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The Impact of Export Tax Incentives on Export Performance

Evidence from the Automotive Sector in South Africa

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Abstract

The original goal of the Motor Industry Development Program was to help the automotive industry in South Africa adjust to trade liberalization and become internationally competitive. In simple terms, it consists of an import/export complementation arrangement, whereby the local value-added of components or built-up vehicles exported earns credits that can be used to rebate import duties on components and vehicles.

This study provides a first attempt at a quantitative analysis of the Motor Industry Development Program using the difference-in-difference methodology, in order to assess to what extent the program was effective in improving South Africa's automotive export performance during 1996–2006. The authors take a two-tier approach. First, they perform a comparative study using different manufacturing sectors within South Africa; second, they apply this methodology to analyze South Africa and a number of comparator countries that are automotive producers and exporters.

The analysis finds that the impact of the program on automotive exports in South Africa is positive and significant. In particular, (i) the largest response to the program in terms of improved manufacturing exports occurs with a delay after the adoption of the law, suggesting that exports need time to fully react to the incentives; and (ii) in turn, the effectiveness of the tax incentives fades in time, reaffirming the common belief that tax incentives may affect some business decisions particularly in the short run, but they are not a primary consideration for investors in the long run.

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Produced by the Research Support Team

The Impact of Export Tax Incentives on Export Performance: Evidence from the Automotive Sector in South Africa

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I. INTRODUCTION

1. The gradual elimination of barriers to global capital and trade flows and the increasing mobility of international firms have stimulated competition among countries for foreign direct investment, often through the use of tax incentives (Morisset, 2003). From tax holidays and import duty exemptions to investment allowances and accelerated depreciation, the global phenomenon of using fiscal incentives to attract multinational corporations, with the resultant technology and knowledge spillovers, appears to have strengthened since the early 1990s. However, the debate over the outcomes of tax incentives is not settled. A number of studies have shown that tax incentives are not the most influential factor for multinationals in selecting investment locations. Factors such as basic infrastructure, political stability, and the cost and availability of labor seem to be more important. Still many other cases (e.g. Ireland or tax havens in the Caribbean and South Pacific) suggest that tax incentives did play a relevant role in attracting foreign investment. The literature suggests several interesting corollaries. For instance, tax incentives affect the composition of foreign direct investment more than on its level. Also, large foreign companies – such as those in the automobile sector – are generally in a better position to negotiate special tax regimes and thus extract rents from host governments (Oman 2000). Furthermore, survey evidence (James 2010) suggests that export oriented investors are much more responsive to incentives than investors oriented towards the domestic market.

2. Mainstream economics cautions us about the use of industrial policies that target sectors, firms and regions. In addition, the implementation of WTO-consistent policy and incentive frameworks is shifting the emphasis from tax benefits towards infrastructure and regulatory frameworks. The Agreement on Subsidies and Countervailing Measures (SCM), for instance, prohibits subsidies that are conditional on exports. Countries subject to these WTO rules[2], will in principle need to revise their incentive regimes to avoid being subject to potential legal challenges from other WTO members.

3. Certainly, tax incentives are costly. The first and most direct costs are those associated with the potential loss of revenues for the host government. Other possible economy-wide distortions include distortions in the allocation of resources and the cost and difficulty of administering the incentive scheme effectively. A cost-benefit analysis can help evaluate the full impact of the MIDP program. Such an exercise is however beyond the scope of the present analysis. In this paper, we contribute to the ongoing debate on the outcomes and effectiveness of tax incentives by examining the case of the automobile industry in South Africa and, particularly, by investigating to what extend the program was effective in improving South Africa's automotive exports.

4. In 1995, the South African government implemented the Motor Industry Development Program (MIDP) with the main objective of improving the international competitiveness of firms in the South African automobile industry, enhancing growth through exports, and stabilizing employment levels. In order to achieve these aims, a series of export-oriented tax incentives were introduced, coupled with a reduction in

[2] The WTO subsidy disciplines apply to WTO members who have a GNI per capita of more than US$ 1,000.

import tariffs between 1995 and 2002. The MIDP is considered by some economists a major success of export and industrial policy, although it has also been challenged in world trade circles. The program was initially scheduled to run for five years but it has been extended three times and is now scheduled to end in 2020.The aim of this paper is to assess the effectiveness of the MIDP in improving South Africa's automotive (vehicles and components) export performance. To achieve this aim, we provide a first attempt at a quantitative analysis of the MIDP using the difference-in-difference methodology and taking a two-tier approach. In a *first analysis*, we perform a comparative analysis between different manufacturing sectors within South Africa before and after the MIDP came into effect. In a *second analysis*, we apply the same methodology to another analysis between South Africa and a number of comparator countries that are automotive producers and exporters before and after the MIDP were implemented.

5. Our regression results cover the period 1996-2006 and suggest that the impact of the MIDP on automotive exports in South Africa is positive and significant. We find that the largest response to the MIDP in terms of improved manufacturing exports occurs with a delay after the adoption of the law as investments take time to materialize and become productive. Also, the results suggest that the effectiveness of the tax incentives fade in time. This finding supports the common belief that tax incentives may affect some business decisions particularly in the short run, but they may not be a primary consideration for investors in the long-run. In the particular case of South Africa, a number of investment climate surveys note that major challenges remain for foreign investors to invest in the country, including a volatile exchange rate, crime, shortage of skilled labor, inadequate infrastructure and a rising regulatory burden.

6. The paper is organized as follows. In *section two* of the paper we review two streams of literature which form the basis for the study. *Section three* provides background information about South Africa's economic performance, details on the MIDP program, and an analysis of the data. *Section four* presents the methodology and results of our analysis. *Section five* concludes.

II. LITERATURE

7. Two streams of literature form the basis for this study: (i) the literature on the effectiveness of tax incentives in improving exports and attracting investment, particularly in a middle income country context; and (ii) the literature on the effectiveness of the Motor Industry Development Program (MIDP) in South Africa.

Literature on export tax incentives and sectoral industrial policies in a middle income country context

8. The literature suggests that productive diversification, especially one extending to production and export of non-traditional manufactured exports, is needed for sustainable economic growth as it usually provides the goods with the most value added and provides opportunities for knowledge transfer and economies of scale. Exports also promote economic growth as they facilitate imports of goods, services, and capital, and thereby also transfer of new ideas and technology. In fact, Bernard and Jensen write that "…exporters are better than non-exporters. A growing body of empirical work has documented the superior characteristics of exporting plants and

firms relative to those producing solely for the domestic market. Exporters are larger, more productive, more capital-intensive, more technology-intensive, and pay higher wages (1999, pp. 1-2)." In line with this approach, a branch of the literature, including Rodrik (2003), argues that in a developing country context, the promotion of non-traditional activities may require government-supported inducements because potential investors in non-traditional products operate in an environment with a high level of information uncertainty. Kaplan3 (2004) places the automotive sector in South Africa as one such category of products, being, the author argues, the major addition to South Africa's export product basket that has otherwise changed little.

9. As part of a set of policy instruments developed to stimulate industrialization and economic diversification, the practice of giving export incentives is near universal, despite its use having been controversial for decades. The extent and the form of export incentives vary from country to country depending on the country's economic structure (including its fiscal structure), its overall resource availability, and the effectiveness of export incentives in realizing its export potential. Measures used by governments to enhance exports4 range from direct subsidies (i.e. export grants, widely used by the European Commission and the US under agricultural assistance schemes), finance assistance (i.e. France has traditionally been an active provider of subsidized export credit), tax incentives (i.e. Malaysia has provided tax breaks based on export performance), Export processing zones (EPZs), or through indirect measures such as R&D assistance and subsidized infrastructure (applied by Korea and Hong Kong SAR, China). Due to the increasingly restrictiveness of WTO rules regarding export incentives, government support occurs more frequently earlier in the production chain (e.g. in the form of investment incentives). Furthermore, WTO's Agreement on Subsidies and Countervailing Measures (SCM Agreement) clearly specifies which export incentives constitute a subsidy and hence subjected to the disciplines of the Agreement, i.e. potentially illegal and subject to fines. While the SCM Agreement exempts low income countries, this exemption does not imply immunity from countervailing duty procedures, should the subsidized products cause material injury to domestic industries in importing countries (R. Ahuja, 2001).

10. A related literature on investment incentives (both tax and grants) has been cautious about their ability to induce additional investment. Undoubtedly, such incentives affect investment decisions in some cases. For instance, James (2010) reports that a 10 percentage point increase in the corporate income tax rate lowers FDI by an estimated 0.45 percentage point of GDP. However, it is not clear that the overall benefits of these incentives outweigh the costs and the analytical literature on this subject is sparse. The literature consistently highlights the importance of the fundamentals affecting the firms' decisions to invest, namely, expectations of future demand, the cost of capital, economic and political certainty, and the existence of strong legal institutions and good infrastructure. The literature also acknowledges that incentives remain a popular tool, despite the dearth of evidence in their support. Barbour (2005) provides a useful checklist for what characterizes an effective and efficient investment incentive. Such an incentive, he argues, "stimulates additional investment for a minimum of revenue loss, and includes a cap on expenditure plus a

[3] Kaplan, however, also acknowledges that sector-specific trade and industrial policies should be predicated on an assessment of dynamic comparative advantage: that is, the sector's prospect, in a defined period, of competing internationally without government support.

[4] Review of Overseas Export Enhancement Measures. Australian Industry Commission, 1992.

sunset clause. Incentives should be transparent, easy to understand and with low administrative costs for both businesses and government".

Literature on the effectiveness of the MIDP program in South Africa

11. The Motor Industry Development Program (MIDP) came into effect on 1st of September 1995 to assist an industry that was self-sufficient as a result of extremely high import duties and local content requirements. The original goal of the MIDP program was to help the automotive industry in South Africa adjust to trade liberalization and become internationally competitive. The program was confined to export facilitation, which entailed a phasing down of tariffs, a removal of local content requirements, duty-free imports of components up to a percentage of the wholesale value of the vehicle, and duty rebate credits earned on exports. In simple terms, the local value-added of components or built-up vehicles exported earn credits that can be used to rebate import duties on components and vehicles. These duty credits are tradable and can either be used to import or sold to provide a separate source of revenue for the exporter. The program was initially scheduled to run for five years, but it has been extended three times, and is slated to end in 2020. The last revision was in 2008, where the name of the program changed to "Automotive Production and Development Programme" (APDP). Although the South African government has been reducing its support in the subsequent revisions of the MIDP, the incentives still remain very significant (Black & Mitchell, 2002).

12. Various costs and benefits analyses of the MIDP program have been done over the years. There is no agreement in the literature on the overall impact of the program. Barnes et. al. (2003) argue that the export success of the South African auto industry results from the industry's competitiveness and efficiency and not from the MIDP. They also conduct a comparative study of the retail car prices in South Africa and in the UK and conclude that the MIDP has resulted in lower prices for South African domestic consumers. Kaplan (2004) provides a mixed evaluation of the program. He argues that there have been many positive spin-offs resulting from the expansion of the auto sector in South Africa. Firstly, given that production is aimed at highly discriminating export markets, inefficiencies are rapidly disciplined. Secondly, he argues that considerable positive externalities exist as auto exporters encourage and support their local suppliers to improve the quality of their products and therefore facilitate the opening of potential new export markets for auto component producers. Finally, the 'success' of the automotive industry reduces the perceived risks for other potential producers considering investments in the automotive or other sub-sectors in South Africa. However, Kaplan (2004) also argues that while there have been productivity gains in autos and auto components in the last few years, these gains have not been exceptional by comparison with many other local manufacturing sectors.

