, fish or crustaceans,	0.296	0.252	-1.6
17	Sugars and sugar confectionery.	4.092	3.068	-2.8
18	Cocoa and cocoa preparations.	0.416	0.268	-4.3
19	Prep.of cereal, flour, starch/milk;	0.260	0.204	-2.4
20	Prep of vegetable, fruit, nuts or o	2.759	2.041	-3.0
21	Miscellaneous edible preparations.	0.430	0.762	5.9
22	Beverages, spirits and vinegar.	2.467	2.375	-0.4
23	Residues & waste from the food indu	0.119	0.208	5.8
24	Tobacco and manufactured tobacco su	0.492	1.649	12.9
25	Salt; sulphur; earth & ston; plaste	2.183	1.428	-4.2
26	Ores, slag and ash.	8.516	7.846	-0.8
27	Mineral fuels, oils & product of th	1.523	0.765	-6.7
28	Inorgn chem; compds of prec mtl, r	4.841	2.884	-5.0
29	Organic chemicals.	0.480	0.678	3.5
30	Pharmaceutical products.	0.183	0.091	-6.7
31	Fertilisers.	2.555	1.338	-6.3
32	Tanning/dyeing extract; tannins &	0.534	0.626	1.6
33	Essential oils & resinoids; perf,	0.539	0.747	3.3
34	Soap, organic surface-active agents	0.953	0.673	-3.4
35	Albuminoidal subs; modified starche	0.283	0.314	1.1
36	Explosives; pyrotechnic prod; match	3.671	4.779	2.7
37	Photographic or cinematographic goo	0.146	0.238	5.0
38	Miscellaneous chemical products.	1.102	1.143	0.4
39	Plastics and articles thereof.	0.331	0.337	0.2

70

Annex Table 3.1 Revealed comparative advantages indices, HS 2 digits *(continued)*

		1996	2006	Annual average growth rate
40	Rubber and articles thereof.	0.535	0.628	1.6
41	Raw hides and skins (other than fu	2.617	1.431	-5.9
42	Articles of leather; saddlery/harne	0.230	0.145	-4.5
43	Furskins and artificial fur; manuf	0.060	0.094	4.6
44	Wood and articles of wood; wood ch	0.709	0.890	2.3
45	Cork and articles of cork.	0.097	0.156	4.9
46	Manufactures of straw, esparto/othe	0.030	0.371	28.4
47	Pulp of wood/of other fibrous cellu	4.118	3.115	-2.8
48	Paper & paperboard; art of paper pu	1.069	0.808	-2.8
49	Printed books, newspapers, pictures	0.344	0.600	5.7
50	Silk.	0.010	0.018	6.4
51	Wool, fine/coarse animal hair, hors	3.359	3.487	0.4
52	Cotton.	0.232	0.108	-7.4
53	Other vegetable textile fibres; pap	0.060	0.241	15.0
54	Man-made filaments.	0.654	0.560	-1.6
55	Man-made staple fibres.	0.433	0.137	-10.8
56	Wadding, felt & nonwoven; yarns; tw	0.306	0.444	3.8
57	Carpets and other textile floor co	0.500	0.508	0.2
58	Special woven fab; tufted tex fab;	0.455	0.370	-2.0
59	Impregnated, coated, cover/laminate	0.211	0.340	4.9
60	Knitted or crocheted fabrics.	0.354	0.107	-11.3
61	Art of apparel & clothing access,	0.213	0.123	-5.3
62	Art of apparel & clothing access, n	0.216	0.078	-9.6
63	Other made up textile articles; set	0.516	0.292	-5.5
64	Footwear, gaiters and the like; par	0.118	0.058	-6.8
65	Headgear and parts thereof.	1.116	0.411	-9.5
66	Umbrellas, walking-sticks, seat-sti	0.575	0.658	1.4
67	Prepr feathers & down; arti flower;	0.317	0.175	-5.8
68	Art of stone, plaster, cement, asbe	1.191	1.350	1.3
69	Ceramic products.	0.299	0.316	0.5
70	Glass and glassware.	0.400	0.350	-1.3
71	Natural/cultured pearls, prec stone	7.427	10.464	3.5
72	Iron and steel.	4.272	3.717	-1.4
73	Articles of iron or steel.	1.109	0.903	-2.0
74	Copper and articles thereof.	1.576	1.068	-3.8
75	Nickel and articles thereof.	8.283	2.369	-11.8
76	Aluminium and articles thereof.	3.004	3.570	1.7
78	Lead and articles thereof.	0.153	0.617	15.0
79	Zinc and articles thereof.	0.816	0.469	-5.4

Annex Table 3.1 Revealed comparative advantages indices, HS 2 digits *(continued)*

		1996	2006	Annual average growth rate
80	Tin and articles thereof.	0.160	0.125	-2.4
81	Other base metals; cermets; article	3.349	2.249	-3.9
82	Tool, implement, cutlery, spoon & f	0.728	0.534	-3.0
83	Miscellaneous articles of base meta	0.253	0.269	0.6
84	Nuclear reactors, boilers, mchy & m	0.345	0.644	6.4
85	Electrical mchy equip parts thereof	0.138	0.162	1.6
86	Railw/tramw locom, rolling-stock &	5.240	1.613	-11.1
87	Vehicles o/t railw/tramw roll-stock	0.303	1.014	12.8
88	Aircraft, spacecraft, and parts the	0.209	0.740	13.5
89	Ships, boats and floating structure	0.086	0.254	11.4
90	Optical, photo, cine, meas, checkin	0.184	0.172	-0.6
91	Clocks and watches and parts thereo	0.034	0.024	-3.4
92	Musical instruments; parts and acce	0.652	0.057	-21.6
93	Arms and ammunition; parts and acc	..	..	..
94	Furniture; bedding, mattress, matt	1.532	0.876	-5.4
95	Toys, games & sports requisites; pa	0.055	0.088	4.7
96	Miscellaneous manufactured articles	0.222	0.198	-1.1
97	Works of art, collectors' pieces an	0.325	0.329	0.1

Source: UN ComTrade.

