The impact of the Maputo Development Corridor on freight flows: An initial investigation

A research project jointly undertaken by the
Development Policy Research Unit in Cape Town and
the Centre for Strategic and International Studies in Maputo

Amanda Driver and João Gabriel de Barros

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Abstract

This paper provides an analysis of the effect of the Maputo Development Corridor (MDC) on freight flows between Mozambique and South Africa. By analysing the transport infrastructure of the MDC, this paper seeks to provide insight into the relationship between investment in infrastructure and economic growth.

This paper shows that the MDC is likely to reduce freight transport costs along the route, in spite of new road tolls. The MDC has strengthened old infrastructure relationships as indicated by a rapid response from bulk exports along the corridor route from Mpumalanga. However, it has yet to create significant new infrastructure relationships, such as container imports to South Africa via the corridor route. This paper also shows that factors outside of the MDC will influence the impact of the corridor, such as the price of tolls on the N3 to Durban.

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1. Introduction

The Maputo Development Corridor (MDC) is widely recognised as an initiative with far reaching significance. Some of the reasons for this are that:

- it represents a new approach within the Southern African Development Community (SADC) to corridors;
- it is seen as an important practical move towards regional integration, which can provide practical lessons for other corridors in the region;
- one of its key elements is the region's first major public-private partnership (PPP);
- it heralds a new era in the relationship between Mozambique and South Africa.

The recent history of the MDC goes back to August 1995, when the Ministers of Transport in Mozambique and South Africa reached an agreement to re-establish the route between Gauteng and Maputo. This was a major transport route until the mid-1970s, when the war in Mozambique and South Africa's destabilisation activities disrupted it.

At the core of the MDC is a series of projects to upgrade the infrastructure that makes up the transport route from Gauteng to Maputo. This includes four major elements: the road, the railway line, the border post and the port of Maputo. These infrastructure upgrades underpin the MDC initiative. It is envisaged not only that the flow of goods along the route will be re-established, but that the investment in infrastructure will crowd in further investment, or, as expressed by the Mpumalanga Investment Initiative, "attract new and value-added industries along the length and breadth of the Corridor" (*Mpumalanga Report* 1999).

There is a well-established relationship between infrastructure and economic development. Widespread empirical evidence shows a correlation between investment in infrastructure and economic growth, and from a theoretical point of view it makes sense that infrastructure facilitates economic growth by increasing the productivity of other factors of production. However, beyond the level of a broad correlation, the nature of the relationship between infrastructure and economic development is relatively poorly understood. As Kessides (1993: 9) points out, "the available studies are not very illuminating regarding the workings of this relationship and therefore the policy implications are not clear." (Also see Batten & Karlsson 1996; and Smit & McCarthy 1998.) Questions that remain unanswered include: Under what conditions does infrastructure act as an effective catalyst for economic growth? Can infrastructure be a "leading" factor in stimulating growth in underdeveloped regions?

The MDC represents an opportunity to examine this relationship between infrastructure and economic growth in action, and to explore the mechanisms at work. Apart from furthering our understanding of the MDC, this may provide insights and lessons that would be valuable for other development corridors in the region.

Transport infrastructure in particular is seen to play an important role in regional integration, and has even been termed "the engine of regional integration" (Lipman 1997: 85). Lipman explains that, "Many of the non-tariff barriers to trade are related to transport, and all regional and international markets in goods, services and labour are dependent on transport and transport linkages."

The various corridors in the region have the potential to facilitate movement of goods between different parts of the region, and between the region and the rest of the world, as well as the potential to promote investment and development in particular local areas. It is this combination of possibilities which makes them so attractive. They offer the prospect of increased trade, increased investment, and local economic development. However, as stated, the mechanisms by which this process works are not fully understood.

Because the infrastructure in the case of the MDC is chiefly transport infrastructure, one important mechanism at work in the relationship between the MDC and economic growth is likely to be transport costs, and the transport of goods along the corridor is an obvious starting point for understanding the impact of the infrastructure upgrades.

With this in mind, the aims of this paper are:

- to build up a picture of current flows along the Maputo corridor;
- to examine the likely impact of the MDC on road freight transport costs;
- to explore some of the other factors that mediate the relationship between investment in infrastructure and economic development in the case of the MDC.[1]

Ultimately the goal is to illuminate the workings of the relationship between investment in infrastructure and economic growth, in the context of a particular set of infrastructure investments aimed at realising regional integration and industrialisation.

The MDC is in its early stages. Much of the infrastructure upgrading that is at the core of the initiative has yet to take place. Any attempt at an overall evaluation of the impact of the MDC would be premature at this stage. However, an investigation at this early stage of some of the factors at work may provide useful insights about what is needed for effective ongoing monitoring and evaluation of the MDC's longer-term impact.

The paper is based on research undertaken jointly by the DPRU at UCT, and CEEI-ISRI in Maputo. Data was collected from secondary sources as well as through interviews and conversations with people and firms involved in and affected by the MDC.

The paper is structured as follows. Section 2 gives some background on Mozambique and South Africa, and the MDC itself. Section 3 focuses on the infrastructure upgrades that form part of the MDC. Section 4 gives information about freight, vehicle and passenger flows along the MDC route. Section 5 explores the likely impact of the MDC on freight flows, as a result of changes in road freight transport costs as well as broader factors. Section 6 presents conclusions and recommendations.

[1] Please note that this paper does not aim to give a comprehensive account of the MDC. It does not deal with the institutional arrangements through which the MDC is being implemented, nor does it deal with elements of the MDC programme apart from the infrastructure upgrades.

2. The Context: South Africa and Mozambique

The MDC takes place in the context of the relationship between South Africa and Mozambique. It is useful to look briefly at some of the major current economic features of this relationship, as well as how the MDC relates to other priorities and initiatives in each country.

South Africa' s GDP was approximately $130 billion in 1997 (SADC 1999), while revised figures for 1997 put Mozambique's GDP at $2 billion (*Business Day* 26.06.98). With a population of about 40 million, South Africa's GDP per capita is about $3 000. With a population of about 18 million, Mozambique has a GDP per capita of just over $100. These stark contrasts cannot fail to influence the way the MDC plays itself out, and the impact that it has.

Further, South Africa is one of Mozambique's major trading partners, while Mozambique accounts for a small proportion of South Africa's trade (see Section A of the Appendix). South Africa has also become a major investor in Mozambique. With $1.65 billion of South African investment pledged between 1995 and mid-1998 through CPI (Mozambique's investment promotion agency), South Africa surpassed Portugal as the biggest investor in Mozambique (*Business Day* 22.06.98).[2]

In addition, Mozambique has a significant migrant and working community in South Africa. In the colonial period, the south of Mozambique was economically integrated with South Africa, as a source of labour for mining and agriculture. After Mozambique's independence, the number of Mozambicans working on South Africa's mines dropped dramatically, from 120 000 to less than 30 000, but has risen steadily again since then, to about 80 000 in 1998 (De Vletter 1998).

Apart from mineworkers, many Mozambicans travel to South Africa in search of work, often illegally. According to the South African High Commission in Maputo, 77 000 illegal Mozambican immigrants were repatriated from South Africa in the first nine months of 1998.

South Africa is also an important source of visitors for Mozambique's rapidly growing tourism industry. Revenues from tourism in 1998 were 70% greater than in 1997.

All of this means that South Africa looms far larger in the Mozambican economy than vice versa, as a market for exports, as a source of imports, as a source of investment, as a source of employment, and as a source of tourists. This is hardly a new insight, but it is worth repeating here since it bears directly on the impact of the MDC.

It is also worth noting that Mozambique's harbours and railways have always handled more international freight than national freight (see Section B of the Appendix). Mozambique's strategic geographical location, with a long coastline and a large hinterland of landlocked countries, positions the country to play a role as a trade and commerce centre in the region. Mozambique has been described as "an economy of ports and railroads" (Grundy 1979 in Iheduru 1996: 5). However, the country was also, in 1973, the sixth largest manufacturer in sub-Saharan Africa (De Vletter 1998).