13. Taking a more critical line, Frank Flatters (2005) argues that the MIDP subsidies "make socially wasteful activities privately profitable" as they are not only paid by the treasury in terms of import duties foregone, but also by consumers in the form of higher prices and restricted choice[5]. In addition, he argues that despite significant improvements in a number of competitiveness indicators between 1998

[5] Flatters estimates that the subsidies create a net economic loss of R20,000 for each R70,000 of South African resources used to produce a vehicle for export (foreign exchange earnings are worth only R50,000).

and 2001. The competitiveness levels achieved in South Africa in 2001 show the country to be lagging behind in all but one or two of the 13 indicators compared to other middle income countries. Flatters and Netshitomboni (2006) also note there has been very little adjustment in the industry and that the MIDP has instead insulated the country's manufacturers from global competition, with the risk that manufacturing activities and related employment are not sustainable without permanent support at high levels.

14. As mentioned earlier, our paper does not venture into a cost-benefit analysis of the MIDP as it has been done by a number of authors. We provide additional information on some of these quantitative analyses in the box below. Instead, we investigate to what extend the MIDP was effective in improving South Africa's automotive (vehicles and components) export performance and how that impact changes over time.

Box 1: The benefits and costs of the MIDP by the numbers

A number of authors analyze the benefits and costs of the MIDP program. We present findings of a few authors. Flatters (2002, 2005) points out the gains in investment, exports and jobs. Investment has increased from less than a billion Rands in 1995 to around 3.5 billion Rands in 2005. Export of vehicles and components increased spectacularly. For instance, vehicles exports sales rose from below 1 billion Rands in 1995 to around 13 billion Rands in 2000 and some 24 billion Rands in 2005. On the other hand, while employment was created, it has been relatively flat, increasing from 274,000 in 1995 to 317,000 in 2005, with "motor trade" – the sales, distribution and servicing of cars – representing the lion's share of this employment (178,000 in 1995 to 198,000 in 2005). This highlights the capital intensity of the automotive industries as well. [6]

The inventory of the costs of the MIDP is also noteworthy. Flatters (2002, 2005) finds that the most recent effective rate of protection (29%) means that every R100,000 of export actually uses R129,000 of South African resources. Subsidies to producers of R11-12 billion per year cost consumers R 19-20 billion per year. He estimates subsidies per jobs to range between R300,000 and R400,000 per year. Edwards and Lawrence (2010) put the cost of one job in motor vehicles at R89,000.[7] These latter find that the export subsidies provided to the automobile industry have led to a net subsidy of 14 percent of the value added (measured at world prices) for the sector. Furthermore, in a counterfactual exercise, they find that if all tariffs were to be removed, the removal of those on the motor vehicles would account for 28% of overall consumer surplus gains.[8] Finally, South Africa's Competition Commission' 2005 review of MIDP impacts finds that "… the high level of South African car prices is at least partly due to the effects of the MIDP. In particular, the reasons for high prices are the 34% tariff on imported CBUs and the 27% tariff on imported component" (page 7).

[6] Flatters, Frank. "The Economics of MIDP" – 2008 (?) and Frank Flatters, 2005, "The Economics of MIDP and the South African Motor Industry", prepared for the TIPS/NEDLAC South Africa Trade and Poverty Programme Policy Dialogue Workshop.
[7] Flatters, Frank. "The Economics of MIDP" – 2008 (?) and Frank Flatters, 2005, "The Economics of MIDP and the South African Motor Industry", prepared for the TIPS/NEDLAC South Africa Trade and Poverty Programme Policy Dialogue Workshop.
[8] Edwards and Lawrence (2010?), SACU Tariff Policies: Where should they go from there? – draft.

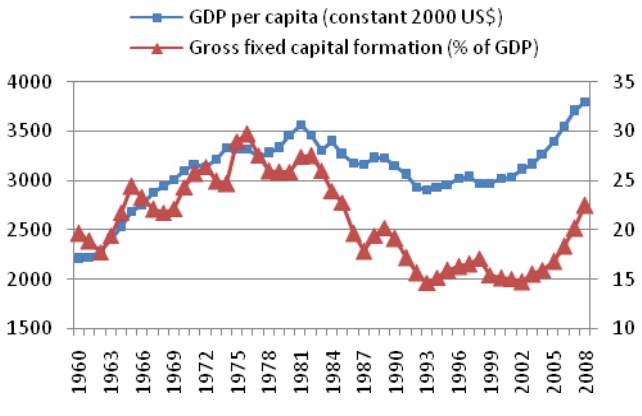
III. BACKGROUND INFORMATION

A. South Africa's General Economic Performance

15. Output grew at a moderate rate in the 1990s, despite the end of apartheid and the debilitating embargo the country faced in the 1980s. Since 1994, per-capita GDP has grown at an average of 1.80 percent per annum, higher than that of Sub-Saharan Africa (1.46 percent) and Latin America (1.75 percent) but considerably below that of South Asia (4.59 percent) and East Asia (7.25 percent). Nonetheless, the pace of growth has picked up since 2000 and in 2006-2007 South Africa's income level finally recovered to the levels attained in 1980 (figure 1). Investment remains at around 20 percent of GDP.

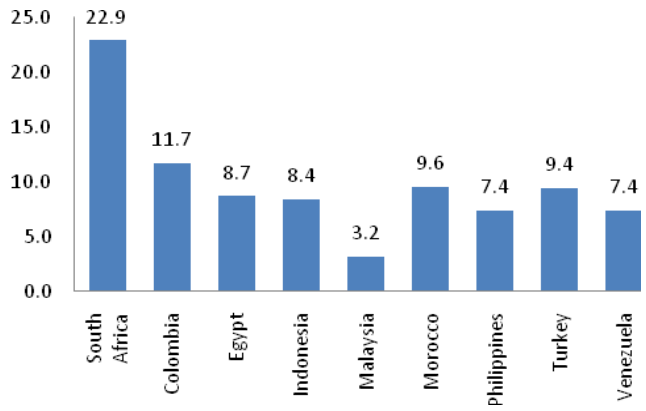
16. Up to 1994, the country's industrial development was driven by a policy of import-substitution industrialization that began in the 1920s and included a trade regime characterized by high levels of protection, a wide dispersion of tariffs, and a complicated array of tariff types (Belli et al. 1993). The post-apartheid government elected in 1994 initiated a range of policy reforms that were designed to encourage economic growth as well as to raise the standard of living of the population and to transform South Africa into a "competitive, outward oriented economy" (Bhorat and Kanbur, 2006). The most important of these reforms were gradual liberalization, deregulation of capital control, deficit reduction and stabilization of the exchange rate (Barbour, 2005). The government reduced tariffs significantly in accordance with the 1995 offer to the WTO and simplified the tariff structure (Cassim et. al., 2002; Edwards and Lawrence, 2006).

Figure 1. Investment and Growth



Source: World Development Indicators

Figure 2. Unemployment rates (2008)



Source: World Development Indicators
(data not available for Tunisia, Vietnam and Ecuador)

17. Despite the reforms and the improvement in output, growth in formal employment, particularly of semi-skilled and unskilled labor has been poor. The country has a very large pool of underutilized unskilled labor and its unemployment rate stood at 23% in 2009. Rodrik (2006) argues that the weakness of export-oriented manufacturing has limited South Africa's ability to create jobs at the low end of the skill distribution. Furthermore, Edwards and Lawrence (2006) notes that tariff reduction seems to have been disproportionately applied to labor-intensive sectors, with the growth in net trade in the post-1994 period biased strongly in favor of skill-intensive sectors10. As discussed by Bhorat and Kanbur (2006), the coincidence of "jobless growth", rising skill and capital-intensity of production and increased integration of South Africa into the international economy has resulted in a growing literature exploring the links between trade liberalization, structural change and employment growth[11]. Yet, there is still no consensus on the impact of trade liberalization on employment and factor returns compared to other factors such as technological change, factor market rigidities and fiscal restraint.

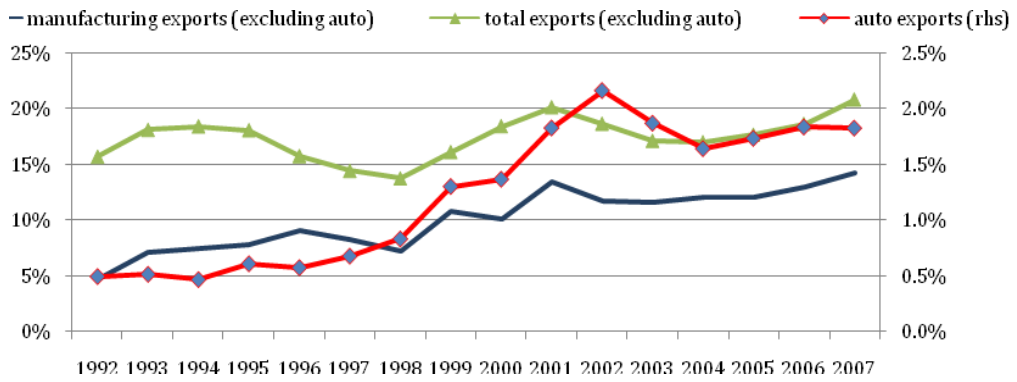
18. The economic reforms and trade liberalization undertaken after 1994 led to rapid increases in trade flows during the second half of the 1990s, particularly within the manufacturing sector. Total exports as a share of Gross Domestic Product (GDP) rose from 24.2 per cent in 1990 to 31.6 per cent in 2007. The ratio of imports to GDP rose from 18.8 per cent to 34.7 per cent over the same period.

[9] If one includes discouraged workers, South Africa's unemployment rate in 2006 increases to 40 percent (Banerjee et al, 2006). 23 percent is one of the highest unemployment rates in the world.

[10] A rising unemployment could have been avoided by a proportionate decline in real wages for low-skilled workers but this appeared impossible politically in view of the democratic transformation in South Africa and the role played by unions in the anti-Apartheid struggle and the new democratic government. The growing mass of unemployed could have also been absorbed into the informal sector but although informal employment has grown rapidly in South Africa, its level remains low by the standards of developing countries (Rodrik, 2006).

[11] This literature includes Bell and Cattaneo, 1997; Nattrass, 1998; Bhorat, 1999; Birdi, Dunne and Watson, 2001; Edwards 2001a, 2001b, 2003; and Fedderke, Shin and Vaze, 2003.

Figure 3. Exports as percentage of GDP



Source: UN Comtrade Statistics

19. South African export performance shows three distinct features: (i) South African manufacturing exports are relatively capital or technology intensive relative to other developing countries (Tsikata, 1999; Allenye and Subramanian, 2001); (ii) South African manufacturing exports are becoming increasingly capital and skill-intensive (Bell and Cattaneo, 1997; Edwards, 2003; Edwards and Schoer, 2001); and (iii) South African export growth during the 1990s is poor relative to other dynamic emerging economies and few exports are concentrated in "dynamic" products (Edwards and Schoer, 2001; Alves and Kaplan, 2004; Van Seventer and Gibson, 2004).

20. As regards the content of South Africa's exports, Edwards and Alves (2006) show that South Africa's market positioning, in terms of its ability to take advantage of high-growth "market-dynamic" products, is comparatively poor. The majority of the country's top 20 product groups are in stagnating world markets (see Annex 8) and very few of South Africa's most important exports are found in the "right quadrant": only passenger cars (SITC 781), pumps & compressors (SITC 743), furniture (SITC 821) and precious metals (SITC 289). Together, these sectors only account for 12% of total South African exports. These authors also conclude that the constraint to export growth in South Africa does not lie on the side of foreign export demand but rather on the side of export supply.