Annex Table 3.2. Top 50 World Value of Trade Growth, 1996-2006

Rank	HS code	Product	Trade growth USD billion	Growth share %
		Total Trade	4024	100
1	271000	Petroleum oils, etc, (excl. crude)	247	6.1
2	270900	Petroleum oils and oils obtained from crude	180	4.5
3	852520	Transmission apparatus, for radiotelephones	141	3.5
4	300490	Other medicaments, retail packs	132	3.3
5	870324	Automobiles, over 3000cc	72	1.8
6	870323	Automobiles, 1500-3000cc	71	1.8
7	852990	Parts, television, radar, transmission equip.	66	1.6
8	847330	Parts and accessories of ADP machines	65	1.6
9	854211	Monolithic integrated circuits, digital	57	1.4
10	847120	Digital auto data process machines	56	1.4
11	880240	Aircraft nes of an unladen weight > 15t	53	1.3
12	870332	Automobiles, 1500-2500cc	49	1.2
13	271121	Natural gas in gaseous state	36	0.9
14	870899	Motor vehicle parts nes	35	0.9
15	852810	Colour television receivers	30	0.8
16	901380	Optical devices, appliances and instruments	28	0.7
17	270112	Bituminous coal, not agglomerated	24	0.6
18	852110	Video recording or reproducing apparatus	19	0.5
19	854219	Monolithic integrated circuits, nes	19	0.5
20	300210	Antisera and other blood fractions	19	0.5
21	271600	Electrical energy	19	0.5
22	870829	Parts and accessories of motor vehicle bodies	18	0.4
23	847192	Input or output units	17	0.4
24	870333	Automobiles, over 2500cc	17	0.4
25	293390	Heterocyclic compounds with nitrogen hetero atom	17	0.4
26	847989	Air-coolers, air-purifiers	16	0.4
27	841191	Parts of turbo-jets or turbo-propel	16	0.4
28	271111	Natural gas, liquefied	15	0.4
29	847199	Automatic data processing machines	15	0.4
30	853400	Printed circuits	15	0.4
31	880330	Aircraft parts nes	14	0.3
32	890190	Cargo vessels nes and other vessels	14	0.3
33	841112	Turbo-jets of a thrust exceeding 25KN	13	0.3
34	840820	Engines, diesel, for vehicles	13	0.3
35	260111	Non-agglomerated iron ores and concentrates	13	0.3
36	851740	Apparatus, for carrier-current line	13	0.3
37	854140	Photosensitive semiconductor device	13	0.3
38	850440	Static converters, nes	13	0.3
39	853690	Electrical app for switching or pro	12	0.3
40	854380	Electrical machines and apparatus,	12	0.3
41	901890	Medical or veterinary Instruments and appliances	12	0.3
42	848180	Taps, cocks, valves and similar app	12	0.3
43	392690	Other articles of plastics, nes	12	0.3
44	853710	Boards, panels, including numerical	12	0.3
45	710812	Gold in unwrought forms non-monetar	12	0.3
46	870840	Transmissions for motor vehicles	12	0.3
47	760120	Aluminium unwrought, alloyed	12	0.3
48	711319	Art. of jewellery and pts thereof	11	0.3
49	852190	Video recording or reproducing appa	11	0.3
50	740811	Wire of refined copper of which the	11	0.3

Note: the dark blue commodities are the ten energy and mineral products. The light blue products are the nineteen consumer electronics components and products that increasing dominated world trade in the decade.

Source: UN ComTrade.

Annex Table 3.3 South Africa: Top 25 HS 6 digit Export Products, 1996 & 2006

USD millions

		1996				2006		
Rank	Product	Product_Name	1996	2006	Product	Product_Name	1996	2006
		Total Trade	23 469	53 170		Total Trade	23 469	53 170
1	710231	Diamonds non-industrial unworked	2 039	1 796	270112	Bituminous coal, not agglomerated	1 456	3 046
2	270112	Bituminous coal, not agglomerated	1 456	3 046	711011	Platinum unwrought or in powder form	0	2 684
3	760110	Aluminium unwrought, not alloyed	638	1 257	842139	Gas filtering or purifying machinery	112	2 381
4	720241	Ferro-chromium containing by weight	592	1 393	711019	Platinum in other semi-manufactured	0	2 336
5	710210	Diamonds unsorted	456	0	870323	Automobiles with reciprocating pistons	97	2 074
6	710239	Diamonds non-industrial nes	359	663	710231	Diamonds non-industrial unworked	2 039	1 796
7	282300	Titanium oxides	331	111	711031	Rhodium unwrought or in powder form	0	1 582
8	100590	Maize (excl. seed)	304	129	720241	Ferro-chromium containing by weight	592	1 393
9	260112	Agglomerated iron ores	287	1 159	760110	Aluminium unwrought, not alloyed	638	1 257
10	940190	Parts of seats except dentists	286	394	260112	Agglomerated iron ores	287	1 159
11	710813	Gold in oth semi-manufactured forms	241	19	271000	Petroleum oils, etc, (excl. crude)	0	1 148
12	470200	Chemical wood pulp	229	348	870421	Diesel powered trucks with a GVW <5t	45	884
13	170111	Raw cane sugar, in solid form	227	259	710239	Diamonds non-industrial nes	359	663
14	750110	Nickel mattes	177	0	711021	Palladium unwrought or in powder form	0	521
15	860900	Cargo containers	174	139	270900	Petroleum oils and oils obtained from crude	108	464
16	720211	Ferro-manganese	160	290	711039	Rhodium in other semi-manufactured	0	464
17	220421	Wine (not sparkling)	150	413	760612	Plate, sheet or strip, aluminium	11	458
18	261000	Chromium ores and concentrates	129	311	261690	Precious metal ores and concentrate	61	456
19	260200	Manganese ores and concentrates	128	265	220421	Wine (not sparkling)	150	413
20	261510	Zirconium ores and concentrates	121	191	261400	Titanium ores and concentrates	60	403
21	843069	Construction equipment	118	9	940190	Parts of seats, except dentists	286	394
22	842139	Gas filtering or purifying machinery	112	2 381	740400	Waste and scrap, copper	50	378
23	740311	Copper cathodes	110	87	721933	Flat rolled prod, stainless steel,	9	358
24	270900	Petroleum oils	108	464	880240	Aircraft nes of an unladen weight >15t	2	349
25	220720	Ethyl alcohol, denatured	103	15	470200	Chemical wood pulp	229	348
		%Total	**39**			**%Total**	**52**	

Source: UN ComTrade.

Annex Table 3.4 Top 25 HS6 South Africa Imports

USD billions

Rank	HS code	Product	1996	HS code	Product	2006
		Total Trade	26 872		Total Trade	69 185
1	270900	Petroleum oils and oils obtained from crude	2 137	270900	Petroleum oils and oils obtained from crude	9 587
2	847330	Parts and accessories of ADP	389	271000	Petroleum oils, etc, (excl. crude);	2 634
3	852520	Transmission apparatus, for radiotelephone	377	870323	Automobiles 1500-3000cc	1 934
4	852490	Recorded media for sound	320	852520	Transmission apparatus, for radiotelephone	1 642
5	710231	Diamonds non-industrial unworked	277	870324	Automobiles >3000cc	974
6	870323	Automobiles 1500-3000cc	238	300490	Other medicaments of mixed or unmix	909
7	300490	Other medicaments	233	847330	Parts and accessories of ADP	884
8	847192	Input or output units	230	710231	Diamonds non-industrial unworked	784
9	281820	Aluminium oxide	218	841112	Turbo-jets of a thrust exceeding 25KN	617
10	847191	Digital process units	195	281820	Aluminium oxide	611
11	100190	Spelt, common wheat and meslin	184	851740	Apparatus, for carrier-current line	497
12	847989	Machines & mechanical appliances nes	177	870322	Automobiles <1500cc	495
13	870190	Wheeled tractors nes	173	847192	Input or output units	444
14	870324	Automobiles >3000cc	162	847120	Digital auto data process mach cntg	435
15	870899	Motor vehicle parts nes	154	870421	Diesel powered trucks GVW <5t	385
16	854219	Monolithic integrated circuits, nes	146	870332	Automobiles, diesel 1500-2500cc	349
17	847199	Automatic data processing machines	143	750210	Nickel unwrought, not alloyed	338
18	100630	Semi-milled or wholly milled rice	139	847199	Automatic data processing machines	338
19	847120	Digital auto data process mach cntg	131	841182	Gas turbines nes exceeding 5000KW	308
20	490199	Printed books, brochures, leaflets	129	870410	Dump trucks designed for off-highway	302
21	844350	Printing machinery nes	125	852490	Recorded media for sound	301
22	851790	Parts of electrical apparatus	121	870899	Motor vehicle parts nes	278
23	848180	Taps, cocks, valves and similar app	115	847191	Digital process units	272
24	901890	Other medical, surgical and vet instruments	100	852810	Television receivers including videos	263
25	851740	Apparatus, for carrier-current line	100	901890	Other medical, surgical and vet instruments	260
		Top 25 % Total	**25**			**37**

Source: UN ComTrade.