It is important for South Africans to be aware that the area of Mozambique that forms part of the MDC is just one small part of the country. The city of Maputo and Maputo Province are also the wealthiest part of Mozambique. Estimates of the proportion of Mozambique's industry located in Maputo vary from 33% (Wood 1998) to 70% (Zimconsult 1996), with people interviewed suggesting between 50% and two-thirds. This is in spite of two other corridor initiatives. The Beira Corridor links the port of Beira with Harare, and the Nacala corridor links the port of Nacala with Liliongwe and Lusaka. Although the port of Nacala is one of best natural deep sea harbours in Africa, the Nacala corridor is the least developed of the three corridor initiatives (see Sections C and D of the Appendix). Its hinterland is also the least industrially developed.

[2] Key investors include the Industrial Development Corporation, Mondi, Shoprite, Sasol, SAB, Illovo sugar, Standard Bank, Barlows, Concor, and Anglo American (*Business Day* 26.06.98).

To counteract industrial concentration in the south of Mozambique, a set of spatially differentiated tax incentives exists. Crudely speaking, the further north a firm locates within Mozambique, the greater the tax rebates available. In addition, Industrial Free Zones have been declared at Maputo, Beira and Nacala.

From South Africa's point of view, the MDC is the flagship of the government's Spatial Development Initiatives (SDI) programme. The SDI programme, which began in 1996 with the MDC, is aimed at unlocking the economic potential of particular areas of the country, through investment in infrastructure and anchor projects in those areas. The approach used in the SDI programme is being extended to other development corridors in the region.

The MDC also fits into the Department of Transport's recently developed Moving South Africa strategy. One of the key requirements identified by Moving South Africa for the freight transport system is to consolidate and build density along particular corridors. One of these is the Maputo corridor.

As mentioned in the introduction, the MDC has not emerged out of nowhere. Before 1975, around 40% of Gauteng's industrial exports were transported along the Maputo corridor route and exported through the port of Maputo.[3] In the first half of the 1970s, the port handled about 14 million tons a year. Following Mozambique's independence, cargo levels at the port dropped dramatically to around 1 million tons. Railway lines leading to Maputo (and other Mozambican ports) were sabotaged and fell into disrepair. South Africa's exports and those of other landlocked countries in Mozambique's hinterland, were diverted to Durban and Richards Bay, dramatically increasing the region's dependence on South Africa's transport infrastructure. Although traffic levels at the Maputo port are climbing again, at about 3 million tons a year, they still have a long way to go before returning to the 1970s levels.

Within SADC in the 1980s, the Maputo corridor was not seen as a priority, since investing in the corridor's infrastructure would have benefited South Africa. More attention was paid to the Beira and Nacala corridors. Now, two decades after Mozambique's independence, attention is once again being paid to the Maputo corridor. In the interim, the port of Durban has grown enormously and has become by far the biggest container port in the region, and the port of Richards Bay, which did not exist in the early 1970s, has emerged as a major bulk port. It is in this context, very different from the pre-1975 context, that the MDC initiative is taking place.

[3] The Mozambique Convention, which became defunct after Mozambique's independence, "required that 47.5% of traffic from the Southern Transvaal use the Maputo port in return for South Africa's right to recruit labourers from Southern Mozambique for work in its gold and coal mines" (Chipeta, Nkomo, Banda & Ngwenya 1993: 15).

3. Key infrastructure elements of the MDC

Figure 1 shows some of the key events in the life of the MDC. As is to be expected with an ambitious undertaking involving two countries with different economies, different institutional cultures, and different languages, the MDC is taking time to implement. This section gives some basic information about transport infrastructure investments that form the core of the MDC. The element of the infrastructure upgrade which has seen the most progress so far is the road.

3.1 The road

The concession for the Witbank-Maputo toll road was awarded to Trans African Concessions (TRAC) in May 1997, financial closure was reached in December 1997, and construction began in June 1998. The $400 million concession is structured as a 30-year Build-Operate-Transfer (BOT) agreement. TRAC is responsible for upgrading the road and maintaining it, in return for revenue earned from tolls at five points along the road. After 30 years, the asset (the road) will be transferred back to the governments of South Africa and Mozambique (who may decide on a further concession agreement). In other words, TRAC has 30 years to recoup the cost of its investment plus ongoing maintenance (and make a commercial return) from revenue earned from tolls.

Most of the 440km road requires selective upgrading and rehabilitation, however, TRAC will build a new road to cover the last 50km stretch from Moamba to Maputo (also cutting 20km off the route). The 90km stretch of the road in Mozambique will account for a third of the project's total cost (*Business Report* 22.06.99). TRAC started on the South African side, and is progressing eastwards, with completion likely by early 2001. The stretch of road which currently links Moamba and Maputo is not TRAC's responsibility to maintain. According to an engineer from TRAC, this section of the road is in extremely bad condition and is falling further into disrepair.

There will ultimately be five toll plazas along the route, three in South Africa and two in Maputo. The three in South Africa (Middelburg, Machado and Nkomazi) have already been opened. The Moamba toll plaza in Mozambique may open as soon as March 2000, and the Maputo toll plaza in early 2001. Details of the toll tariffs are given in Section 5.1.

3.2 The railway line

There are three railway lines that link the port of Maputo to its hinterland: the 78km Ressano Garcia line to South Africa, the 63km Goba line to Swaziland, and the 521km Limpopo line to Zimbabwe. As with the rest of Mozambique's railway lines, these lines are currently owned and operated by CFM, Mozambique's rail and port parastatal. A 15-year concession for the upgrading of each line is envisaged.

In late 1997, a Spoornet-led consortium was identified as the preferred bidder for the Ressano Garcia line. (A Portuguese-led consortium, Consortia 2000, was identified for the other two lines.) The Spoornet consortium submitted a bid to CFM, and negotiations on the terms of the concession began. However, negotiations broke down early this year, and the bid has been shelved. The difficulty seems to be related to the value which CFM places on its assets, and the "substantial fixed fee and relatively high proportion of annual profits" that CFM requires from Spoornet in return for the right to run the line (Mpumalanga Report 1999: 15).

At the moment, the part of the railway line that is situated in South Africa is electrified, while the part in Mozambique is not. The line carries about 1.3 million tons a year, of which nearly a million tons is coal (see Section C of the Appendix). As a comparison, COALlink, the Spoornet line from Mpumalanga to Richards Bay, carries over 60 million tons of coal a year (Spoornet web site 1999).

Figure 1: A timeline of events in the life of the MDC

August 1995	Agreement between Ministers of Transport in Mozambique and South Africa to re-establish the Gauteng-Maputo link
6 May 1996	MDC officially launched at an Investors Conference
26 July 1996	Framework Agreement for the establishment of the MDC signed by Mozambican and South African governments, with three ancillary agreements (a protocol for the operation of the toll road, a statement of intent to establish a Corridor Company, and a statement of intent about upgrading the railway and harbour)
May 1997	Witbank-Maputo toll road concession awarded to TRAC
September 1997	Shoprite opens a store in Maputo
December 1997	Financial closure on toll road concession
December 1997	Spoornet-led consortium named preferred bidder for the concession to operate the Ressano Garcia railway line
April 1998	Trans-Kalahari Highway opened
May 1998	Mersey Docks-led consortium named preferred bidder for the concession to operate the Maputo port
6 June 1998	Construction of toll road officially launched at Ressano Garcia
July 1998	Construction of Mozal officially launched
August 1998	Mozal concludes agreement with CFM to develop and operate its own port facilities
28 Sept - 1 Oct 1998	3-day strike by construction workers at Mozal over wages and working conditions
1 December 1998	US-Mozambique bilateral investment treaty signed
8 December 1998	Middelburg toll plaza opened
19 Jan 1999	Another strike by construction workers at Mozal
February 1999	Negotiations on the rail concession break down
30 April 1999	Framework agreement signed for MISP and Pande gas field
18 May 1999	Machado toll plaza opened
27 May 1999	Contract for N3 concession signed with N3TC
July 1999	Nkomazi toll plaza opened
March? 2000	Moamba toll plaza to open
Early 2001	Road scheduled to be completed Maputo toll plaza to open Mozal scheduled to come on stream

3.3 The port

The port of Maputo has terminals for containers, sugar, citrus, steel, general cargo, cereals, fuel, and coal. The combined capacity of the port is 15 million tons a year. The operation of the citrus, sugar, coal and container terminals was contracted out to the private sector in the mid-1990s. "These concessions have improved the efficiency, security and throughput of the port" (SA Transport Business Special 1997: 14). The concession for the sugar terminal is held by Manica Freight Services, a division of Rennies, together with the Swaziland Sugar Association and the Zimbabwe Sugar Association. Manica also has a share in the citrus terminal, along with Capespan Mozambique, a subsidiary of the South African company, Capespan.