B. MIDP Program and Analysis of the Data

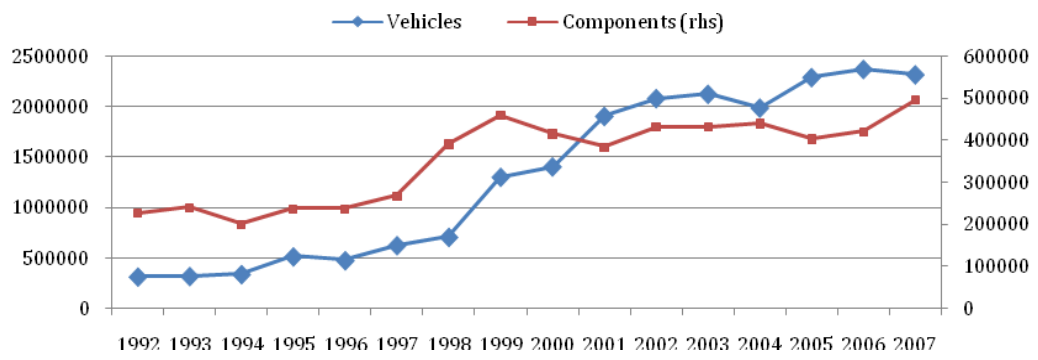
21. Since its inception, the MIDP has been subject to three reviews, the first in 1999, the second in 2002 and the most recent one in 2008. The program has been extended to run until 2020. Reductions in government support have been introduced in subsequent revisions to the MIDP but the levels of support still remain very significant (Kaplan, 2004). Import duties on vehicles have fallen from 65 percent in 1995 to 40 percent in 2002 and to 30 percent in 2007. Import duties on components have fallen from 49 percent to 30 percent and to 25 percent in the same years. In order to offset the reduction in the value of incentives a new feature, named "Productive

Asset Allowance" (PAA) was introduced, which in effect subsidizes investments in new facilities for export production rather than directly to export production.[12]

22. There is consensus in the literature that the MIDP has resulted in a remarkable transformation of imports, exports and production in the South African automotive sector. Barnes, Kaplinsky and Morris (2003), for example, find that "since the implementation of the MIDP, South Africa has seen rapid growth in the auto sector, based not only on a speedy rise in the exports of completely-built-up units (CBUs), especially after 1998, but also in the exports of auto components". However, much debate has taken place on whether the program has been worth the cost to customers, taxpayers and the government. In particular, the system has been criticized for its high compliance costs, the great discretion it grants to program administrators, and the difficulties it poses for firms in determining the tax implications of alternative business decisions. Overall, many authors have pointed out that the complexity of the MIDP makes it difficult to determine its true economic impact.

23. Figure 4 illustrates the exponential growth in automotive exports experienced by South Africa since the early 1990s, differentiating between vehicles and components[13].

Figure 4: Vehicles and Components Exports
(constant US dollars 2000, in $'000)



Source: UN Comtrade and WDI

24. Despite this seemingly successful export performance, Hausmann and Klinger (2006) point to the fact that large automotive exports have sometimes been offset by even larger imports of these goods, similar to what has occurred in other manufacturing sectors in South Africa such as other machinery & equipment, food and leather products. The only principal sectors showing large net exports, they argue,

[12] PAA grants import duty credits equal to 20 percent of the value of qualifying new capital investments in the sector, with the duty relief spread over a period of 5 years from the date of the investment (Flatters, 2002).

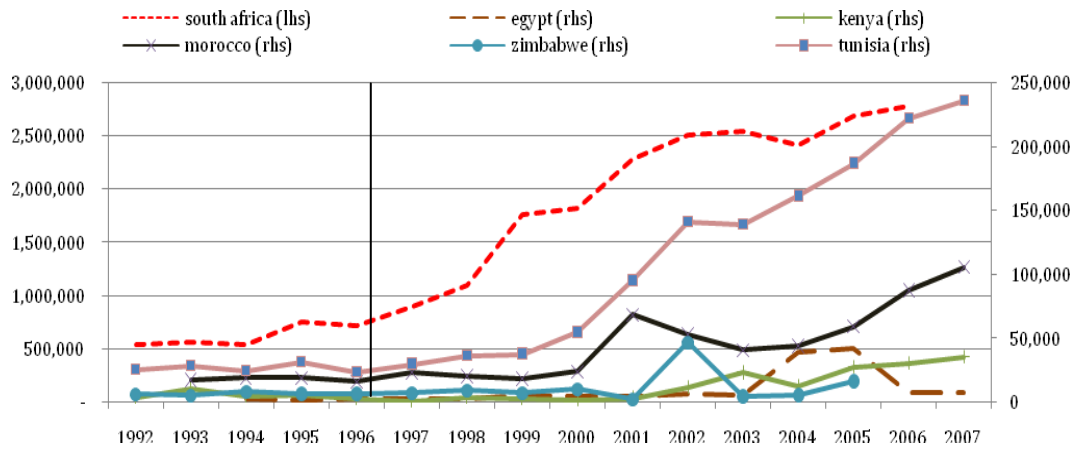
[13] With respect to CBU (completely built units) exports, three German assemblers sourced large numbers of cars from South Africa to their global markets (destined mainly for North America, Australia, Europe and Japan). Component exports have also grown, particularly that of catalytic converters (48 percent of total component exports in 2001) and leather seats (13 percent of the total). Catalytic converters are an especially interesting case, since initially the level of value added was low. However, as scale built up, investment of more than 2 billion rand (more than $200 million) were made into a deepening of the production process. In 2002, South Africa supplied 12 percent of the global catalytic converter market and was the most important supplier of catalytic converters to the European Union (pg. 8-9)."

are mining and basic iron and steel (Figures 5.1 and 5.2 in Annex 5 show the evolution of manufacturing and automotive import and export volumes).

25. Figure 5 below illustrates the evolution of automotive (vehicles and component) exports from 1991 until 2007 in South Africa compared to six other African countries that produce and export vehicles and components, which we have included in our study. We note the clear increase of South African exports post 1995. We also note the increases in the Tunisian and Moroccan exports starting in 2000-2001due to the support policies specifically directed to their respective automobile industries.

26. The case of Tunisia is particularly interesting, given the export promotion policies undertaken by the Tunisian government after 1995. Since 1998 Tunisia enjoys duty-free access to the EU. Also at that time, the Tunisian government negotiated with European automakers "local content rules" for the import of European cars. This implied that starting 1998, foreign makers were authorized to export their vehicles to Tunisia only in exchange for purchasing motor vehicle components manufactured by Tunisian firms14. In Morocco, the government also considers the automotive sector to be a strategic part of its industrial policy. The strategy aimed at attracting foreign enterprises has included measures such as tax incentives, reductions in logistical costs, financing the cost of industrial buildings and new capital equipment, etc. The 60 to 70 per cent of local content requirements applied to the automotive assembly industry was abolished by Morocco in 2004[15].

Figure 5: Evolution of automotive exports in selected African countries (constant US dollars, 2000), in $'millions



Source: UNComtrade

27. In Figure 6 we plot the evolution of automotive (vehicles and components) exports from South Africa compared to other middle income countries around the world which are also automotive producers and exporters. We can observe a rather flat and stable trend in the automotive exports of most of these countries prior to 1995 (with the slight exception of Venezuela and Philippines). From the late 1990s onwards, automotive exports increase sharply in most nations.

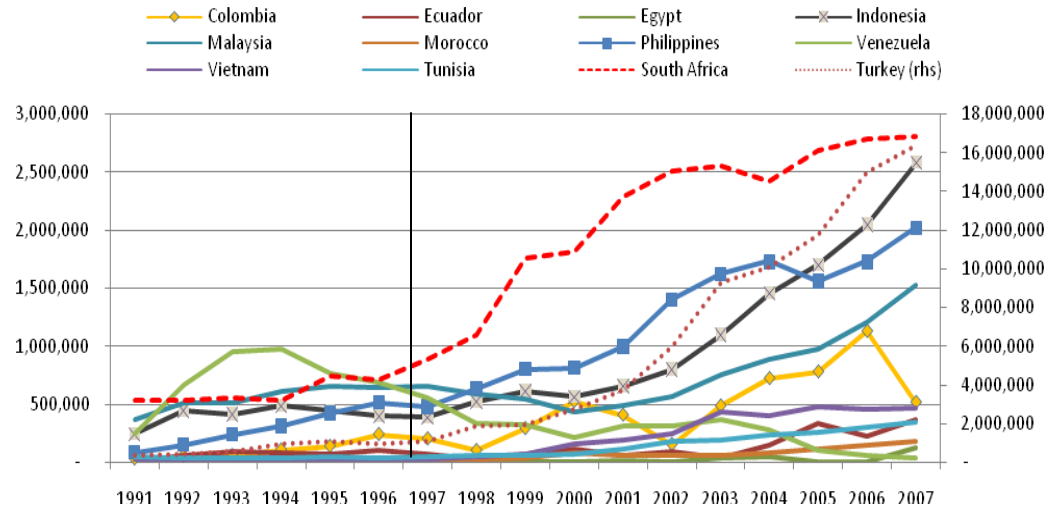
[14] Tunisia's Global Integration: Second Generation of Reforms to Boost Growth and Employment. Social and Economic Development Sector Unit. Middle East and North Africa Region, World Bank (May 2008).

[15] By Dahir No. 1-04-155 of 4 November 2004, enacting Law No. 03-04 repealing Law No. 10-81 governing the motor vehicle assembly industries.

28. This sharp increase is particularly evident in Turkey, where the Customs Union with the EU in 1996 helped to boost automotive exports, particularly to European markets. Indonesia also experienced a rapid growth of their automotive component industry in the late 1990s[16]. In this latter country, the government's initial policy strategy (in the late 1970s) consisted on forbidding imports of Completely Built Up (CBU) cars and setting local content requirement rules. This strategy turned, from 1999 onwards, to a new policy based on supporting business competitiveness by means of removing the local content requirements and reducing other trade barriers.

29. It can be observed in Figure 6 that, despite the significant increases in automotive exports in most of the considered countries from the late 1990s onwards, South Africa is still the country experiencing the sharpest rise. This trend starts however to flatten from around 2004 onwards.

Figure 6: Evolution of automotive exports in selected middle income countries (constant US dollars, 2000), in $'millions



Source: UNComtrade

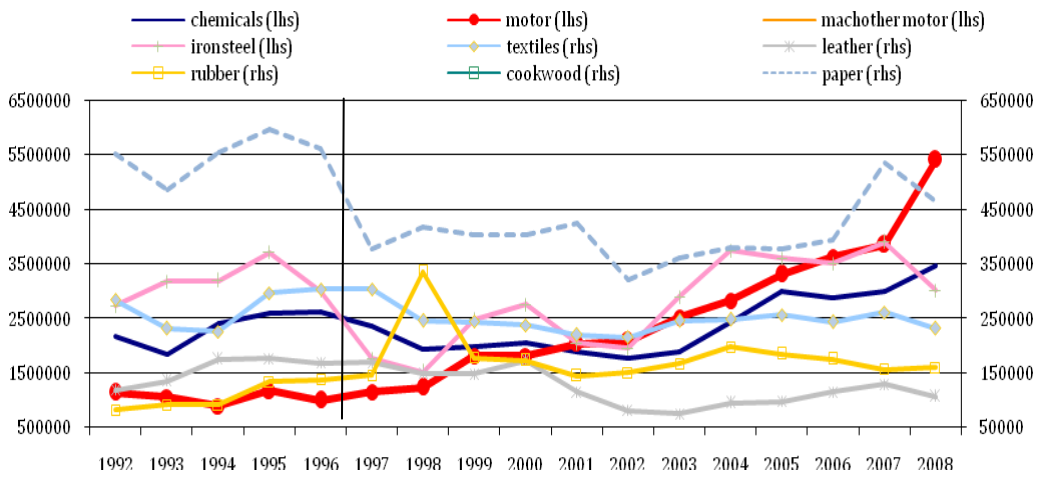
30. Figure 7 illustrates the evolution of South Africa's manufacturing exports (US$ nominal, deflated by each sector's producer price index) from 1992 until 2008, for 9 sectors (automotive, chemicals, machinery other than motor, textiles, leather, rubber, cork and wood, paper, iron and steel, and other manufacturing). Also from this viewpoint, we note a steady increasing trend of auto exports after 1995 (particularly since 1998). The choice of the sectoral producer price index as deflator allows ruling out the impact of sector price fluctuations (e.g. related to natural resources). This chart shows that the selected manufacturing sectors display parallel evolutions in their real exports before the launch of the MIDP despite the different levels at which their exports stood. In Annex 9 we have also computed the export intensity[17] of the mentioned sectors. According to those results, the automotive sector is the sector

[16] Production Linkages and Industrial Upgrading: Case Study of Indonesia's Automotive Industry, by Haryo Aswicahyono and Pratiwi Kartika.