Annex Figure 4.1. Exporter fixed effects (total trade).
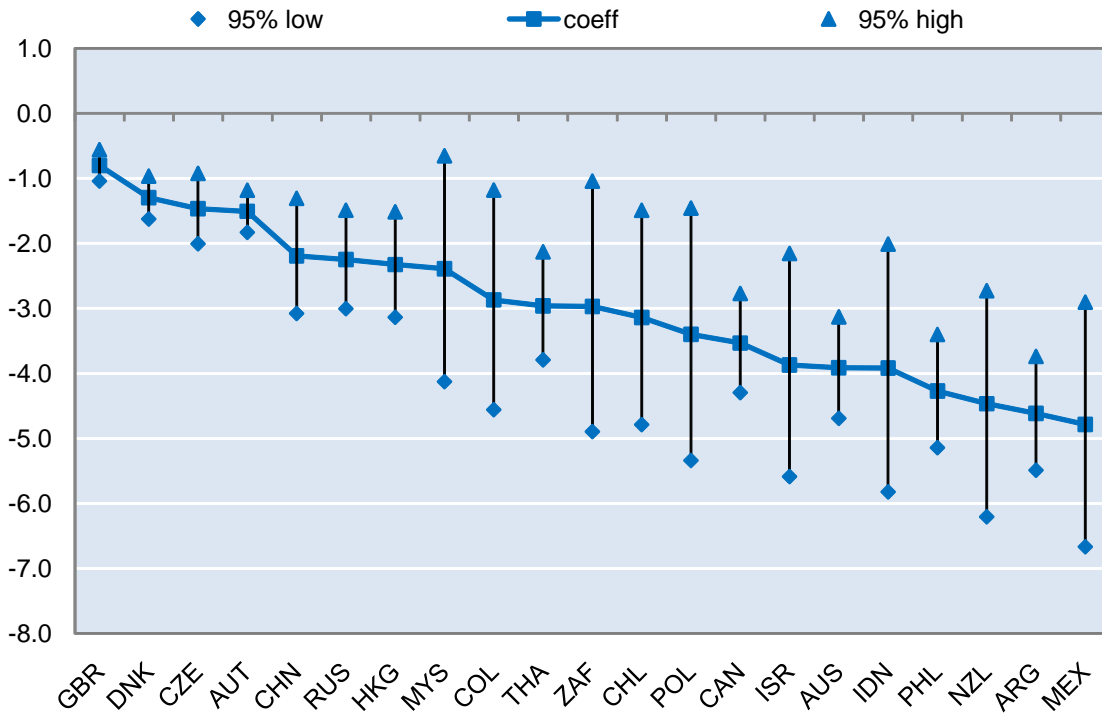
Source: Authors' calculations.

Annex Figure 4.2. Importer fixed effects—total trade (total trade).
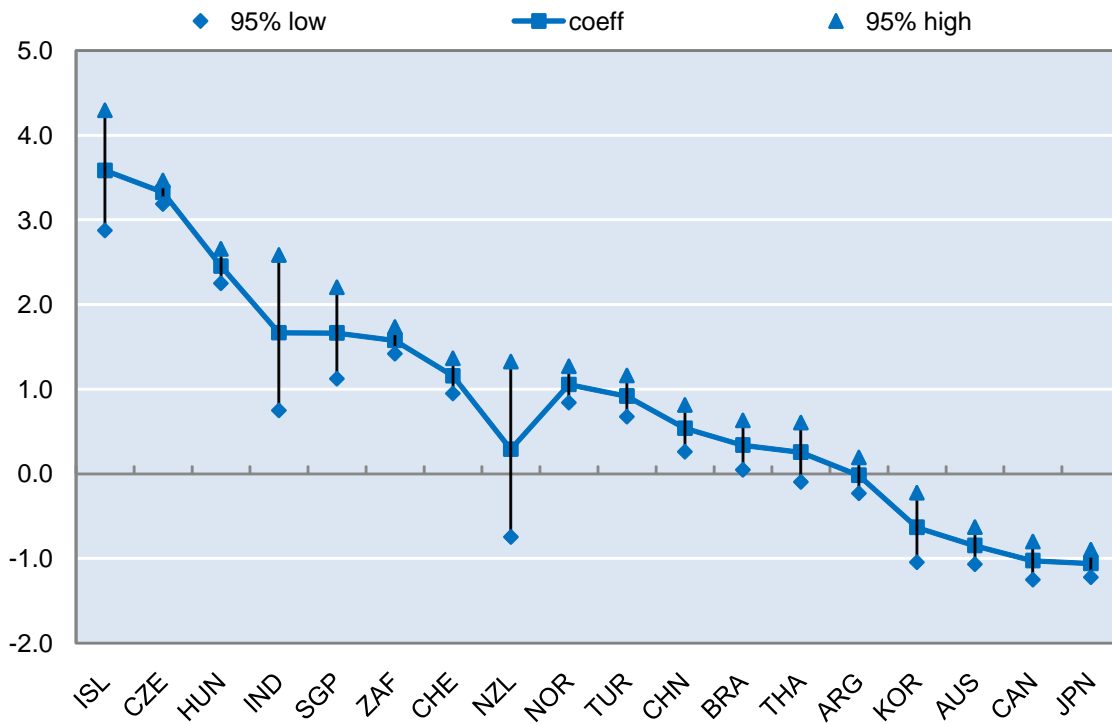
Source: Authors' calculations.