The container terminal is operated by Mozambique International Port Services (MIPS), a joint venture company owned by Rennies Group (37%), CFM (33%), and P&O Ports, a subsidiary of P&O Australia, (30%). The concession is for ten years, and began in March 1996. The project required an initial investment of $7.4 million (MIPS 1998), including two new cranes. According to the CEO of MIPS, about 12 000 containers were handled in 1998 (10 000 imports, 2 000 exports). By far, the bulk of container traffic is made up of consumer goods for domestic consumption in Mozambique (in other words not exports from or imports to South Africa). MIPS has a target of 100 000 containers made up of 20 000 imports for local consumption, 40 000 inward to Southern Africa, and 40 000 outward from Southern Africa. (As a comparison, the Durban port handles about 1 million containers a year).

Two international shipping lines, Macs and Maersk, make regular calls at the container terminal, linking Maputo to Europe and more recently the Far East. There is something of a chicken-and-egg situation here that is important to understand: In order to attract more container traffic, the port needs to attract more shipping lines, but in order to attract more shipping lines, there has to be more cargo (see Section 5.2). Mozal has concluded an agreement with CFM to build and operate its own berth and other terminal facilities at Matola (a section of the Maputo port). The total cost will be $70 million, including $14 million for the new berth. Ownership of the facilities will eventually revert to CFM (*Business Report* 27.08.98).

At any port, in addition to the services provided at individual terminals, there are general port and upkeep services that are essential. These are also to be concessioned to the private sector. In May 1998, a consortium led by Merseyside Docks and Harbour Company (a UK company) was named the preferred bidder for this concession. The $85 million concession includes dredging the port channel to increase the depth from 9.5 to 13.5 metres, as well as managing, organising and maintaining port facilities (*Mpumalanga Report* 1998).

However, the Mersey Docks consortium is reluctant to finalise the concession until more progress has been made with the concession for the Ressano Garcia railway line. Mersey Docks wants to be sure that Spoornet is involved in the railway line, since Spoornet would have the ability to re-route goods from other lines to the Maputo port. The stalemate surrounding the port and rail concessions has resulted in unexpected delays in the upgrading of these key elements of the MDC's infrastructure.[4]

3.4 The border post

The border post is the final major infrastructure element of the MDC. A new, twenty-four hour, one-stop border post is being planned. It will cost $33 million and take three years to build. A great deal of planning has gone into the design of the new border post. According to the *Mpumalanga Report* (1999), the South African Cabinet has now authorised the National Interdepartmental Structure for

[4] The original expectation was to announce the preferred bidder for the port in December 1997, award the contract by February 1998, and begin construction by mid-1998. Each of these stages has taken longer than expected.

Border Control (NIDS) to go ahead with a Rapid Procurement Programme to begin upgrading the border post.

At the moment, passengers and vehicles going through the border post have to go through two separate sides. The border post closes at 7 p.m., so anyone arriving after that time has to wait there until the next morning. According to the South African Road Freight Association, the average processing time at the border

post is two hours. Kennedy et al. (1998) found an average processing time of four hours for freight vehicles. According to Mocargo in Mozambique, each of their trucks spends three to six hours at the border post, and Kawena Cargo Carrier Company reported between one-and-a-half and six hours. The new border post should reduce these times dramatically. The new Lebombo border post is being seen as a pilot project. If it is successful, the same model will be implemented at other border posts in the region.

4. Freight, vehicle and passenger flows along the Maputo corridor

4.1 Freight flows

Detailed information about current freight flows along the Maputo corridor route proved difficult to come by. Neither Mozambique nor South Africa has a national freight database with data on freight flows broken down by route, mode and commodity. Nevertheless, it was possible to piece together information from various sources. Ideally one wants to distinguish between:

- domestic and cross-border freight;
- different modes (road and rail in this case);
- commodity types;
- different origin-destination pairs.

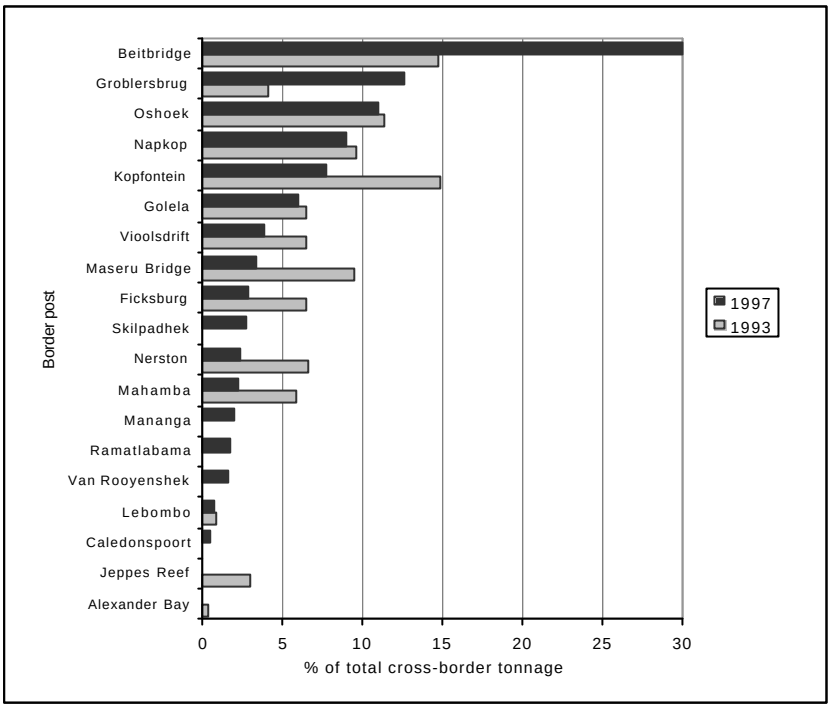
Moving South Africa (1998) gives figures for aggregate annual freight flows along major transport corridors. A figure of 9 million tons is given for the Gauteng-Maputo corridor, with a prediction of 25 million tons for the year 2020. The current figure of 9 million tons is made up of 6.9 million tons of rail freight and 1.8 million tons of road freight.[5] These figures include both domestic and international traffic going in both directions.

The CSIR did a survey of passenger and freight flows by road through South Africa's border posts in 1997 (Kennedy, Sallie & Nordengen 1998), which provides useful information. The survey was done over three separate weeks at different times of the year, and the data collected was then annualised. This means that the results are estimates, however, they seem to be the most detailed and reliable estimates available for cross-border road freight. Figure 2 shows the proportion of total cross-border road freight volumes accounted for by each of South Africa's border posts.

The graph shows clearly that road freight flows through the Lebombo border post[6] are small from South Africa's point of view. In 1997, just over 29 000 tons of goods passed through the Lebombo border post by road (compared to 1.2 million tons through Beitbridge, for example). Figure 3 shows road freight flows consolidated by country.

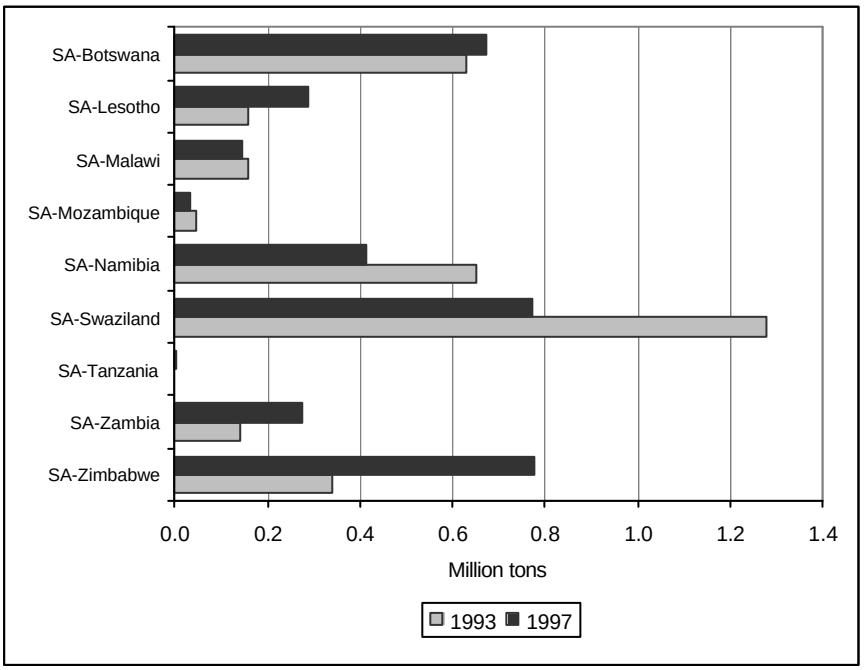
[5] This breakdown is not given in the Moving South Africa document, but Nathan Wilson (Policy Advisor: Freight Infrastructure at the South African Department of Transport) was able to provide the breakdown.
[6] The border post is referred to as the Lebombo border post rather than the Ressano Garcia border post, since the CSIR study was done in South Africa.