[17] Due to data limitations, we have used as proxy for export intensity the share of nominal exports over the sectoral value added. The sectoral value added is defined, according to the UNIDO ISIC Database, as the value of census output less the value of census input.

where average export intensity has increased the most when comparing the years before (1992-1995) and after (1995-2008) the MIDP implementation.

Figure 7: Evolution of exports in selected South African sectors (US$ nominal, deflated by each sectoral PPI), in $'millions



Source: UN Comtrade and UNIDO ISIC Database

IV. METHODOLOGY AND RESULTS

31. Difference-in-difference methodology (D-in-D) is used to evaluate the impact of the changes in export incentives on the export performance of the automotive sector in South Africa. The question we would like to assess is 'in the South African automotive sector has there been higher export growth due to the implementation of the MIDP than would have occurred otherwise?'. We assess this by following a two-tier approach: (i) first, we perform an analysis of automotive exports compared to other manufacturing exports within South Africa and (ii) secondly, we undertake an analysis of automotive exports in South Africa compared to other middle income automotive producer countries. We note that our database is small and therefore the results may be subject to bias. They should therefore be viewed with the appropriate caution.

A. Comparative Sector Analysis within South Africa

32. In the first part of the analysis we study the exports of the main manufacturing sub sectors within South-Africa. As mentioned above, many changes occurred in South Africa around 1994-1995, including the country's first non-racial democratic election, GATT membership, and macroeconomic reforms. In this changing environment, the treatment of automotive industry by the government differed from other industrial sectors. This policy difference thus offers a relatively clean way of identifying the impact of the MIDP program on overall manufacturing exports.

33. Our approach is to start first with a simple difference-in-difference (D-in D) approach where outcomes are observed for two groups (automotive exports as the treatment group, and the other manufacturing exports within South Africa as the control group) and two periods (before and after 1996, the law having been adopted in September 1995). We then proceed with a more detailed analysis where dummy

variables for each manufacturing subsector and each time period are introduced. The analysis of a policy change using the D-in-D methodology assumes that the treatment and control group show similar trends prior to the tax reform. In figure 6 of the previous section we have observed comparable trends, before 1996, in the evolution of exports across the South African manufacturing sectors of the sample.

34. We use a panel database of 9 manufacturing subsectors (automotive, chemicals, machinery other than motor, textiles, leather, rubber, cork and wood, paper, iron and steel, and other manufacturing), sourced from the UNIDO ISIC database and spanning 10 years, from 1994 to 2004[18]. The dependent variable in the analysis is the natural logarithm of total South-African manufacturing exports (US$ nominal, deflated by the South African Producer Price Index (PPI)), obtained from UNComtrade. The choice of the South African PPI as deflator is done in order to capture the macroeconomic dynamics of the South African economy and the national price into the dependent variable. Alternative deflators, namely the US PPI, were tried and did not alter the results. The main constraint in conducting this study has been the lack of complete sectoral data.

35. The starting set up gives the following specification:

$$LManufacturingExports_{it} = \beta_0 + \beta_1 Auto_i + \beta_2 95_t + \beta_3\, Auto95_{it} + \gamma X_{it} + \varepsilon_{it} \quad (1)$$

36. Where i (i=1….9) denotes the sector and t (t=1994…2004) the year. $\mathbf{Auto_i}$ is the automotive (treatment sector) dummy variable taking the value 1 for automotive and 0 otherwise. The coefficient β_1 captures possible differences between the automotive sector and the other manufacturing sectors prior to the policy change. $\mathbf{95_t}$ is the time dummy variable taking the value 1 in the post treatment period (> 1995) and 0 in the pre-treatment period (≤1995). Consequently, β_2 captures aggregate factors that would cause changes in manufacturing exports after 1995 even in the absence of a policy change. $\mathbf{Auto95}$ is an indicator variable coded 1 if the observation is in the treatment group (automotive sector) and in the second time period (>95), 0 otherwise. β_3 is thus the D-in-D estimator, capturing the response of total manufacturing exports to the change in export tax incentives related to the MIDP in South Africa.

37. The vector $\mathbf{X_{it}}$ contains other control variables that vary over time and that typically affect a country's export supply. The choice of these variables was based on results of studies on the determinants of South Africa's export performance that highlight the importance of supply rather than demand factors (for instance Edwards and Alves, 2006). The following variables are identified as main factors enhancing the profitability of export supply in South Africa (also in line with Tsikata, 1999; and Golub and Ceglowski, 2001): relative prices, inflation, industry concentration, infrastructure, variable production costs, tariff rates and skilled labor.

38. Based on this research and data availability, we have considered the following control factors in our study:

(i) as a proxy of relative prices, we use the manufacturing terms of trade index (having also considered the general Terms of Trade), which proves to be

[18] Due to missing observations for the sectoral variables in the latter years, we had to limit the study to 2004.

highly significant. We could not use nominal or real effective exchange rates (either from IFS or WDI sources) due to missing observations for four of the sample countries considered in the second analysis;

(ii) To capture the potential effects of macroeconomic policy on manufacturing production and export, we consider inflation and real interest rates. *Inflation* was considered due to its potential negative effect associated with economic imbalances and distortions, as well as being a symptom of economic mismanagement. *Real interest rates* were incorporated as a proxy for average productivity of capital, expecting that lower interest rates would boost investments, increase productive capacity, and exports. Neither inflation nor real interest rates entered significantly in the regressions.

(iii) As a proxy of industry concentration, we have used *economic density* (US$/sq m), which is highly significant in all the regressions. Real GDP per capita, as a proxy for the level of development and income level of the country was tried but was mostly insignificant.

(iv) *Infrastructure* has important consequences for an economy's export performance by lowering the transaction costs, facilitating diversification and giving rise to forces for agglomeration[19]. To evaluate the effect of infrastructure on exports, we considered a number of variables, including rail carrying capacity (tones), roads paved (km), electricity generated (gigawatts) and telephone mainlines per 1,000 people. Due to data constraints, telephone mainlines per 1,000 people was used in our analysis; however, it did not enter significantly.

(v) For the sectoral analysis, we have incorporated a variable to capture sector specific human capital contributions. Roberts and Tybout (1997b) find that the average wage is a better proxy for human capital than the skill ratio because it reflects variations in the quality of employees across firms. So we use the sectoral average wage, computed as total remuneration divided by total employment (data sourced from the UNIDO ISIC database). We expect this variable to affect positively export performance.

(vi) In this first analysis we have not accounted for the effects of trade liberalization as the tariff reductions related to the GATT membership affected all the considered manufacturing sectors. We use a proxy for trade liberalization in our second analysis, which we will discuss in the next section.

39. In addition, to test the sensitivity of the model to the selection of different deflators when adjusting the nominal automotive exports series, two sources have been used, which do not alter the results: (a) each country's export price index (2000=100) and (b) the US wholesale price index (2000=100), both obtained from the WDI.

40. We formulate specification (2) below by expanding specification (1) and incorporating dummies for each sector, year, and the interaction between the two, together with the vector of other sector-specific and time changing control variables. The dummies aim to control for the effect of exogenous shocks that affect exports in all sectors equally (ρ_t, year fixed effects), and also for those sector specific

[19] Elbadawi, 1999; Collier, 2002; Redding and Venables, 2004; Mayer, 2003

characteristics that do not change over time (μ_i, sectoral fixed effects). This gives the following specification:

$$LManufacturingExports_{it} = \alpha + \beta_1 Auto94_{it} + \beta_2 Auto95_{it} + \beta_3 Auto96_{it} + \beta_4 Auto97_{it} + \beta_5 Auto98_{it} + \beta_6 Auto99_{it} + \beta_7 Auto00_{it} + \beta_8 Auto01_{it} + \beta_9 Auto02_{it} + \beta_{10} Auto03_{it} + \beta_{11} Auto04_{it} + \rho_t + \mu_i + \gamma X_{it} + \varepsilon_{it} \quad (2)$$

41. The β coefficients are the D-in-D estimators, capturing the impact of the change in export tax incentives in the automotive sector on total manufacturing exports for each of the years under consideration. The regression results are shown in Table 1. The D-in-D estimates from the simple analysis are shown in columns (1), (2) and (3). The response for each year of the reform is given in column (4) and with sector specific fixed effects in column (5).

42. The results indicate that economic density and the terms of trade are significant in explaining manufacturing export performance, entering the regression with a positive and negative sign, respectively. The impact of sectoral human capital intensity proves to be highly significant as well, with a positive sign in all except for one regression. It can be seen from column (3) that infrastructure, inflation, GDP per capita growth and real interest rates do not enter significantly into the regression.

43. In the base case specification (1), which does not include any additional control variables and has a very low explanatory power, the impact of the MIDP does not enter significantly. In the subsequent specifications, however, we find a very significant and positive effect of the MIDP program. From specifications (2) and (3), we find that, on average, the MIDP program increased manufacturing exports by approximately 75%. This positive impact persists after controlling for additional control variables and fixed effects. The response for each year of the reform is given in column (4) and in column (5). The largest response to the MIDP in terms of improved manufacturing exports occurs with a delay after the adoption of the law. This could suggest that the largest bulk of investment and export volumes were not achieved until some years later. This delayed investment and export would be in line with the long lead times involved in planning, investing and producing vehicles[20]. In turn, it also seems that the effectiveness of the export tax incentives fades in time. As the sample had to be restricted to 2004 due to missing observations in 2005 and 2006, it is not possible to grasp from the table what the impact is in these latter years. We however pursue this line of investigation in the next section with consistent results.

[20] Financial Mail, Automotive Industry 2007

TABLE 1: SUMMARY of COEFFICIENTS – MULTIPLE DUMMIES
COMPARATIVE SECTOR ANALYSIS within SOUTH AFRICA
Dependent variable: Manufacturing Exports (log)

	(1)	(2)	(3)	(4)	(5)
	Base case	Base case with controls	Base case with additional controls	Multiple year and interaction dummies	Multiple year, sector and interaction dummies (fixed effects)
auto * >95 (effect MIDP)	0.526 [0.406]	**0.756** [0.299]**	**0.768** [0.304]**		
Auto	0.440 [0.341]	**1.253** [0.235]***	**1.280** [0.231]***	**1.319** [0.346]***	
>95	0.485 [0.374]	**-0.484** [0.278]*	**-0.880** [0.431]**		
Economic density		**0.032** [0.007]***	**0.035** [0.009]***	**0.022** [0.009]**	**0.007** [0.003]***
Terms of trade		**-0.086** [0.044]**	**-0.105** [0.059]**	**-0.136** [0.075]*	**-0.029** [0.018]*
Human capital intensity		**0.043** [0.003]***	**0.045** [0.003]***	**0.047** [0.003]***	**-0.007** [0.003]***
Infrastructure			0.0005 [0.001]		
Inflation			0.061 [0.073]		
GDP per capita growth			0.062 [0.098]		
Real interest rate			0.075 [0.047]		
Auto 94				-0.007 [0.498]	-0.218 [0.184]
Auto 95				0.126 [0.470]	-0.072 [1.666]
Auto 96				0.131 [0.471]	-0.200 [0.170]
Auto 97				0.333 [0.464]	0.041 [0.175]
Auto 98				0.474 [0.415]	0.064 [0.204]
Auto 99				**0.986** [0.463]**	**0.396** [0.158]**
Auto 00				**0.947** [0.476]**	**0.368** [0.161]**
Auto 01				**1.514** [0.511]***	**0.563** [0.178]***
Auto 02				**1.570** [0.556]***	**0.658** [0.181]***
Auto 03				0.883 [0.588]	**0.864** [0.166]***
Auto 04				0.837 [0.604]	**0.836** [0.182]***
Year Dummies	-	-	-	Yes	Yes
Country Dummies	-	-	-	-	Yes
Constant	**12.769** [0.341]***	**16.645** [4.276]***	**17.237** [5.216]***	**23.008** [7.789]***	**15.277** [1.720]***
Observations	120	108	108	108	108
R-squared	**0.06**	**0.54**	**0.55**	**0.59**	-

Robust std errors in brackets * significant at 10%, ** significant at 5%, *** significant at 1%

BOX 2: South Africa, the MIDP and AGOA preferences.