Annex Figure 4.3 Time Varying Fixed Effects of BRIICS as Exporters (intermediate goods)
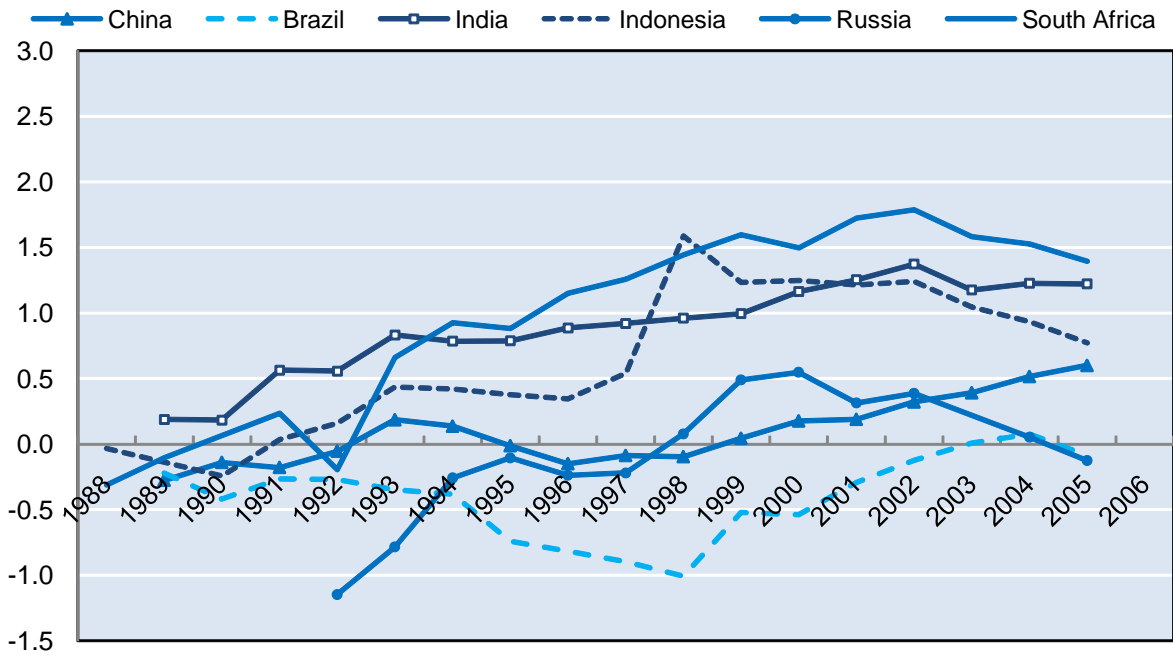
Source: Authors' calculations.

Annex Figure 4.4 Time Varying Fixed Effects of BRIICS as Importers (intermediate goods)
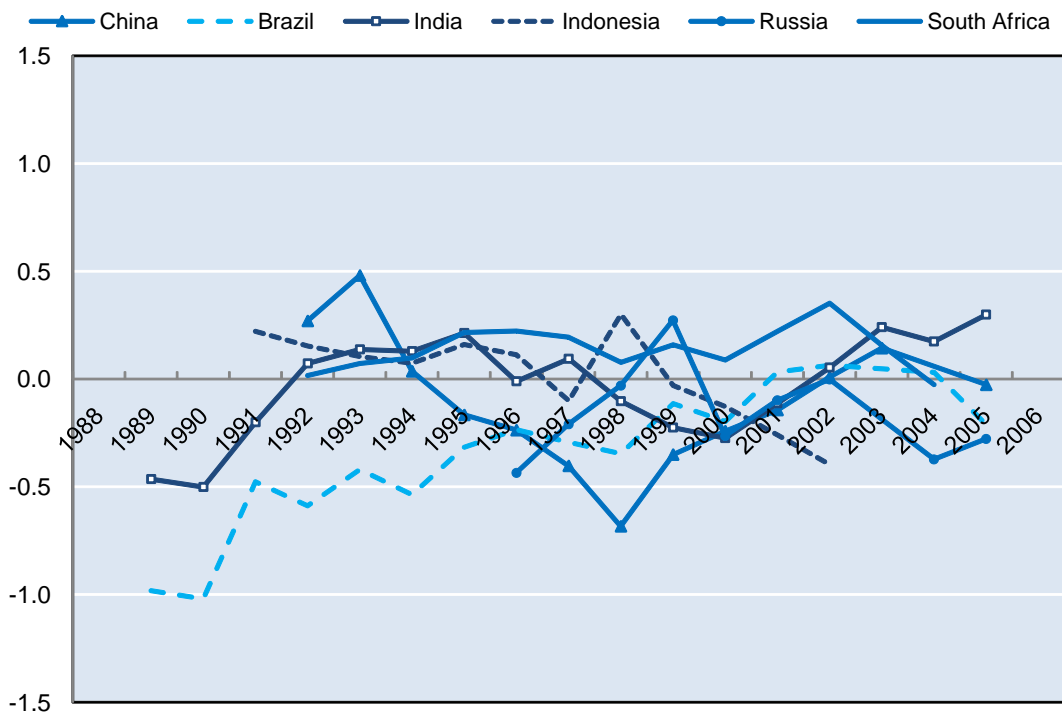
Source: Authors' calculations.

Annex Figure 4.5 Time Varying Fixed Effects of BRIICS as Exporters (consumption goods)
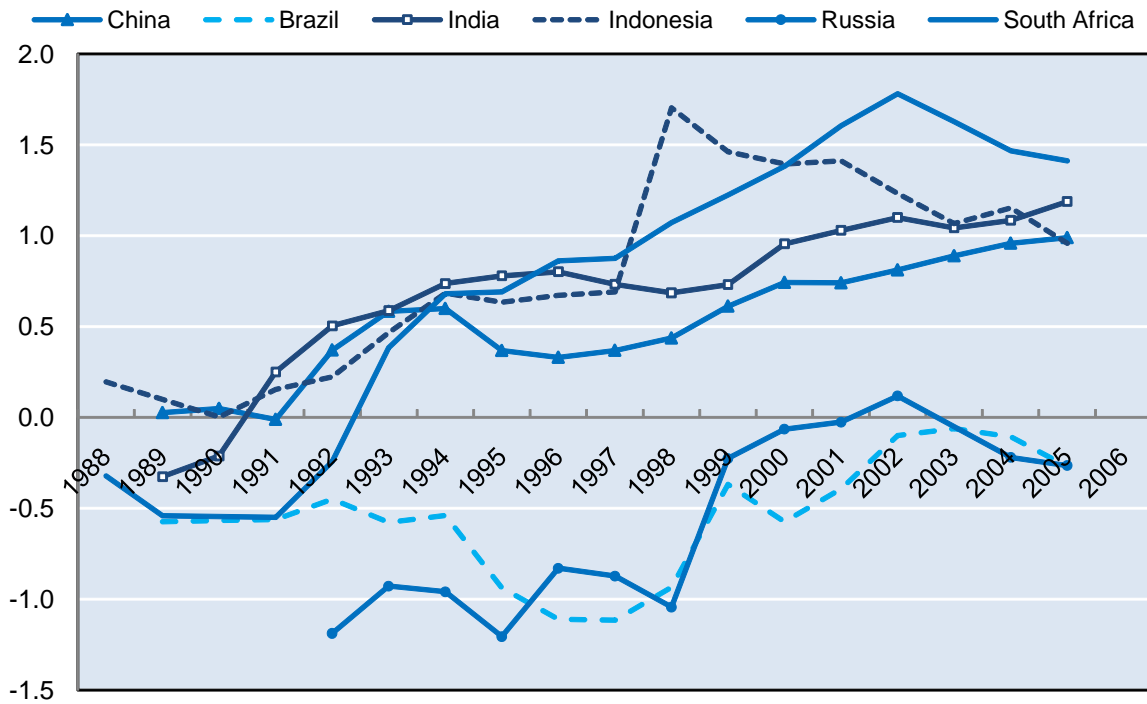
Source: Authors' calculations.