Figure 2: Percentage of total cross-border road freight between SA and neighbouring countries per border post, 1993 & 1997



Source: Data from Kennedy et al. (1998)

Figure 3: Estimated annual cross-border road freight volumes between South Africa and neighbouring countries, 1993 & 1997



Source: Data from Kennedy et al. (1998)

The 29 000 tons of cross-border road freight between South Africa and Mozambique in 1997 was made up of 26 000 tons of goods going from South Africa to Mozambique, and 3 000 tons going from Mozambique to South Africa. Kennedy et al. (1998) give a breakdown of the commodities involved, shown in Table1.

Altogether, vegetables and fruit products, cement and building products, miscellaneous manufactured articles, and prepared foodstuffs, beverages etc., going from South Africa to Mozambique, accounted for just over 13 400 tons or 46% of the total road freight flows between the two countries in 1997. This was before the construction of Mozal began in mid-1998, which is likely to have increased the volumes of construction materials going through the border post from South Africa to Mozambique.

The main single road freight flow between South Africa and Mozambique thus consists of basic consumer goods and construction materials going from South Africa to Mozambique. Presumably, the majority of these goods are destined for local consumption in the Mozambican market (rather than for export to other countries via the port of Maputo).

Table 1: Road freight percentages by commodity through the Lebombo border post, 1997

Commodity	From Moz (%)	From SA (%)	Total (%)
Vegetables and fruit products	33	22	23
Cement and building materials	6	13	13
Ferrous metals	14	11	11
Miscellaneous manufactured articles	22	7	9
Plastics and articles thereof	0	7	7
Vehicles, aircraft, ships, boats, vessels, transport equipment	0	7	7
Wood and articles of wood, charcoal, cork	5	6	6
Prepared food stuff, beverages, spirits, canned food, tobacco	1	6	5
Live animals, animal products	19	2	4
Animal and vegetable fats and oil		4	3
Pulp of wood, cellulose material, paperboard, paper	0	3	3
General mining products	0	3	3
Other products	0	9	6
TOTAL	**100 (3 000 tons)**	**100 (26 000 tons)**	**100 (29 000 tons)**

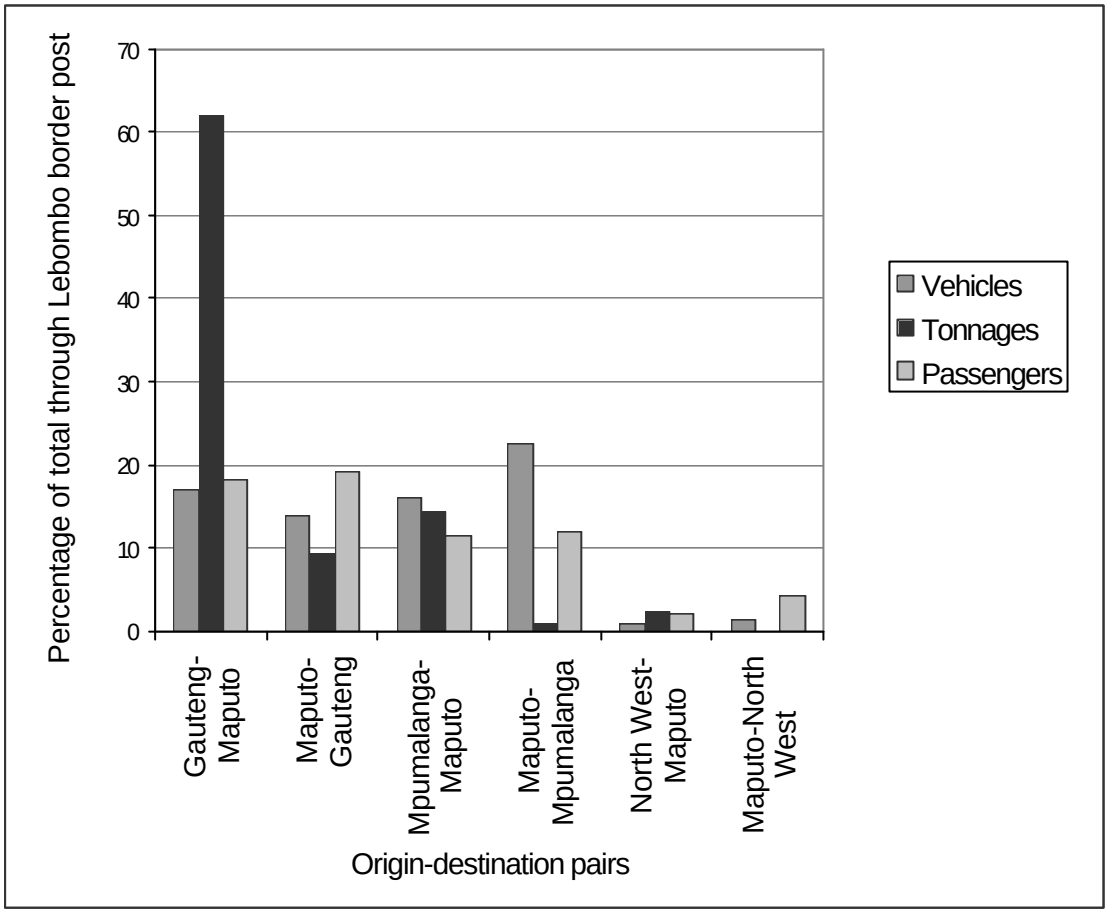
Source: Data from Kennedy et al. (1998)

Thinking back to the Moving South Africa figures, it is clear that of the 1.8 million tons of road freight which travel along the Maputo corridor route, only a very small proportion (29 000 tons or less than 2%) is cross-border freight. The vast majority of the 1.8 million tons is likely to be accounted for by freight moving between destinations within South Africa.[7] Some of it will be made up of goods moving between destinations within Mozambique, but given the relative sizes of the Mozambican and South African economies, this is likely to be a much smaller amount than the amount within South Africa.

A breakdown of cross-border road traffic through the Lebombo border post by origin-destination pairs reveals interesting results. Figure 4 is based on information provided by Kennedy et al. (1998) on origin-destination pairs.

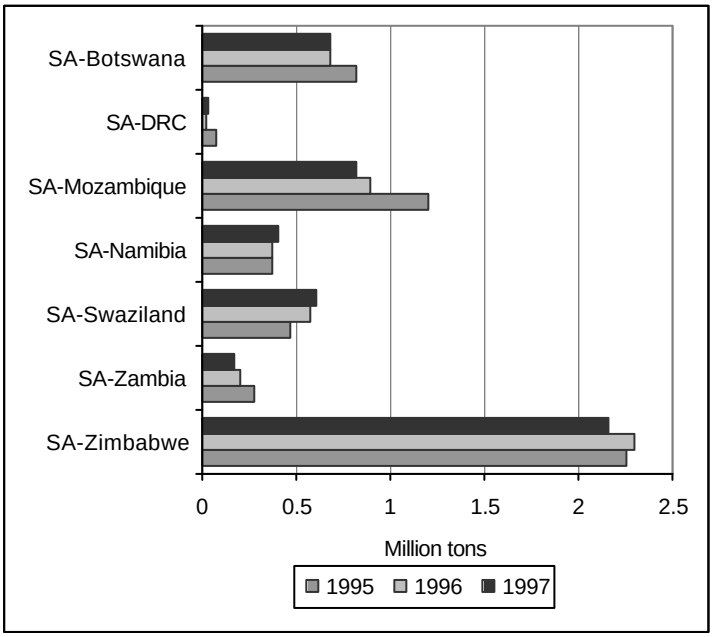
[7] According to Statistics South Africa (1999), the combined road and rail freight tonnage for the whole of South Africa in 1998 was 625 million tons, made up of 448 million tons transported by private freight operators, and 187 million by Transnet. No further breakdown is available from Statistics South Africa.