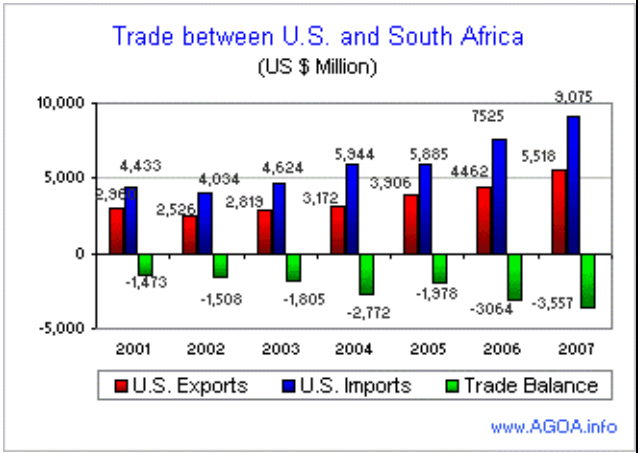
What is AGOA?

In May 2000, the U.S. Congress approved legislation known as the **African Growth and Opportunity Act**, or *AGOA.* The purpose of this legislation was to assist the economies of Sub-Saharan Africa and to improve economic relations between the United States and the region. AGOA provides trade preferences for quota and duty-free entry into the United States for certain goods, expanding the benefits under the Generalized System of Preferences (GSP) program. While AGOA is often synonymous with preferential garment exports, it has also opened the US market to a large number of African-sourced goods. South Africa has benefited by increasing and diversifying its exports to the US. Initially, AGOA was set to expire in 2008 but in 2004, the United States Congress passed the AGOA Acceleration Act of 2004, which extended the legislation to 2015.

Has South Africa benefitted from AGOA?

Yes. South Africa's expanded access to the US market has helped it increase overall export and diversify its export basket to the US. In fact, data suggests that South Africa's exports to the US have steadily increased, almost doubling over 2001-2007. Exports qualifying under AGOA and GSP amounted to $ 1.5 billion in 2005, $1.8 billion in 2006, US$2.27 in 2007 and US$ 3.88 in 2008. Exports of products that were added under AGOA amounted US $ 455 million in 2005, US$ 717 million in 2006, US$1.08 billion in 2007 and US$2.43 billion in 2008. According to full years 2007 and 2008 data, key exports sectors under AGOA were 'minerals and metals', followed by far by 'transportation equipment', 'chemicals and related', and 'agricultural products'.[21]

Are the export gains credited to the MIDP program actually due to South Africa's expanded access to the US market?



Not entirely. There is a partial timing overlap between our results of MIDP impact on automotive exports and AGOA impact on exports. MIDP started in 1995, while AGOA was launched in 2000 and South Africa became eligible. AGOA effects could have only kicked in starting in 2001. Our first set of results -regression analysis of MIDP impact within the manufacturing sector of South Africa - suggests that the impact of MIDP was already present starting in 1999 and increased up to 2004. Here, the effects of AGOA could have enhanced the MIDP incentives from 2001 by providing the South African automotive industries a large and open market. However, our second set of results from comparing the South African performance to other countries suggests that MIDP's impact starts in 1996-97 and fades by 2002 at the latest.

Furthermore, Comtrade data show that between 1996 and the year 2000, exports of vehicles (category 78) as well as machinery and transport equipments (category 7) to the U.S. increased by some 150% and 127% respectively, albeit from a small base.[22] The share of total South African exports directed to the US market compared to the world market increased from 7.6 % in 1995 to 9.16% in the year 2000 and to 11.76% in 2007. Category 78 share of exports directed to US market compared to the world increased from 7.41% in 1995 to 11.39% in 2000 and to 13.28% in 2007(right before the financial crisis).

Therefore, while AGOA has played an important role in promoting South African exports to the U.S. (export of vehicles and transport equipment specifically) after 2001, we cannot dismiss the significant – albeit short term – impact of MIDP incentives on the automotive sector in South Africa.

[21] Information from www.AGOA.info.

[22] Comtrade data base. Categories 7 and 78 of exports from South Africa to the United States.

B. Comparative Country Analysis of Automotive Exports

44. In this second part of the analysis, we carry out an analysis of South African automotive exports versus comparator countries that produce and export vehicles and components. As a first step, we compare South Africa with a sample of five African countries including Morocco, Tunisia, Egypt, Kenya and Zimbabwe. In a second step, we aim at expanding the sample size by considering as comparator countries other main global producers and exporters of vehicles and components. To design this latter sample of countries, we choose among world automotive producer and exporter countries which are classified, just as South Africa, by the World Bank as "middle-income economies". This comprises two sub-set of countries: (i) a group classified as "lower-middle-income economies" (Ecuador, Egypt, Indonesia, Morocco, Philippines, Tunisia and Vietnam), with an annual GDP per capita in the range of $996-$3945; and (ii) an "upper-middle-income economies" group (Colombia, Malaysia, South Africa, Turkey and Venezuela), with an annual GDP per capita in the range of $3,946-$12,195.

45. We place a caveat on the selection of comparator countries. Ideally, we would like to find treatment (i.e. South Africa) and control groups (i.e. comparator countries) which are similar in every way except for receiving the treatment. Our group of comparators is not necessarily from a homogeneous geographic region, nor do they necessarily share comparable economic fundamentals or policy frameworks. We have however taken this into account by introducing additional control variables and by stress-testing the results obtained applying a number of robustness checks, including significant modifications in the composition of the sample countries.

46. A challenge in our study is that very few African nations produce and export autos, particularly in Sub-Saharan Africa. Outside the African continent, we have aimed at finding comparator based on three main considerations about the countries: (i) they are middle income economies producing and exporting autos; (ii) they are going (or have gone) through economic transformation away from agriculture and towards industry and services; and (iii) they have practiced some sort of industrial policy affecting the automotive sector.

47. As in the previous analysis, the D-in-D methodology also requires that the treatment and control group show similar trends prior to the treatment (i.e. the MIDP launch). This is true in both of the samples considered, as illustrated in Figures 5 and 6 in the previous section, where comparable trends in automotive exports before 1995 in all sample countries can be seen.

48. As noted, in a first step we proceed with a panel database of 6 African countries spanning 1993-2007. In a second step, we have increased the sample size by considering other middle income countries around the world that are automotive producers and exporters. Below, we describe in detail the methodology that has been applied in both analyses, as well as the results obtained.

49. The dependent variable is the natural logarithm of automotive exports (US$ real), obtained from UNComtrade. As in the section above, we start with a simple difference-in-difference (D-in D) approach where outcomes are observed for two groups (South Africa, as the treatment group, and all other countries that are automobile producers and exporters, as the control group) and two periods (before

and after 1996, the law having been adopted in September 1995). We then proceed with a more detailed analysis where dummy variables for each country and each time period are introduced.

50. In the simple set up, South Africa is exposed to the MIDP program in the second period (after 1995) but not in the first (before and up to 1995) and the other automotive producers are not exposed to the treatment during either period. The simple set up gives the following specification:

$$LAutoExports_{it} = \beta_0 + \beta_1 SA_i + \beta_2 95_t + \beta_3 SA95_{it} + \gamma X_{it} + \varepsilon_{it} \qquad (3)$$

51. Where i (i=1….10) denotes the country and t (t=1993…2006) the year. SA_i is the South African (treatment country) dummy variable taking the value 1 for South Africa and 0 otherwise. The coefficient β_1 captures possible differences between South Africa and the other countries prior to the policy change. 95_t is the time dummy variable taking the value 1 in the post treatment period (> 1995) and 0 in the pre-treatment period (≤1995). Consequently, β_2 captures aggregate factors that would cause changes in automotive exports after 1995 even in the absence of a policy change. $SA95$ is an indicator variable coded 1 if the observation is in the treatment group (South Africa) and in the second time period (>95), 0 otherwise. β_3 is thus the D-in-D estimator, giving the sensitivity of automotive exports to the change in export tax incentives related to the MIDP in South Africa.

52. The vector X_{it} contains control variables that vary over time and which may affect each country's export supply. As before, we have considered a number of general macroeconomic factors that can influence export supply.

53. It is important in this country analysis to account for the effects of the trade liberalization measures that were implemented in South Africa since 1994. These measures can be expected to have improved export performance by lowering the cost of imported intermediate and capital goods used in export production, and reducing the incentives to produce for the domestic market relative to the export market (Edwards and Alves, 2006). Due to the difficulties in compiling harmonized measures of tariff protection for all sample countries, we use import penetration as a proxy for the impact of tariff liberalization on export performance. Import penetration affects exports by (a) improving access to imported intermediate inputs, (b) enhancing productivity growth (Johnson and Subramanian, 2001; Harding and Rattso, 2005) and (c) lowering mark-ups and hence the relative incentive to produce for the domestic market (Fedderke et al. 2003; Edwards and van de Winkel, 2005).

54. From the simple specification in (3), we proceed by adding country and year dummies as well as interaction terms to capture the impact for each year of the MIDP program. This is done because in the simple model, an identification problem could occur due to additional omitted determinants of automotive exports (James and Van Parys, 2006). These omitted variables could be categorized in three groups: (i) the time varying determinants that affect automotive exports in all countries similarly (year fixed effects), (ii) time invariant country characteristics (country fixed effects), and (iii) country specific characteristics that vary over time. These considerations give the following specification:

$$LAutoExports_{it} = \alpha + \beta_1 SA93_{it} + \beta_2 SA94_{it} + \beta_3 SA95_{it} + \beta_4 SA96_{it} + \beta_5 SA97_{it} + \beta_6 SA98_{it} + \beta_7 SA99_{it} + \beta_8 SA00_{it} + \beta_9 SA01_{it} + \beta_{10} SA02_{it} + \beta_{11} SA03_{it} + \beta_{12} SA04_{it} + \beta_{13} SA05_{it} + \beta_{14} SA06_{it} + \rho_t + \mu_i + \gamma X_{it} + \varepsilon_{it} \quad (4)$$

55. Where i (i=1….10) denotes the country and t (t=1993…2006) the year. The coefficients $SA\beta_1$ … $SA\beta_{14}$ capture the response of automotive exports to the MIDP program in South Africa for each year of the reform. The year fixed-effects ρ_t control for those events that affect automotive exports in all countries equally, as for example a downturn in the global business cycle. The country fixed effects μ_i capture those characteristics of each country that do not change over time but that differ between them, such as geographical differences. The vector X_{it} contains country specific characteristics that vary over time and that we have to take into account when evaluating the impact of South Africa's policy change.