Annex Figure 4.6 Time Varying Fixed Effects of BRIICS as Importers (consumption goods)
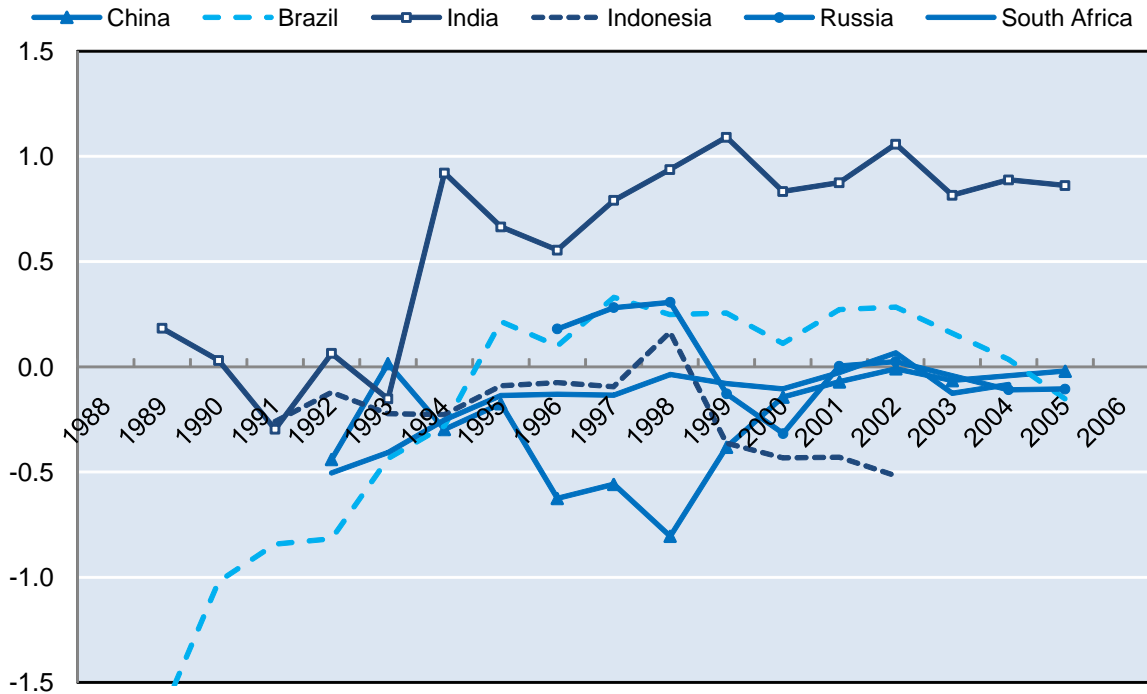
Source: Authors' calculations.

Annex Figure 4.7 Time Varying Fixed Effects of BRIICS as Exporters (capital goods)
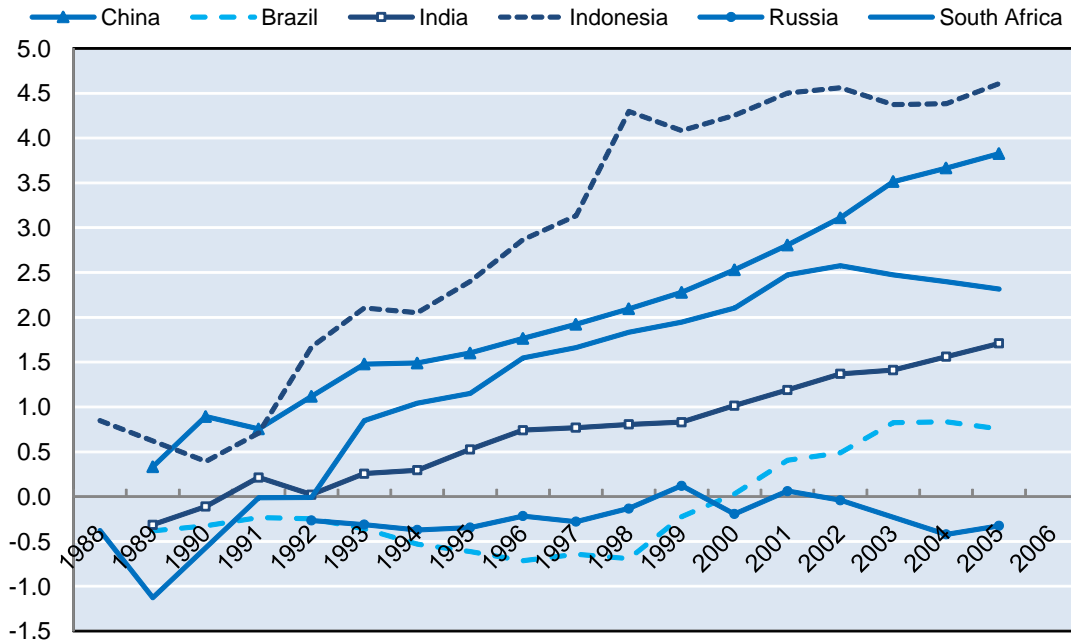
Source: Authors' calculations.

Annex Figure 4.8 Time Varying Fixed Effects of BRIICS as Importers (capital goods)

Source: Authors' calculations.

Annex Figure 4.9 Time Varying Fixed Effects of BRIICS as Exporters (raw materials)

Source: Authors' calculations

Annex Figure 4.10 Time Varying Fixed Effects of BRIICS as Importers (raw materials)

Source: Authors' calculations.

Annex Table 5. 1. Employment by sector and skill in 2007 (formal sector)