Figure 4: Origin-destination pairs for traffic at the Lebombo border post, 1997



Source: Based on data from Kennedy et al. (1998)

Figure 5: Rail freight volumes between South Africa and other countries, 1995-1997



Source: Kennedy et al. (1998) (based on data from Spoornet)

Goods moving from Gauteng to Maputo are, by far, the dominant freight flow. We will return to a discussion of vehicle and passenger flows further on in this section. Note that the only other South African province that features significantly is Mpumalanga, with the Northern Province putting in a small appearance. Flows to and from South Africa's other provinces, Mozambique's other provinces, and other countries in the region, were too small to show up on the graph. Kennedy et al. (1998) also give aggregate data for rail freight flows, provided to them by Spoornet.

Figure 5 shows that Mozambique-South Africa cross-border rail freight flows are far greater than Mozambique-South Africa cross-border road freight flows (refer to figure 3). Whereas Mozambique accounts for only a small proportion of cross-border road freight flows between South Africa and neighbouring countries, Mozambique accounts for a significant proportion of cross-border rail freight flows between South Africa and neighbouring countries.

The composition of goods transported on the Ressano Garcia line in 1997 is shown in Table 2. (See Section C of the Appendix for 1995 and 1996 figures.)

The flow of goods from South Africa to Mozambique far outweighs the flow of goods in the opposite direction. Of the 1.2 million tons of cross-border rail freight between South Africa and Mozambique in 1997, 1.17 million tons was from South Africa to Mozambique, and only 30 000 tons was from Mozambique to South Africa. The dominant commodities, together making up 84% of total flows in both directions in 1997, are coal and citrus from Mpumalanga, which are destined for export via the port of Maputo. Coal volumes have increased rapidly over the last three years, and 20% twenty percent of South Africa's citrus exports go through Maputo. Continued growth in the volumes of both of these products is expected (SA Transport Business Special 1997). According to a railway specialist at the Southern African Transport and Telecommunications Commission (SATCC), increases in rail volumes have been possible because of improvements in the management of the railway, even though the rail infrastructure has not yet been upgraded.

Table 2: Goods transported on the Ressano Garicia railway line, 1997 (tons)

Into Mozambique	
Coal	949 272
Steel	8 000
Citrus	166 702
Vermiculite	3 256
Clinker	38 766
Containers	9 114
Cement	39 780
Various	30 678
Molasses	22 560
Sugar	2 898
Maize	18 647
Chrome	851
TOTAL	**1 290 524**
Out of Mozambique	
Steel	2 240
Semea	7 792
Bentonite	7 288
Various	7 510
Vehicles	12 760
TOTAL	**37 590**

Source: CFM Traffic Section (Direcção dos Caminhos de Ferro de Mocambique, Departamento de Tráfego, Secção de Estatistica, CFM)

To summarise, there are two major cross-border freight flows between South Africa and Mozambique.

- bulk rail freight, involving bulk goods from Mpumalanga destined for export through the port of Maputo;
- road freight, involving goods from Gauteng destined for consumption within Mozambique.

4.2 Vehicle and passenger flows

Data on vehicle flows on the Witbank-Maputo toll road is available from TRAC, but at this stage only for South Africa. At the moment, approximately 10 000 light vehicles and 1000 heavy vehicles go through the Middelburg toll plaza every day. The figures for the Machado toll plaza are approximately 5 000 light vehicles and 900 heavy vehicles per day. (The opening of the toll plazas has influenced the amount of traffic. This is discussed further in Section 5.)

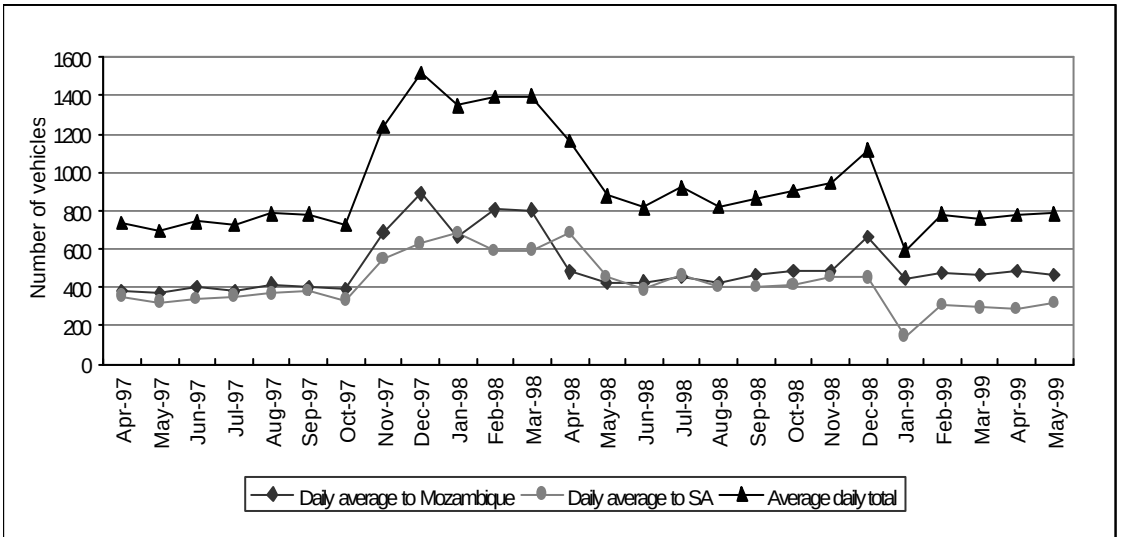
Bearing in mind the relative sizes of the South African and Mozambican economies, it is likely that levels of traffic on the Mozambican side of the road are lower. According to a member of the Lenders Team for the toll road (made up of all the organisations that have contributed to the loan financing for the road), more than 90% of the revenue from tolls is expected to come from traffic on the South African part of the road.

For vehicle flows, as for freight flows, cross-border traffic is a small proportion of total traffic along the route. (Most of the traffic is either within South Africa or within Mozambique.) According to data from the South African Revenue Service (SARS) office at the Lebombo border post, the average number of vehicles going through the border post every day is around 800. Figure 7 shows how this daily average has changed from month to month since April 1997.

Surprisingly, although there are considerable variations from month to month, with large peaks in some months, there is no overall upward trend, even since the construction of Mozal began in mid-1998.

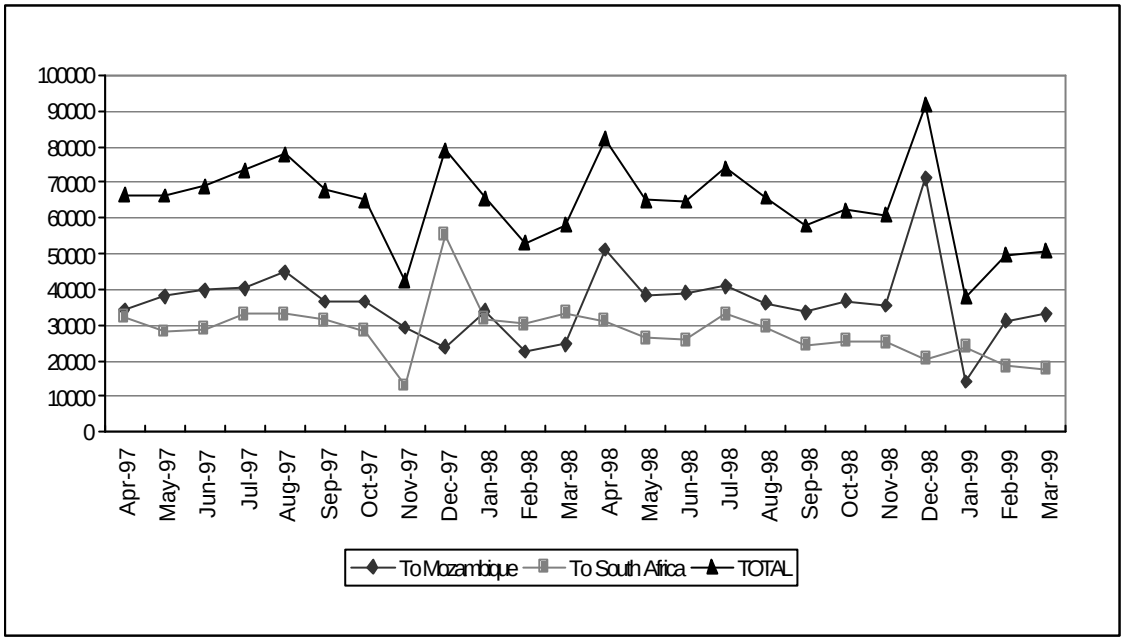
It might be tempting to conclude that the dramatic (but temporary) jump in the average number of vehicles per day in December 1997 and early 1998 can be explained by holiday traffic. However, as Figure 7 shows, there was no corresponding increase in the number of passengers travelling from South Africa to Mozambique in those months (although there was a jump in the number of passengers travelling to South Africa in December 1997, and a jump in the number as passengers travelling to Mozambique in December 1998.)