56. Table 2 presents the regression results of the first analysis *(South Africa compared to other African producers and exporters of vehicles and components)*.

57. Table 3 presents the results of the second analysis *(South Africa compared to other African and non-African middle income automotive producers and exporters)*.

58. In both tables the D-in-D estimates from the simple analysis are shown in columns (1), (2) and (3). In all of them, the impact of the MIDP on automotive exports is positive and highly significant at the 1% level. On average, the incentives provided raised automotive exports by approximately 70 to 90%, depending on the specification and controls used. The positive and significant impact persists after adding additional control variables, including the impact of trade liberalization and fixed effects. The responses for each year of the reform are given in column (4) and with country-level fixed effects in column (5). The coefficients become positive and significant with a slight delay after the adoption of the law in September 1995. As discussed in the last section, this could suggest that the largest bulk of investment and export volumes were not achieved until some years later.

59. Similarly to the results of the sectoral analysis within South Africa, we find that the positive impact of the MIDP program lasts four to six years. In particular, the coefficient turns insignificant from 2002 onwards. This result supports the common finding that tax incentives may affect some business decisions particularly in the short run, but in general they are not a primary consideration for investors in the long run. The fading out of the tax incentives may also be related to the challenges facing general economic activities in South Africa. As noted in a number of investment climate surveys, these challenges to investing in South Africa include: a volatile exchange rate, a remote location, crime, shortage of skilled labor, inadequate infrastructure and an increasing regulatory burden.

60. Economic density and the terms of trade are significant in explaining automotive export performance. In particular, one unit increase in the economic density coefficient (measured as US$/sq m) increases, on average, the volume of automotive exports by 0.8 to 1 percent. The coefficient of the terms of trade enters the regression negatively, suggesting that for every 1 unit decrease in the terms of trade index, automotive exporters increase the volume of their auto exports by approximately 0.3 percent. This result may at first seem counterintuitive, as

neoclassical economic theory posits a positive relationship between price and quantity supplied, for any particular good or service provided. However, Morrissey and Mold (2006) also obtain this same negative relationship in their study of Africa's export performance. The authors argue that *"outside the standard neoclassical assumption, this response can be rationalized as the reaction of countries to the decline in the unit price of their exports, by trying to maintain net income (revenues) through an increased volume of exports*". The coefficient of the infrastructure variable proves insignificant in the analysis within African countries (Table 2), despite the fact that numerous studies relate this variable with improved export performance. One reason for this could be that in some of the sample African countries, including South Africa, infrastructure investment has declined in many of the years under study, particularly in transport infrastructure (ports, railways and roads). Another reason could be that our control variable (number of phones lines per 1000 inhabitants) does not adequately capture the infrastructure constraint the sector faces.

61. We also find that the inclusion of the import penetration variable gives counter-intuitive results, where higher import penetration is negatively correlated to automotive sector exports. We posit two explanations. On the one hand, part of the industrial organization/trade literature would argue that import penetration has led to de-industrialization in South Africa. On the other hand, exploring the underlying data for our analysis, we find that the probable reason for our counterintuitive result, at least for the comparative country analysis lies in the fact that while exports and imports trended upwards for South Africa after 1995, this was not the case for the other countries (particularly the African ones) included in the panel data. In many cases, imports increased in these countries while export performance remained flat or decreased. The overwhelming impact of these relationships affected our regression results. Also, as import penetration can be considered an endogenous variable, we also ran our specifications with a lagged import penetration variable. This did not alter the results and also did not increase the significance of the import penetration variable.

62. Finally, we have conducted a couple of robustness checks in order to substantiate the results obtained on this cross-country analysis (the summary tables with the results of these checks are presented in Annex 10). These robustness checks have consisted in modifying the sample of countries in order to retain the most similar ones and thus to make the control group more homogeneous. Through all the constructed samples, the significance of the MIDP program and its dynamics through time remain qualitatively the same. The checks applied are the following:

(i) First, we excluded from the sample the countries with the lowest amounts of automotive exports in the period prior to 1995. These are Egypt and Vietnam;

(ii) As a second check, we have excluded the countries with the lowest annual GDP per capita in the initial period, which are Indonesia, Vietnam and Philippines;

(iii) Finally, we have run the specification excluding the largest automotive exporters, Indonesia and Turkey.

TABLE 2: SUMMARY of COEFFICIENTS
COMPARATIVE ANALYSIS of SOUTH AFRICA vs other AFRICAN AUTOMOTIVE PRODUCERS
Dependent variable: Automotive Exports (log)

	(1)	(2)	(3)	(4)	(5)
	Base case	Base case with main controls	Base case with additional controls	Multiple year and interaction dummies	Multiple year, country and interaction dummies (fixed effects)
SA * >95 (effect MIDP)	**0.769** [0.244]***	**0.785** [0.186]***	**0.649** [0.234]***	-	
SA	**3.924** [0.166]***	**3.289** [0.162]***	**3.273** [0.182]***	**3.404** [0.357]***	
>95	**0.453** [0.260]*	0.041 [0.153]	-0.023 [0.158]		
Economic density		**0.017** [0.001]***	**0.017** [0.002]***	**0.016** [0.002]***	0.006 [0.006]
Terms of trade		**-0.042** [0.012]***	**-0.043** [0.012]***	**-0.035** [0.012]***	-0.003 [0.012]
Infrastructure			0.0006 [0.0005]		
Inflation			0.002 [0.0014]		
GDP per capita growth			0.0006 [0.019]		
SA 93				-0.316 [0.368]	-0.209 [0.328]
SA 94				-0.050 [0.380]	-0.137 [0.211]
SA 95				2.332 [0.465]	0.266 [0.264]
SA 96				0.514 [0.416]	**0.413** [0.195]**
SA 97				0.705 [0.536]	**0.682** [0.375]*
SA 98				0.777 [0.579]	**0.664** [0.237]***
SA 99				**1.256** [0.470]***	**1.088** [0.218]***
SA 00				**1.159** [0.645]*	**1.101** [0.218]***
SA 01				**1.586** [0.747]**	**1.237** [0.503]**
SA 02				**0.948** [0.539]**	**0.619** [0.400]*
SA 03				0.648 [0.531]	0.482 [0.337]
SA 04				-0.061 [0.415]	0.022 [0.411]
SA 05				-0.598 [0.491]	-0.438 [0.524]
SA 06				0.195 [0.504]	-0.183 [0.434]
Year Dummies				Yes	Yes
Country Dummies				-	Yes
Constant	**9.248** [0.206]***	**12.485** [1.247]***	**12.578** [1.234]***	**11.668** [1.234]***	**9.689** [1.266]***
Observations	90	86	86	86	86
R-squared	**0.67**	**0.87**	**0.88**	**0.90**	-

Robust std errors in brackets * significant at 10%, ** significant at 5%, *** significant at 1%

TABLE 3: SUMMARY of COEFFICIENTS
COMPARATIVE ANALYSIS of SOUTH AFRICA vs. other MIDDLE INCOME AUTOMOTIVE PRODUCERS
Dependent variable: Automotive Exports (log)

	(1)	(2)	(3)	(4)	(5)
	Base case	Base case with main controls	Base case with additional controls	Multiple year and interaction dummies	Multiple year, country and interaction dummies (fixed effects)
SA * >95 (effect MIDP)	0.179 [0.379]	0.339 [0.266]	**0.429** [0.267]*****	-	
SA	**1.931** [0.319]*******	**2.339** [0.236]*******	**2.312** [0.239]*******	**2.548** [0.305]*******	
>95	**0.978** [0.352]	**0.415** [0.242]	**0.407** [0.237]		
Economic density		**0.009** [0.008]	**0.008** [0.0009]	**0.009** [0.0009]	**0.001** [0.0008]
Terms of trade		**-0.032** [0.005]	**-0.029** [0.0047]	**-0.034** [0.006]	**-0.025** [0.002]
Infrastructure			**0.030** [0.0139]		
Inflation			0.012 [0.003]		
GDP per capita growth			-0.005 [0.021]		
SA 93				0.424 [0.449]	0.389 [0.319]
SA 94				0.244 [0.518]	0.229 [0.306]
SA 95				0.551 [0.483]	0.392 [0.289]
SA 96				0.471 [0.430]	0.243 [0.358]
SA 97				0.717 [0.499]	**0.539** [0.273]**
SA 98				0.835 [0.540]	**0.636** [0.286]**
SA 99				**0.929** [0.527]*****	**0.750** [0.253]***
SA 00				**0.871** [0.421]*****	**0.441** [0.270]*
SA 01				**1.334** [0.037]*******	**0.656** [0.272]***
SA 02				**1.122** [0.498]******	**0.698** [0.304]**
SA 03				0.602 [0.468]	0.363 [0.346]
SA 04				0.146 [0.445]	0.017 [0.282]
SA 05				0.255 [0.517]	0.099 [0.272]
SA 06				0.638 [0.555]	0.133 [0.282]
SA 07				0.589 [0.483]	0.196 [0.280]
Year Dummies				Yes	Yes
Country Dummies				-	Yes
Constant	**11.274** [0.319]	**13.399** [0.529]	**12.767** [0.488]	**14.240** [0.679]	**15.612** [0.525]
Observations	191	191	191	191	191
R-squared	**0.14**	**0.58**	**0.63**	**0.62**	**-**

Robust std errors in brackets * significant at 10%, ** significant at 5%, *** significant at 1%

V. CONCLUSION AND DISCUSSION

63. This study contributes to the empirical evidence of the effectiveness of tax incentives in developing countries. Most of the literature on incentives is cautious about their ability to induce additional investment and export growth, highlighting instead the importance of fundamentals affecting the firms' decisions to invest, namely, expectations of future demand, the cost of capital, economic and political certainty, and the existence of strong legal institutions, a good business environment and good infrastructure. However, the practice of giving export incentives to promote industrialization and economic diversification remains a popular tool for many countries around the world.

64. In this study we provide a first quantitative analysis of the *South Africa Motor Industry Development program* (MIDP) using the difference-in-difference methodology to assess to what extend the MIDP has affected South Africa's automotive export performance. To do this we take a two-tier approach. In a *first analysis*, we apply this methodology to different manufacturing sectors within South Africa. In a *second analysis*, we perform a comparative analysis between South Africa and a number of other African and middle income countries that are automotive producers and exporters.

65. From our analysis we find that the impact of the MIDP on automotive exports in South Africa is positive and significant. In particular, we find that (i) the largest response to the MIDP in terms of improved manufacturing exports occurs with a delay after the adoption of the law, suggesting that exports need time to fully react to the incentives; and (ii) in turn, the effectiveness of the tax incentives fades in time, reaffirming the common belief that tax incentives may affect some business decisions particularly in the short run, but they are not a primary consideration for investors in the long run.