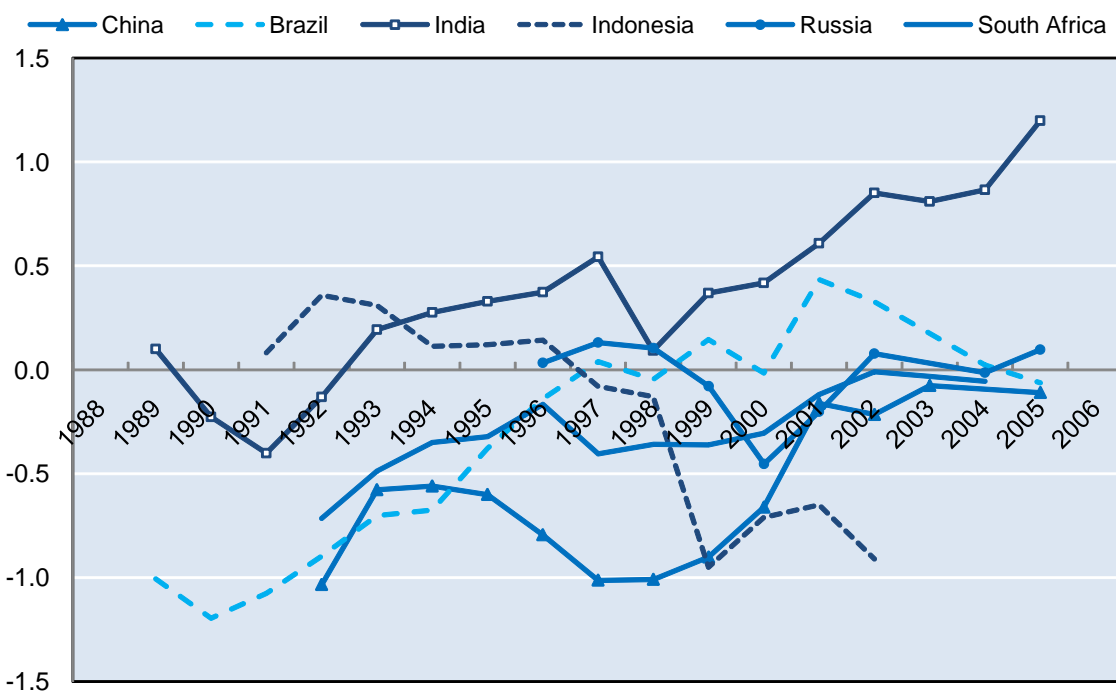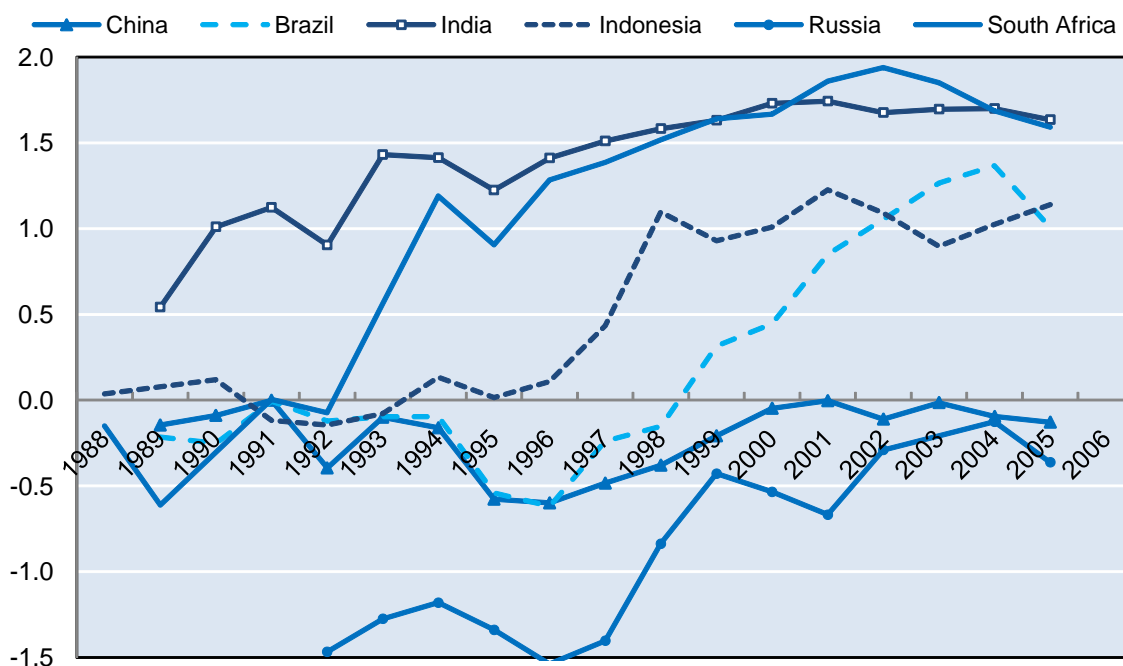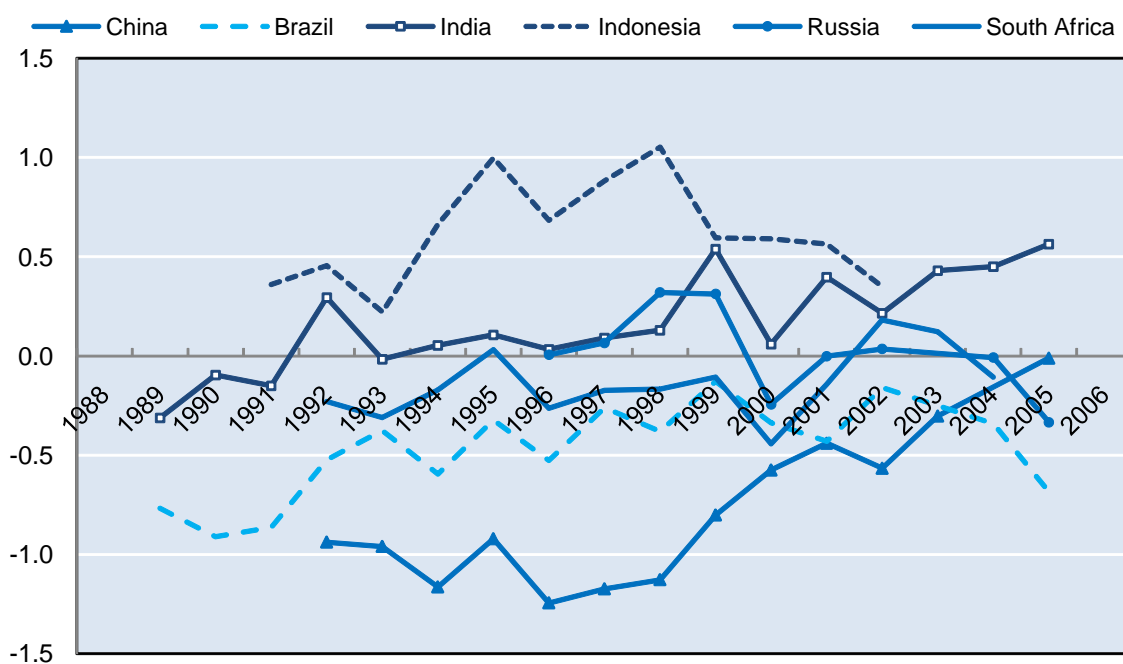|	Employment			Shares			Fixed capital stock	
	Unskilled	Skilled	Highly skilled	Unskilled	Skilled	Highly skilled	Value in Rm	Value in Rm per employee
Agriculture, forestry and fishing								
Coal mining	42 977	12 731	4 165	72	21	7	32 001	0.53
Gold and uranium ore mining	130 190	29 420	12 977	75	17	8	45 566	0.26
Other mining	190 961	49 866	21 553	73	19	8	98 765	0.38
Food	93 895	55 958	12 505	58	34	8	22 224	0.14
Beverages	22 567	11 877	4 520	58	30	12	11 052	0.28
Tobacco	1 861	871	180	64	30	6	615	0.21
Textiles	25 586	18 012	4 057	54	38	9	3 631	0.08
Wearing apparel	35 549	31 994	3 233	50	45	5	1 075	0.02
Leather and leather products	3 710	3 285	419	50	44	6	257	0.03
Footwear	4 717	4 990	440	46	49	4	262	0.03
Wood and wood products	38 409	16 919	2 438	66	29	4	3 827	0.07
Paper and paper products	18 825	11 407	3 945	55	33	12	12 450	0.36
Printing, publishing and recorded media	17 200	27 496	9 514	32	51	18	4 350	0.08
Coke and refined petroleum products	5 127	8 021	3 778	30	47	22	82 600	4.88
Basic chemicals	10 410	7 685	2 969	49	36	14	39 353	1.87
Other chemicals and man-made fibers	23 037	17 961	8 045	47	37	16	13 337	0.27
Rubber products	8 313	4 582	1 356	58	32	10	1 787	0.13
Plastic products	24 856	10 642	2 727	65	28	7	1 973	0.05
Glass and glass products	5 190	4 625	1 153	47	42	11	2 306	0.21
Non-metallic minerals	42 335	12 843	2 803	73	22	5	15 556	0.27
Basic iron and steel	30 221	17 471	3 988	58	34	8	21 619	0.42
Basic non-ferrous metals	14 962	8 096	2 151	59	32	9	17 201	0.68
Metal products excluding machinery	44 207	63 032	18 063	35	50	14	7 529	0.06
Machinery and equipment	48 830	49 462	15 419	43	43	14	6 695	0.06
Television, radio and communication equipment	2 382	4 308	1 305	30	54	16	1 038	0.13
Professional and scientific equipment	2 798	4 909	1 401	31	54	15	599	0.07
Motor vehicles, parts and accessories	53 791	58 127	18 827	41	44	14	22 480	0.17
Other transport equipment	4 900	6 278	1 927	37	48	15	1 588	0.12
Furniture	19 435	20 402	3 062	45	48	7	906	0.02
Other manufacturing	29 534	25 755	6 175	48	42	10	8 466	0.14
Electrical machinery and apparatus	23 823	14 947	4 096	56	35	10	2 523	0.06
Electricity, gas and steam	18 961	13 940	6 372	48	35	16	97 332	2.48
Water supply	9 363	3 939	1 438	64	27	10	44 845	3.04
Building construction	219 251	47 877	17 000	77	17	6	11 886	0.04
Civil engineering and other construction	145 665	31 808	11 294	77	17	6	6 199	0.03
Wholesale and retail trade	470 439	866 794	169 671	31	58	11	116 384	0.08
Catering and accommodation services	58 425	147 505	27 609	25	63	12	12 358	0.05
Transport and storage	175 436	88 724	29 224	60	30	10	343 183	1.17
Communication	13 441	38 529	14 512	20	58	22	66 813	1.00
Finance and insurance	39 608	268 276	151 386	9	58	33	220 390	0.48
Business services	286 593	813 576	263 356	21	60	19	349 033	0.26
Other producers	1 020 542	47 095	13 689	94	4	1	4 387	0.00
General government services	306 099	1 001 377	330 645	19	61	20	486 137	0.30
Medical, dental and veterinary services	39 145	125 598	31 246	20	64	16	21 236	0.11
Excluding medical, dental and veterinary services	24 108	31 269	10 356	37	48	16	16 113	0.25
Total	3 847 673	4 140 282	1 256 992	42	45	14	2 279 925	0.25