Figure 6: Average number of vehicles going through the Lebombo border post per day, April 1997-May 1999



Source: Based on data from SARS

Figure 7: Number of passengers going through the Lebombo border post per month, April 1997-March 1999



Source: Based on data from SARS

Based on these figures from SARS, the average number of passengers per vehicle over the whole time period was 2.3. The average number of passengers per vehicle in the 1997 survey done by Kennedy et al. (1998) was 3.9.

Table 3 shows a breakdown of the people that moved through the border post in May 1999, based on statistics from Mozambique.

Table 3: Movement of people through the Ressano Garcia border post by road, May 1999

Category	Into Moz	Out of Moz	Total
Mozambicans resident in Moz	6 722	11 152	17 924
Mozambicans resident outside Moz	1 542	3 084	4 626
National diplomats resident in Moz	3 437	998	4 435
National diplomats resident outside Moz	19	65	84
Miners	16 770	19 161	35 931
National repatriates from outside	4 762		4 762
Foreigners resident in Moz	3 208	2 145	5 353
Foreign diplomats resident in Moz	192	153	345
Foreign diplomats resident out of Moz	7	3	10
Foreign repatriates		16	16
Border facilities of nationals	2 511	2 511	5 020
Border facilities of foreigners	709	709	1 418
TOTAL	**45 690**	**45 221**	**90 911**

Source: Mozambican National Directorate of Migration (Direcção Nacional de Migração, 1999, *Relatório sobre o movimento migratório na Provincia de Maputo no posto de Ressano Garcia*.)

Miners make up by far the largest category, followed by Mozambicans resident in Mozambique.[8] Anecdotal evidence suggests that large numbers of Mozambicans travel to Mpumalanga, and particularly Nelspruit, to shop.

It seems that passenger flows by rail are much smaller than passenger flows by road between South Africa and Mozambique. Table 4 shows the number of passengers per month on the Interpax Passenger Train between Maputo and Johannesburg in 1998.

The railway journey takes 17 hours each way, and makes 28 stops between Maputo and Johannesburg, according to Spoornet's timetable (Spoornet website 1999). According to CFM, the majority of passengers (between 77% and 86%) are small scale traders or businesses, attracted by the relatively cheaper tariffs offered for this kind of transport. For CFM, passenger transport earns much less revenue than transport of goods. In fact, passenger transport is cross-subsidised by revenue from transport of goods.

Table 4: Passengers on the Interpax Passenger Train between Maputo and Johannesburg, 1998

	No. of passengers
January	3 734
February	3 037
March	2 972
April	3 724
May	3 417
June	2 924
July	2 277
August	1 902
September	2 228
October	1 986
November	1 974
December	3 219
TOTAL	**33 394**

Source: Railway Directorate, Traffic Department, Statistical Section, CFM, June 1999

[8] Although it is not clear to what extent this is a consistent pattern, from month to month.

5. The impact of the MDC on freight flows

Originally, the focus of this study was going to be more narrowly on freight transport costs along the Maputo corridor route, and how these would change as a result of the infrastructure upgrades that form part of the MDC. We hoped that this would enable us to say something about the likely impact of the infrastructure upgrades on investment patterns. However, three things became clear. Firstly, with much of the infrastructure not yet in place, detailed calculations of transport costs would be premature and would not yield definite answers. Secondly, the information needed to make such calculations is not necessarily available.[9] Thirdly, even if one could say with certainty how transport costs for various goods would be affected, it may still not be possible to say anything about the aggregate impact of the infrastructure upgrades on investment patterns, because there are a number of wider factors involved. These wider factors are arguably more important than the direct impact of the infrastructure upgrades on transport costs, in determining the impact of the MDC.

The discussion below looks at some of the factors that influence road freight transport costs along the Maputo corridor (since the road is the part of the corridor's infrastructure that is most developed), and then at some of the broader factors which influence the impact of the MDC.

5.1 Road freight transport costs

Road freight operators face a variety of costs. According to the Road Freight Association in South Africa, the main fixed costs are capital and finance for vehicles, depreciation, insurance, staff, administration, licences, and scheduled maintenance. The main variable costs are fuel, lubricants, variable maintenance, and tyres. For light delivery vehicles, the biggest contributors to total costs are staff and vehicle costs. These vehicles would seldom be used for long-distance journeys. For heavy vehicles, diesel and staff costs are the biggest contributors to total costs.

The upgraded Witbank-Maputo road will undoubtedly be a better road than the old road, and it will be 20km shorter. These two factors together will make the journey time shorter, and reduce costs such as fuel and maintenance costs.

Once the new streamlined border post is in place, the journey time will be further reduced. In addition, the 24-hour border post will allow more flexibility in planning trips, and may allow for additional trips to be made. There will also be less directly calculable cost savings, for example from improved security along the road in the form of patrols and SOS phones. For fragile cargo, such as fruit and bottles, the better quality road will mean less chance of damage – another cost saving.

However, in return for all these benefits, users of the route now have to pay tolls. Table 5 shows the toll tariffs at the three toll plazas in South Africa. (Note that local residents and commuters are eligible for discounts.) The toll tariffs at the toll plazas in Mozambique have yet to be decided on.

Table 5: Toll tariffs for normal users on the Witbank-Maputo toll road

Toll plaza	Class 1	Class 2	Class 3	Class 4
Middelburg	R20.00	R40.00	R60.00	R80.00
Machado	R30.00	R80.00	R120.00	R170.00
Nkomazi	R21.00	R44.00	R65.00	R92.50
Total	**R71.00**	**R164.00**	**R245.00**	**R342.50**

Class 1: Light vehicles (cars and bakkies, including trailers and caravans)
Class 2: Medium heavy vehicles
Class 3: Large heavy vehicles
Class 4: Extra large heavy vehicles

Source: Information supplied by TRAC

[9] The World Bank has recently undertaken a study on transport costs along eight corridors in SADC, and has found that there are significant data gaps that "need to be at least partially covered to arrive at meaningful conclusions in the analysis" (*Freight and Trading Weekly* 1999).

As can be seen, the toll tariffs are substantial. A heavy vehicle travelling the whole route has to pay R342.50 at the moment, and this will increase once the last two plazas are opened. Is this increase in costs compensated for by the cost savings that result from an improved road and decreased journey times? Reactions of road users to the new tolls may provide some insight.

Figures from TRAC show that the opening of the first two toll plazas led to substantial reductions in the number of vehicles using the road. At Middelburg, the average number of heavy vehicles per day during the 20 weeks before the toll plaza opened in December 1998 was just over 2 100. This has dropped to approximately 1 000, with no sign of an upward trend towards previous levels.[10] At Machadodorp, the average number of heavy vehicles per day during the 46 weeks before the toll plaza opened in May 1999 was approximately 1 400. This has dropped to approximately 900. (It is too soon to tell whether there is an upward trend towards previous levels.) The numbers of light vehicles going through both toll plazas also decreased, but less dramatically.

According to an engineer at TRAC, only about 2% of the decrease in traffic is due to trip suppression (in other words, to fewer trips being made), and most of this will be for light vehicles. Most of the decrease in traffic is accounted for by trip diversion, in other words, by vehicles taking different routes in order to avoid the toll plazas.