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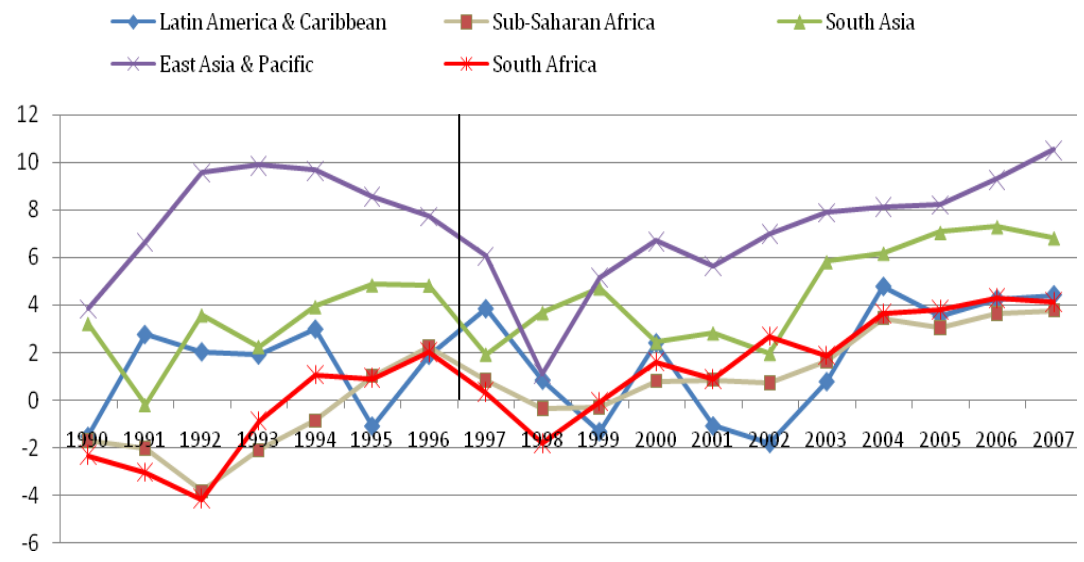
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ANNEXES

Annex 1

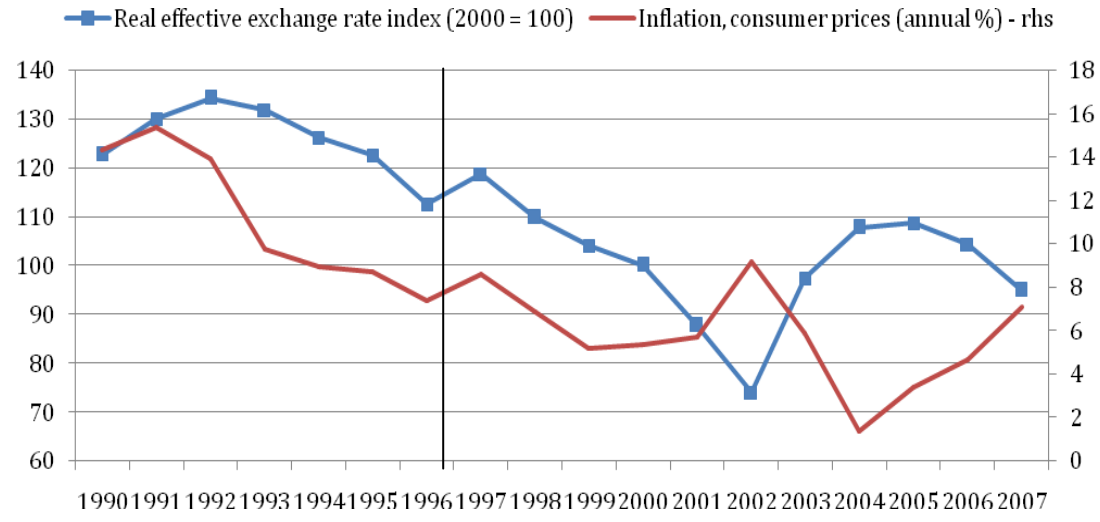
Figure 1.1: Evolution of GDP per capita growth in South Africa compared to other main world areas (annual %)



Source: World Development Indicators

Annex 2

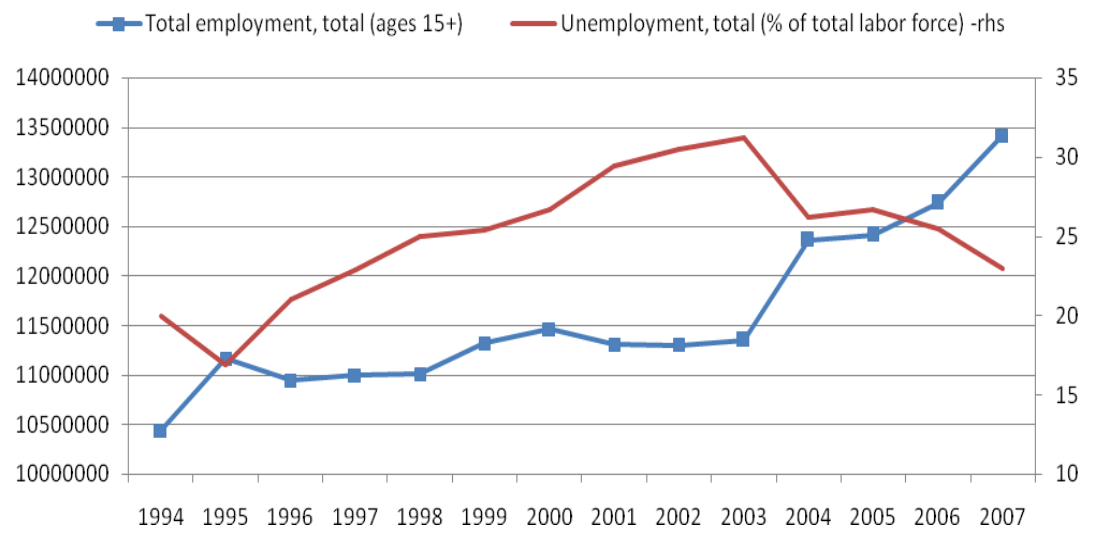
Figure 2.1: Evolution of REER and inflation in South Africa



Source: World Development Indicators

Annex 3

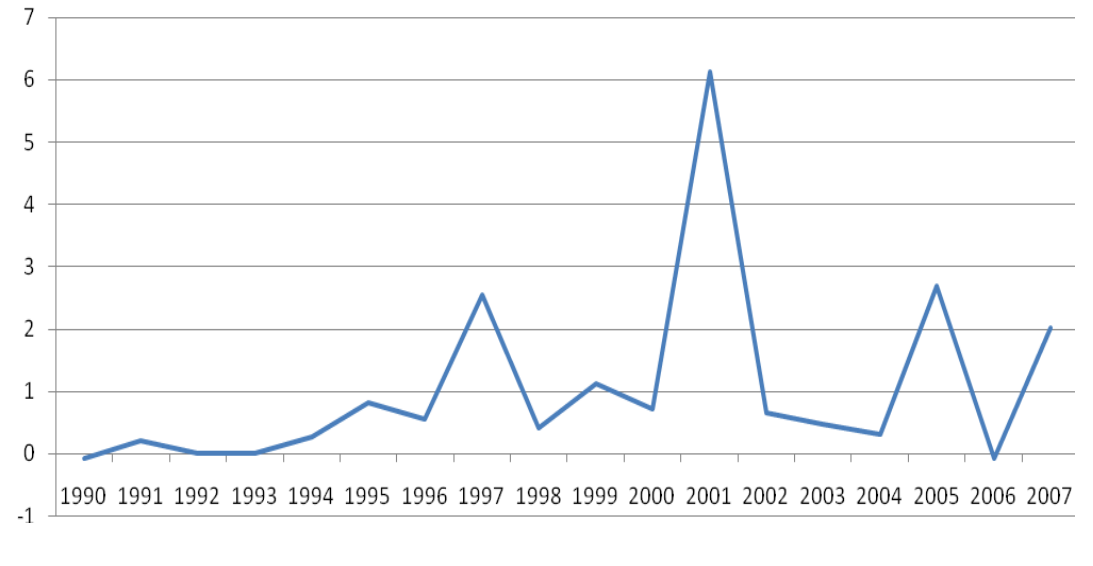
Figure 3.1: Evolution employment in South Africa



Source: World Development Indicators

Annex 4

Figure 4.1: Foreign direct investment, net inflows (% of GDP) in South Africa



Source: World Development Indicators

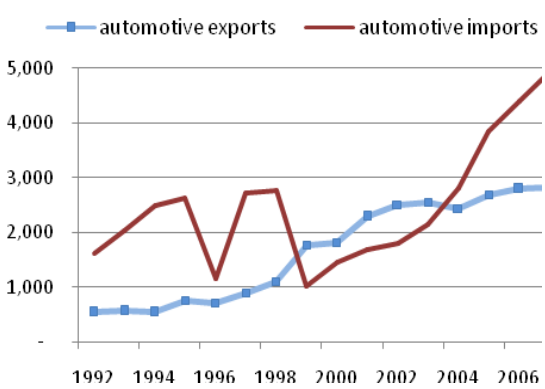
Annex 5

Figure 5.1: South Africa manufacturing exports, excluding the automotive sector (constant US dollars, 2000), in $'millions



Source: UNComtrade and World Development Indicators

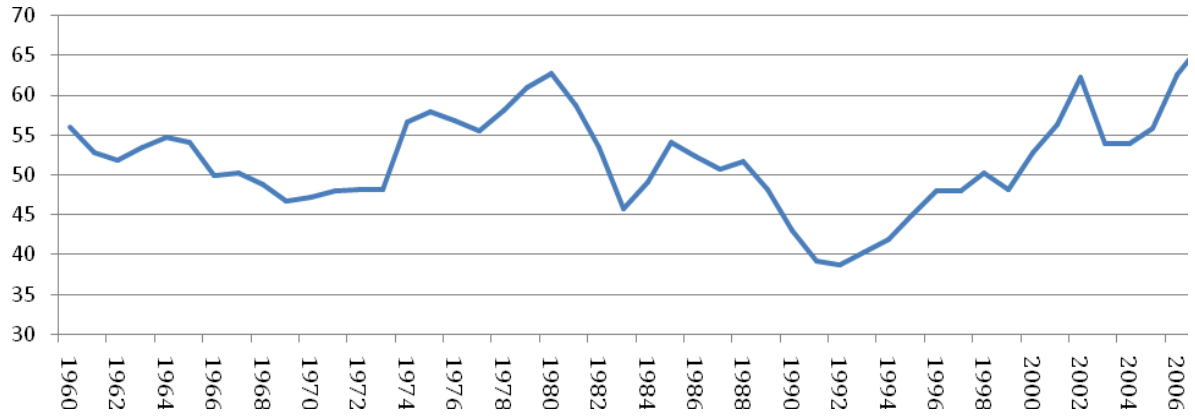
Figure 5.2: South Africa automotive exports (constant US dollars, 2000) in $' millions



Source: UNComtrade and World Development Indicators

Annex 6

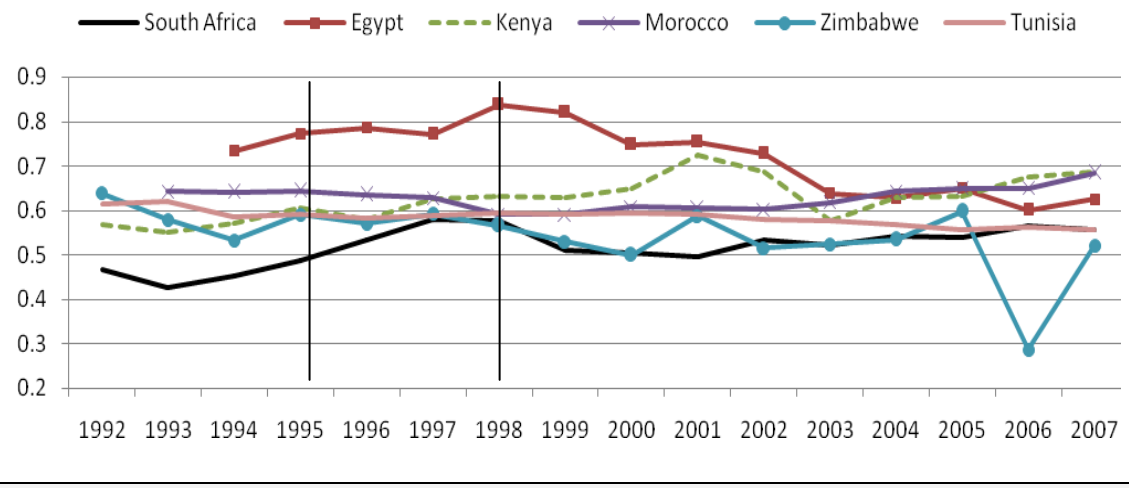
Figure 6.1: Evolution of the degree of openness in South Africa (imports and exports as % of GDP)