Source: Quantec database.

Annex Table 5.2 Tariffs by SIC sector 2001-2007

Panel A.

	Simple average applied tariff rate						Trade-weigthed average applied tariff rate					
	2001	2004	2005	2006	2007	% Δ 01-07	2001	2004	2005	2006	2007	% Δ 01-07
Agricultural products	4.9	4.6	4.1	4.1	4.2	-0.8	4.9	2.9	1.9	2.4	2.9	-2.3
Apparel and related products	34.7	32.7	31.1	30.4	28.6	-3.2	33.5	35.0	34.7	34.5	33.1	0.8
Chemicals and allied products	3.2	3.6	3.3	3.2	3.0	0.0	2.3	2.5	2.3	2.1	2.1	-0.2
Coal and lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crude petroleum and natural gas	3.7	2.9	3.4	3.1	3.0	-0.6	0.5	0.3	0.7	1.0	1.0	0.5
Electrical machinery, equipment, and supplies	4.6	4.3	3.9	3.7	3.9	-0.9	3.6	3.3	2.8	2.9	4.9	-0.6
Fabricated metal products, except machinery and tr	7.4	7.1	6.7	6.6	6.0	-0.7	9.0	8.3	8.9	8.7	8.0	-0.2
Fish, fresh, chilled, or frozen, and other marine	11.4	3.2	2.5	2.8	2.9	-7.7	9.3	2.7	2.3	3.4	2.7	-5.3
Food and kindred products	10.8	10.4	9.2	8.9	9.2	-1.7	7.2	8.4	6.4	7.1	7.5	-0.1
Forestry products, nspf	4.6	6.2	5.0	4.4	4.4	-0.1	1.3	0.5	0.4	0.3	0.2	-1.0
Furniture and fixtures	16.7	16.5	14.7	14.3	13.1	-2.0	14.3	14.0	13.6	13.6	13.6	-0.7
Leather and leather products	21.1	22.3	21.0	20.5	19.7	-0.5	21.0	22.1	22.8	23.1	22.7	1.7
Livestock and livestock products	0.9	2.1	1.5	1.6	1.8	0.7	1.5	2.8	2.0	2.4	2.3	0.8
Lumber and wood products, except furniture	9.8	11.0	9.5	9.4	9.3	-0.4	3.1	4.0	4.1	4.4	3.8	1.3
Machinery, except electrical	2.2	2.1	1.9	1.8	1.5	-0.4	2.1	2.0	2.0	1.9	1.8	-0.2
Metallic ores and concentrates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous manufactured commodities	7.1	7.1	6.7	6.4	6.5	-0.6	4.1	2.3	2.1	2.3	2.4	-1.7
Nonmetallic minerals, except fuels	0.7	0.6	0.5	0.5	0.6	-0.2	0.2	0.3	0.4	0.2	0.2	0.0
Paper and allied products	9.2	9.1	8.0	7.7	6.1	-1.4	7.9	8.1	7.4	7.2	5.9	-0.7
Petroleum refining and related products	4.5	4.7	4.8	4.2	4.0	-0.3	1.0	0.9	0.7	0.8	0.9	-0.2
Primary metal products	4.6	4.4	3.4	3.2	2.1	-1.3	4.2	2.4	1.9	1.8	1.0	-2.4
Printing, publishing, and allied products	7.2	6.6	6.5	6.1	5.7	-0.9	2.2	2.1	1.8	2.0	2.0	-0.2
Rubber and miscellaneous plastics products	13.0	12.4	11.4	10.9	10.5	-1.8	15.2	15.1	12.0	11.9	14.1	-2.8
Scientific and professional instruments; photograp	0.9	0.9	0.8	0.7	0.6	-0.2	0.7	0.6	0.5	0.4	0.4	-0.3
Stone, clay, glass, and concrete products	6.7	7.3	6.4	6.2	6.1	-0.5	5.4	7.0	6.4	6.2	5.2	0.7
Textile mill products	18.5	17.0	15.9	15.3	14.1	-2.7	17.2	15.4	14.3	14.3	13.7	-2.5
Tobacco manufactures	39.2	37.8	33.5	30.8	33.6	-6.0	39.4	28.2	22.7	23.1	26.2	-11.7
Transportation equipment	6.5	5.2	5.0	4.4	4.1	-2.0	18.0	13.6	16.3	16.9	14.7	-0.9

Panel B.