There are two types of trip diversion: local and long distance. For long distance trips (for example, between Johannesburg and Maputo), trip diversion options are limited. Vehicles could take the N17 (south of the N4 Witbank-Maputo road), but that involves going through Swaziland. Another option is the R38, also south of the N4, which rejoins the N4 east of Nelspruit, and so would only result in partial avoidance of the tolls. The R38 also involves travelling over several mountain passes. Local trip diversion options are more attractive at Middelburg than at Machadodorp, and least attractive of all at the Nkomazi toll plaza, where there has apparently been almost no reduction in traffic subsequent to the opening of the toll plaza.

Unsurprisingly, it seems that the extent of the decrease in traffic at the toll plazas is related to the attractiveness of alternative local routes around each toll plaza. What is not clear is whether long distance freight operators are avoiding the plazas by taking local alternative routes and then rejoining the N4 in-between the toll plazas.

However, whether freight operators are avoiding the toll plazas or not does not necessarily tell us anything about whether the costs of the tolls are being compensated for, since of course road users who are not used to paying tolls on a particular route are not going to be happy about the introduction of tolls on that route. The extra cost of the tolls may be felt more directly than cost savings from improved quality of the road. Also, this is the first time in Southern Africa that there are tolls that reflect the full cost of the investment in and maintenance of road infrastructure. Tolls on other roads, including notably the N3 between Johannesburg and Durban, are still subsidised (in other words, the toll tariffs are not designed to cover the full cost of road building and maintenance).

When the toll plazas in Mozambique open, the tolls may be resented less there because the improvement in the quality of the road will be more dramatic. Mozambican companies interviewed seemed to think that the improvements in the quality of road and the accompanying benefits would compensate for the cost of the tolls. Companies suggested that a better road, combined with the new border post, would enable them to make more trips and increase their turnover, which would in turn enable them to absorb the cost of the tolls. (The research did not attempt to deal with the potential reactions of local residents in Mozambique).

[10] The exact figures are obviously sensitive information from TRAC's point of view, and TRAC requested that they not be included here.

According to the South African Road Freight Association (RFA), approximately 70% of the cost of the tolls is compensated for by improved quality and reduced journey times. Also, according to the RFA, for an average 30-ton payload, the tolls add approximately 18% to the cost of the journey between Johannesburg and Maputo. The road freight industry is a highly competitive one in South Africa. Some members of the RFA are passing on the full cost of the tolls to their customers (in effect billing their customers directly for the tolls, in spite of cost savings due to the improved quality of the road). It is not clear whether all operators are doing this. Over time, because of competition between operators, any net increases in cost resulting from the tolls might be absorbed by the operators.

Apart from diesel and staff costs (mentioned earlier as the major contributors to the cost of a long distance journey), there is a further factor that can have a substantial impact on the costs of a road freight operator in relation to revenue. This factor is the extent of backhaul opportunities, in other words, the extent to which trucks can carry loads in both directions. At the moment, trucks often carry a load from South Africa to Mozambique, and then return empty. Only one half of the journey generates revenue for the freight operator.

This is obviously partly a reflection of the economic relationship between the two countries. As the Mozambican economy develops, there will no doubt be increased opportunities for carrying revenue-generating loads in both directions. However, it is also a reflection of the fact that port of Maputo is not used to import goods into South Africa. If some of the goods that are currently imported through the Durban port were to be imported through the container terminal at the Maputo port, this would provide a ready supply of return loads for road freight operators.

It should be noted that there is a concern amongst Mozambican freight companies that South African road operators may start operating in Mozambique, and with greater financial and other resources at their disposal, displace Mozambican operators. For example, at the moment, small Mozambican operators play a role in transporting goods from the road terminal to their final destinations. Once the road is improved, South African companies may choose to take goods to their final destination in Maputo, rather than just to the terminal.

Overall, there can be no doubt that the combined effect of the upgraded Maputo corridor road and the new border post will make the journey between Maputo and Johannesburg quicker, safer, and less wear-and-tear-inducing. Initially, this might be accompanied by somewhat increased road freight costs as a result of the tolls. However, assuming that increased efficiency and reliability will lead to increased volumes in both directions over time, the longer-term impact is likely to be a decrease in freight transport costs along the route. Because of the competitive nature of the road freight industry, it is likely that these cost savings will be passed on to customers.

5.2 Broader factors

Arguably more important than direct transport costs along the MDC are a number of broader factors that will influence the impact of the corridor. These include:

- the price of the tolls on the N3 to Durban;
- how the port of Maputo fits into global shipping networks;
- the evolution of the port system on Southern Africa's east coast.

Firstly, it is important to understand that when it comes to imports to and exports from South Africa, the Maputo corridor route is in many ways a competitor with the route between Johannesburg and the Durban port. The "captive hinterland" of the Maputo port is small – it does not extend much beyond Mpumalanga. Beyond that, the distance to Maputo and the distance to Durban start to equal out. However, even though Maputo is physically slightly closer to Gauteng than Durban is, the travelling time to Maputo is still greater. According to the Road Freight Association, a return journey to Maputo takes 18 hours, compared with 14 hours to Durban and back. But the 18 hours to Maputo includes two hours at the border post each way, so once the new border post is in place, and the road upgrade is completed, the journey time to Maputo will compare much more favourably with the journey time to Durban. (It will still be a while though before this happens.)

At the same time, the tolls on the N3 to Durban are set to increase. As noted earlier, these tolls are currently at subsidised levels. However, in May 1999, a concession for upgrading the N3, similar to the Witbank-Maputo toll road concession, was signed with a company called N3TC. It will take a couple of years for the new tolls to come into effect, but once they do, "then you can start to compare apples with apples", as one interviewee put it. This will provide a further boost for the Maputo corridor route.

Another major factor in this contest between Maputo and Durban is the state of their respective ports. The port of Durban is congested (and its expansion is physically constrained by lack of land), but its size means that it is better connected into global shipping networks that the port of Maputo. Far more shipping lines call far more regularly at the Durban port than at the Maputo port. As explained in Section 3, there is a chicken-and-egg situation involved here. Unless more cargo comes to the Maputo port, shipping lines will be reluctant to call there; unless more shipping lines call, cargo owners will be reluctant to send their cargo there.

However, even without the chicken-and-egg problem, it would not be easy for the Maputo port to compete with Durban for shipping lines, because of the nature of the global shipping system. Over the last decade at least, the trend in world shipping has been towards a hub-and-spoke system. In the past, container ships would call at all ports along a particular route. With increasing ship sizes and other changes in the shipping industry, it now makes more sense for ships to call at one port along a coastline (the so-called hub port), and for goods to be transhipped from there to the smaller ports along the coastline (the so-called feeder ports). Although for various reasons this hub-and-spoke system has not been fully implemented in Southern Africa, it is only a matter of time before it is. Of the ports along Southern Africa's east coast, Durban seems the most likely candidate as a hub port for container shipping.

As Prof. Trevor Jones of the University of Natal explains, "At present Durban is the only South African container port with any remote pretension to hub status, and it is overwhelmingly supported by the carriers as the choice for future terminal expansion. … The carriers strongly favour the concentration of their eastern seaboard southern African activities in a single port, and even more strongly oppose a split of mainstream container-handling facilities across neighbouring ports such as Durban and Richards Bay, thereby requiring two port calls within a 100 nautical mile range" (quoted in *Freight and Trading Weekly* 1998).

It seems that the port of Maputo's status as a niche port for bulk goods from Mpumalanga is secure. Growth areas for the port are seen in "its traditional exports of coal, sugar, citrus and fertiliser" (SA Transport Business Special 1997: 17). The dominant transport mode for these goods will probably remain rail, because of the nature of the goods. The picture for container traffic is far more open-ended, and yet vital in determining the overall impact of the corridor. As discussed in Section 5.1, one of the most significant ways of reducing road freight costs along the Maputo corridor route is increased opportunities for return loads, and this will depend crucially on the level of imports destined for Gauteng (or other inland locations) that come through the Maputo port.

For both road and rail freight, it is important to have all the links in the logistics chain in place before the full benefits of reductions in costs and improvements in efficiency can be felt. If the border post is not functioning properly, or if the port has not been dredged, the full impact of the corridor is not going to be felt. The link between the railway line and the port is already strong, since most of the rail traffic is destined for export through the port. Most of the road freight transported along the corridor at the moment is not linked to the port. However, without port facilities being in place, there is no real chance of developing a strong relationship between road freight and the port, for imports or exports.