Source: World Development Indicators

Annex 7

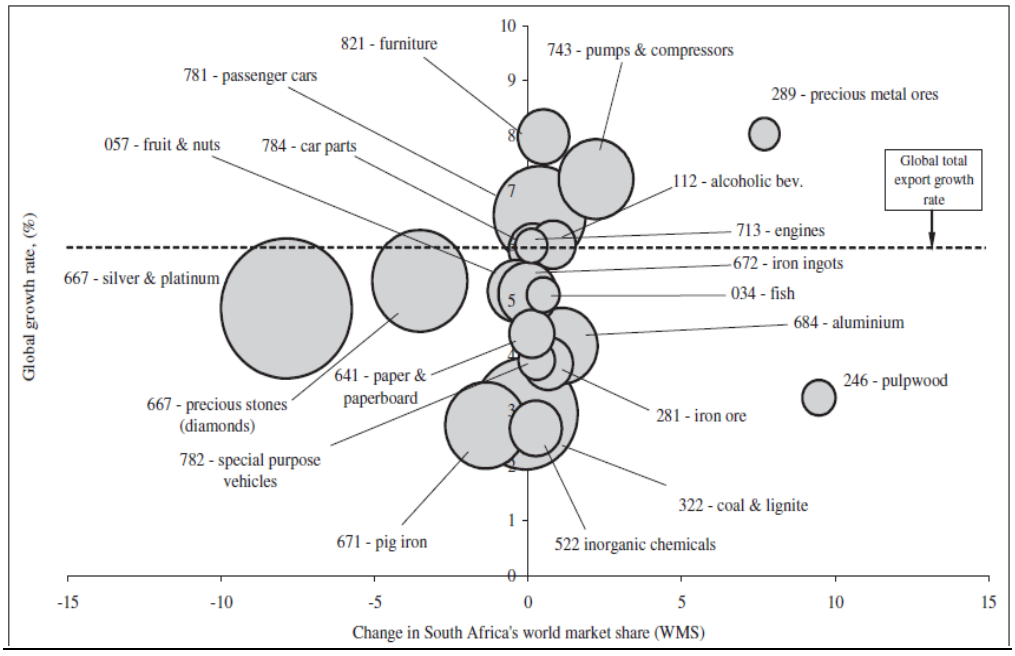
Figure 7.1: Evolution import penetration in various African countries (total imports/total trade)



Source: UNComtrade Statistics

Annex 8: Evolution of import penetration and the degree of openness

The market positioning of South Africa's top 20 exports

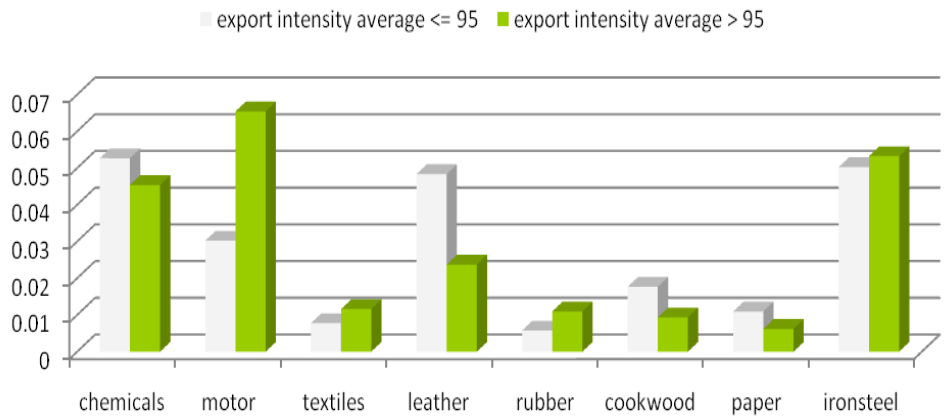


Source: Edwards and Alves, 2006

Notes: WMS changes expressed as percentage points. Bubble size denotes export value in 2002.

Annex 9: Sectoral export intensity

Figure 8.1. Proxy of average sectoral export intensity before and after the implementation of the MIDP program (nominal exports/sectoral value added)



Source: UNComtrade and UNIDO ISIC Database

Annex 10: Robustness checks

TABLE 10.1: SUMMARY of COEFFICIENTS when excluding EGYPT AND VIETNAM Dependent variable: Automotive Exports (log)					
	(1)	(2)	(3)	(4)	(5)
	Base case	Base case with main controls	Base case with additional controls	Multiple year and interaction dummies	Multiple year, country and interaction dummies (fixed effects)
SA * >95 (effect MIDP)	0.399 [0.325]	**0.518** [0.232]**	**0.547** [0.237]**	-	
SA	**1.312** [0.257]***	**1.787** [0.184]***	**1.835** [0.197]***	**2.325** [0.255]***	
>95	**0.758** [0.293] ***	0.314 [0.205]	0.316 [0.206]		
Economic density		**0.007** [0.000]***	**0.007** [0.000]***	**0.007** [0.000]***	0.002 [0.000]
Terms of trade		**-0.025** [0.003]***	**-0.023** [0.003]***	**-0.026** [0.004]***	-0.023 [0.002]
Infrastructure			**0.023** [0.014]*		
Inflation			**0.009** [0.003]***		
GDP per capita growth			0.003 [0.021]		
SA 93				0.375 [0.389]	-0.006 [0.276]
SA 94				0.140 [0.441]	-0.241 [0.244]
SA 95				0.483 [0.414]	0.055 [0.229]
SA 96				0.547 [0.422]	0.007 [0.261]
SA 97				0.667 [0.424]	0.149 [0.240]
SA 98				**0.892** [0.525]*	0.367 [0.287]
SA 99				**0.999** [0.464]**	0.464 [0.229]
SA 00				**0.757** [0.406]*	**0.453** [0.158]***
SA 01				**1.365** [0.024]***	**0.421** [0.187]**
SA 02				**1.194** [0.445]***	**0.471** [0.247]**
SA 03				**0.905** [0.513]*	0.322 [0.317]
SA 04				0.452 [0.457]	-0.082 [0.236]
SA 05				0.427 [0.427]	-0.161 [0.227]
SA 06				0.674 [0.480]	-0.156 [0.241]
SA 07				0.547 [0.447]	0.011 [0.237]
Year Dummies				Yes	Yes
Country Dummies				-	Yes
Constant	**11.892** [0.257]***	**13.305** [0.341]***	**12.816** [0.344]***	**14.016** [0.542]***	**13.892** [0.297]***
Observations	159	159	159	159	159
R-squared	**0.15**	**0.60**	**0.64**	**0.64**	**-**

Robust std errors in brackets * significant at 10%, ** significant at 5%, *** significant at 1%

TABLE 10.2: SUMMARY of COEFFICIENTS when excluding INDONESIA, VIETNAM and PHILIPPINES Dependent variable: Automotive Exports (log)					
	(1)	(2)	(3)	(4)	(5)
	Base case	Base case with main controls	Base case with additional controls	Multiple year and interaction dummies	Multiple year, country and interaction dummies (fixed effects)
SA * >95 (effect MIDP)	0.365 [0.453]	**0.591** [0.300]**	**0.984** [0.262]***	-	
SA	**2.035** [0.390]***	**2.324** [0.265]***	**2.194** [0.215]***	**2.167** [0.352]***	
>95	**0.792** [0.431]*	0.162 [0.279]	-0.228 [0.214]		
Economic density		**0.009** [0.000]***	**0.004** [0.000]***	**0.009** [0.001]***	0.001 [0.000]
Terms of trade		**-0.030** [0.005]***	**-0.027** [0.004]***	**-0.032** [0.007]***	-0.026 [0.002]
Infrastructure			**0.165** [0.018]***		
Inflation			0.003 [0.003]		
GDP per capita growth			0.003 [0.019]		
SA 93				0.251 [0.516]	0.017 [0.290]
SA 94				0.109 [0.641]	-0.092 [0.282]
SA 95				0.431 [0.580]	0.178 [0.253]
SA 96				0.233 [0.489]	-0.165 [0.372]
SA 97				0.634 [0.615]	0.257 [0.267]
SA 98				**1.138** [0.550]**	**0.614** [0.274]**
SA 99				**1.108** [0.624]*	**0.639** [0.244]***
SA 00				0.825 [0.641]	**0.294** [0.277]
SA 01				**1.351** [0.039]***	**0.576** [0.268]**
SA 02				**1.340** [0.595]**	**0.653** [0.326]**
SA 03				0.782 [0.557]	0.290 [0.386]
SA 04				0.268 [0.529]	-0.136 [0.290]
SA 05				0.403 [0.634]	-0.182 [0.652]
SA 06				0.822 [0.691]	0.236 [0.715]
SA 07				0.602 [0.586]	-0.238 [0.365]
Year Dummies				Yes	Yes
Country Dummies				-	Yes
Constant	**11.169** [0.390]***	**13.157** [0.572]***	**11.945** [0.433]***	**9.508** [1.249]***	**13.683** [0.359]***
Observations	143	143	143	143	143
R-squared	**0.18**	**0.64**	**0.80**	**0.66**	**-**

Robust std errors in brackets * significant at 10%, ** significant at 5%, *** significant at 1%

TABLE 10.3: SUMMARY of COEFFICIENTS when excluding INDONESIA and TURKEY Dependent variable: Automotive Exports (log)					
	(1)	(2)	(3)	(4)	(5)
	Base case	Base case with main controls	Base case with additional controls	Multiple year and interaction dummies	Multiple year, country and interaction dummies (fixed effects)
SA * >95 (effect MIDP)	0.243 [0.404]	**0.374** [0.276]	**0.646** [0.255]***	-	
SA	**2.313** [0.348]***	**0.253** [0.238]***	**2.310** [0.219]***	**2.301** [0.309]***	
>95	**0.914** [0.378]**	0.355 [0.253]	0.135 [0.213]		
Economic density		**0.010** [0.001]***	**0.011** [0.001]***	**0.009** [0.001]***	0.001 [0.000]
Terms of trade		**-0.029** [0.005]***	**-0.026** [0.004]***	**-0.032** [0.006]***	**-0.025** [0.002]***
Infrastructure			**0.064** [0.014]***		
Inflation			**0.019** [0.005]***		
GDP per capita growth			-0.006 [0.019]		
SA 93				0.297 [0.479]	0.529 [0.366]
SA 94				0.270 [0.531]	0.421 [0.341]
SA 95				0.530 [0.501]	**0.635** [0.320]*
SA 96				0.349 [0.463]	0.230 [0.398]
SA 97				**0.695** [0.529]	**0.602** [0.289]**
SA 98				**0.951** [0.487]**	**0.861** [0.285]***
SA 99				**0.978** [0.437]**	**0.863** [0.263]***
SA 00				0.665 [0.561]	**0.474** [0.284]*
SA 01				**1.355** [0.039]***	**0.706** [0.277]***
SA 02				**1.223** [0.490]**	**0.735** [0.319]**
SA 03				0.598 [0.485]	0.508 [0.388]
SA 04				0.026 [0.473]	0.182 [0.316]
SA 05				0.087 [0.553]	0.269 [3.172]
SA 06				0.479 [0.596]	0.273 [3.274]
SA 07				0.281 [0.474]	0.602 [0.388]
Year Dummies				Yes	Yes
Country Dummies				-	Yes
Constant	**10.891** [0.348]***	**12.763** [0.584]***	**11.752** [0.444]***	**13.267** [0.688]***	**13.568** [0.409]***
Observations	159	159	159	159	159
R-squared	**0.23**	**0.61**	**0.68**	**0.64**	**-**