	Maximum tariff rate						Standard deviation					
	2001	2004	2005	2006	2007	% Δ 01-07	2001	2004	2005	2006	2007	% Δ 01-07
Agricultural products	35.0	39.0	35.0	35.0	35.0	0.0	8.0	8.0	7.8	7.7	7.5	-0.3
Apparel and related products	40.0	40.0	40.0	40.0	40.0	0.0	10.1	10.5	12.2	13.1	13.5	2.7
Chemicals and allied products	22.0	22.0	22.0	22.0	22.0	0.0	5.7	6.3	6.1	5.9	5.7	0.2
Coal and lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crude petroleum and natural gas	15.0	15.0	15.0	15.0	15.0	0.0	6.4	5.9	6.2	6.3	6.1	-0.1
Electrical machinery, equipment, and supplies	37.0	30.0	30.0	30.0	30.0	-5.1	7.8	7.6	7.3	7.1	6.9	-0.6
Fabricated metal products, except machinery and tr	30.0	30.0	30.0	30.0	30.0	0.0	8.3	8.4	8.3	8.1	7.8	-0.2
Fish, fresh, chilled, or frozen, and other marine	30.0	25.0	25.0	30.0	30.0	0.0	11.5	9.8	8.3	8.7	8.9	-2.4
Food and kindred products	55.0	96.0	55.0	55.0	55.0	0.0	10.9	11.4	10.4	10.4	10.7	-0.4
Forestry products, nspf	25.0	25.0	25.0	25.0	25.0	0.0	9.0	9.3	8.9	8.4	8.3	-0.6
Furniture and fixtures	20.0	20.0	20.0	20.0	20.0	0.0	7.9	7.7	8.0	8.0	8.1	0.1
Leather and leather products	30.0	30.0	30.0	30.0	30.0	0.0	12.5	12.0	12.4	12.7	12.5	0.2
Livestock and livestock products	22.0	25.0	25.0	25.0	25.0	2.5	3.7	5.9	4.9	5.0	5.3	1.3
Lumber and wood products, except furniture	30.0	30.0	30.0	30.0	30.0	0.0	10.6	10.7	10.6	10.5	10.7	-0.1
Machinery, except electrical	42.5	38.0	34.0	32.0	30.0	-7.4	7.6	7.4	7.2	7.0	6.4	-0.5
Metallic ores and concentrates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous manufactured commodities	30.0	30.0	30.0	30.0	30.0	0.0	9.2	9.3	9.0	8.8	8.5	-0.4
Nonmetallic minerals, except fuels	10.0	10.0	10.0	10.0	10.0	0.0	2.7	2.3	2.3	2.1	2.3	-0.5
Paper and allied products	30.0	30.0	22.0	22.0	22.0	-6.2	7.3	7.4	7.2	7.0	6.7	-0.3
Petroleum refining and related products	20.0	20.0	20.0	20.0	20.0	0.0	7.1	7.3	7.2	6.8	6.6	-0.3
Primary metal products	20.0	20.0	20.0	20.0	20.0	0.0	5.4	5.4	5.3	5.1	4.8	-0.3
Printing, publishing, and allied products	20.0	20.0	20.0	20.0	20.0	0.0	7.4	7.3	7.1	6.9	6.6	-0.5
Rubber and miscellaneous plastics products	32.5	30.0	30.0	30.0	30.0	-1.9	8.7	8.6	8.2	8.0	8.0	-0.6
Scientific and professional instruments; photograp	35.0	30.0	30.0	30.0	30.0	-3.7	5.0	5.0	4.8	4.5	4.3	-0.5
Stone, clay, glass, and concrete products	30.0	30.0	30.0	30.0	30.0	0.0	8.0	8.5	8.2	7.9	7.9	-0.1
Textile mill products	40.0	40.0	40.0	40.0	40.0	0.0	5.4	8.8	9.2	9.3	9.0	3.7
Tobacco manufactures	45.0	45.0	45.0	45.0	45.0	0.0	12.8	14.8	18.1	18.6	15.9	5.2
Transportation equipment	42.5	36.0	34.0	32.0	30.0	-7.4	14.0	11.6	11.0	10.3	9.4	-3.2

Source : UN TRAINS.

Annex Table 6.1 TFP regression results

Dependent variable *dprod$_{it}$*

	Specification									
	1	2	3	4	5	6	7	8	9	10
erp_incl_s	-0.027 (4.33)***	-0.028 (7.04)***	-0.028 (6.34)***	-0.027 (5.19)***	-0.027 (4.83)***	-0.028 (4.84)***	-0.03 (5.44)***	-0.027 (5.19)***	-0.036 (7.13)***	-0.038 (7.23)***
import_share	-0.092 -0.66	-0.059 -0.45	-0.097 -0.76							
intermediate imports share				0.912 -0.19	0.755 -0.15	3.765 -0.76	3.85 -0.83	5.326 -1.02		
export_share	-0.049 -1.21	-0.039 -0.97	-0.036 -0.89	-0.046 -1.54	-0.044 -1.41	-0.028 -0.82	-0.025 -0.78	-0.028 -0.85		
empl_share	-1.38 -1.21	-8.345 (2.17)**	-8.106 (1.96)*	-8.515 (2.24)**	-7.869 (1.92)*		-5.988 -1.31		-7.106 (2.21)**	
cap_lab_ratio	3.402 (4.82)***	3.295 (5.90)***	3.054 (5.24)***	3.248 (3.82)***	3.684 (3.37)***	3.387 (3.05)***	3.2 (2.95)***	3.307 (2.90)***	3.68 (5.80)***	3.658 (5.43)***
investment		-0.161 (1.84)*	-0.17 (1.99)*	-0.161 (1.89)*	-0.163 (1.89)*	-0.181 (2.12)**	-0.17 (2.01)*	-0.183 (2.22)**	-0.195 (2.55)**	-0.207 (2.68)**
local_π		-0.329 (2.82)***		-0.33 (2.84)***	-0.327 (2.82)***	-0.308 (2.73)**	-0.309 (2.75)**	-0.281 (2.50)**	-0.274 (2.61)**	-0.259 (2.59)**
imported_π			-0.191 (2.05)**							
skill_unskill					-3.146 -0.74	-3.775 -0.86	-2.933 -0.67	-4.182 -0.96	-1.805 -0.48	-2.431 -0.62
markup						0.213 (1.84)*	0.186 -1.6	0.218 (1.96)*		0.161 -1.4
unit labour cost							-0.058 -1.48		-0.073 (2.12)**	-0.068 (2.10)**
import final g									-0.001 (3.56)***	-0.001 (5.41)***
import interm g									0.19 (4.06)***	0.186 (4.11)***
export_g									0.02 -0.43	0.012 -0.22
year	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	2.837 -1.53	5.658 (2.46)**	5.362 (2.13)**	4.755 (1.73)*	7.663 -1.63	0.587 -0.1	3.14 -0.57	8.737 -1.59	12.945 (3.45)***	6.072 -1.37
Observations	432	432	432	432	432	432	432	432	432	432
Number of sector	27	27	27	27	27	27	27	27	27	27
R-squared	0.22	0.28	0.27	0.28	0.28	0.29	0.29	0.29	0.37	0.37
F_test: Prob>F	6.24	7.43	6.86	7.42	7.13	7.28	7.08	6.94	9.5	9.57
F_test: all ui=0	2.36	2.48	2.62	2.06	2.04	2.12	2.05	2.13	2.75	2.6
WaldTest:heterog:chi2	0	0	0	0	0	0	0	0	0	0

Note: * significant at 10%; ** significant at 5%; *** significant at 1%.
Robust t statistics in parentheses
Absolute value of t statistics in parentheses
Source: Authors' calculations