A common view expressed was that once the new border post is in place, once general port services at the port of Maputo are in place, *and* once the new higher tolls on the N3 are in place, then the Maputo corridor route will begin to emerge as a real alternative to the Johannesburg-Durban route, for imports

and exports. However, the consolidation of shipping lines around a single hub port along the east coast of Southern Africa may mean that the Durban port is further strengthened in relation to Maputo in spite of this.

6. Conclusions and recommendations

To summarise briefly, there are currently two main freight flows along the Maputo corridor route: a bulk rail freight flow, consisting of goods from Mpumalanga destined for export through the Maputo port; and a road freight flow, consisting mainly of goods from Gauteng for domestic consumption within Mozambique. The improved quality of the upgraded road, combined with reduced journey times, is likely to lead to decreased road freight costs over time, in spite of the cost of the tolls on the road. The other major factor that will influence road freight costs is the extent of return haul opportunities. This will be affected by the growth of the Mozambican economy, and by the level of imports to South Africa through the Maputo port.

The role of the Maputo port as a niche bulk port for goods from Mpumalanga is secure. However, if the container terminal is to develop substantially, all the road- and border post-related infrastructure needs to be in place, and competition with the Durban port is involved. This takes place within the context of the move towards a hub port system on Southern Africa's east coast.

It is early days yet for the Maputo Development Corridor. Perhaps one of the main conclusions which emerges out of this research is that it is important to be realistic about time frames when one is thinking about the impact of development corridors in SADC. Four years since it was conceptualised, the MDC is certainly a reality and much has been achieved. However, there is a long way to go. This should not be seen as a failing, but it should tell us that large infrastructure investments take time, and that their impacts will not be felt overnight. The most rapid response to the MDC has come from a traditional area of strength along the corridor route: bulk exports from Mpumalanga. This is an area in which the MDC is re-establishing an old relationship rather than building a new one. Breaking new ground (for example, container imports to South Africa via the Maputo corridor) is proving more intractable.

A second conclusion is that the impact of the MDC will be partly determined by factors outside of the MDC itself, notably the future of the N3 to Durban and developments in international shipping, although there are probably others as well. For any development corridor, such "external" factors will exist. It is important to understand what they are, but there is no formula for working them out. They need to be examined on a case by case basis.

Thirdly, freight, vehicle and passenger movements may be useful indicators of impacts, and of wider factors at work. Ideally a regional freight database should be developed. However, given that developing such a database in South Africa is proving less than straightforward[11] this is an ambitious goal to say the least. There may be ways of collecting more systematic information on a corridor by corridor basis though.

Finally, this research raises questions about how one goes about studying the economic impact of a major initiative such as the MDC as it is unfolding. What should be the aims of our research at this stage? What data should be collected and monitored, and what can one expect to discover from it? To what extent are any findings generalisable to other corridors in the region? Answers to these questions are important from the point of view of both the MDC and other corridors in the region.

Does all of this tell us anything about the relationship between infrastructure and economic development?

[11] The CSIR (Transportek) and the South African Department of Transport are engaged in discussions about the possibility of establishing such a database for South Africa.

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Appendix

A: South African and Mozambican trade

Table 9: Mozambique's main trading partners, 1996

Exports	US$ (1000)	%
Spain	47.6	21.1
South Africa	43.8	19.4
India	26.8	11.8
USA	25.8	11.4
Portugal	17.5	7.7
Japan	17.2	7.6
Zimbabwe	9.8	4.4
Tanzania	4.0	1.8
Netherlands	3.5	1.5
Others	30.1	13.3
TOTAL	**226.1**	**100.0**

Imports	US$ (1000)	%
South Africa	259.7	33.2
Portugal	49.3	6.3
India	35.8	4.6
France	34.8	4.4
Italy	32.7	4.2
USA	32.6	4.2
Japan	31.0	4.0
Zimbabwe	30.8	3.9
Germany	20.7	2.6
UK	18.2	2.3
Others	237.0	30.3
TOTAL	**782.6**	**100.0**

Source: Instituto Nacional de Estatística. 1996. Estatísticas do comércio externo, exportações e importações.

Table 10: Mozambique trade with SADC, 1996

Exports	US$ (1000)	%
South Africa	43.8	73.4
Zimbabwe	9.8	16.5
Malawi	1.4	2.3
Angola	0.4	0.8
Mauritius		
Tanzania	4.0	6.6
Namibia		
Zambia	0.1	0.2
Swaziland	0.1	0.2
Botswana	0.0	0.0
Lesotho	0.0	0.0
TOTAL	**59.6**	**100.0**

Imports	US$ (1000)	%
South Africa	259.7	83.3
Zimbabwe	30.8	9.8
Malawi	10.7	3.4
Angola	0.0	0.0
Mauritius		
Tanzania	0.1	0.0
Namibia	0.3	0.1
Zambia	0.2	0.1
Swaziland	10.3	3.3
Botswana	0.0	0.0
Lesotho	0.0	0.0
TOTAL	**312.1**	**100.0**

Source: Instituto Nacional de Estatística. 1996. Estatísticas do comércio externo, exportações e importações.

Table 11: South Africa's main trading partners, 1991-1995 ($ billion)

	1991	1992	1993	1994	1995
Exports					
Italy	2.2	2.3	0.4	0.5	2.5
Japan	1.7	1.7	1.0	1.2	2.3
USA	1.6	1.6	1.1	1.2	2.1
Germany	1.7	1.8	0.9	1.0	1.7
UK	1.5	1.3	1.2	1.7	1.6
South Korea	0.0	0.5	0.4	0.5	1.1
Taiwan	0.5	0.9	0.6	0.5	0.9
Belgium-Lux.	0.6	0.7	0.7	0.7	0.9
Zimbabwe	0.5	0.5	0.5	0.7	0.9
China			0.2	0.2	0.6
Imports					
Germany	2.8	2.8	2.8	3.7	4.0
UK	1.8	1.8	2.0	2.5	2.9
USA	2.1	2.4	2.4	3.5	2.8
Japan	1.6	1.7	2.3	2.2	2.5
Italy	0.6	0.6	0.6	0.8	1.1
France	0.9	0.7	0.6	0.8	1.0
Taiwan	0.4	0.5	0.6	1.0	1.0
Hong Kong	0.5	0.6	0.3	0.4	0.8
China			0.3	0.4	0.6
Belgium-Lux.	0.4	0.4	0.4	0.5	0.6

Exports: CIF value at country of arrival, except USA
Imports: FOB value at point of departure
Source: Official SADC Trade, Industry and Investment Review 1998

B: Decline of Mozambican port and railway traffic from 1975

Table 12: National and international traffic in Mozambican ports, 1975-1992 (million tons)

	National traffic	International traffic	Total
1975	1.0	13.8	14.8
1976	1.0	10.8	11.8
1977	1.2	9.4	10.6
1978	1.9	8.2	10.1
1979	1.2	9.7	10.9
1980	1.6	8.3	9.9
1981	1.3	7.7	9.0
1982	1.4	7.5	8.9
1983	1.3	5.2	6.5
1984	0.9	4.6	5.5
1985	0.5	4.0	4.5
1986	0.6	3.6	4.2
1987	0.9	4.2	5.1
1988	1.1	4.6	5.7
1989	1.1	5.3	6.4
1990	1.1	4.2	5.3
1991	0.1	3.8	4.7

Source: Comissão Nacional do Plano, Informação estatistica sobre transporte e communicações, 1975-1984; Comissão Nacional do Plano, Informação estatistica sobre transporte e communicações, 1989; EIU, Mozambique Country Profile, 1994.

Table 13: Cargo carried by CFM, 1975-1994 (thousand tons)

	Total	National	Inter-national	CFM-South	CFM-Central	CFM-North
1975	13 380	2 174	11 216	9 838	2 928	439
1976	10 285	2 402	7 983	7 763	2 048	433
1977	9 126	2 197	6 929	6 839	1 799	367
1978	8 550	1 978	6 672	8 521	1 706	394
1979	8 880	2 073	6 807	6 849	1 519	476
1980	7 549	1 993	5 554	5 548	1 608	452
1981	7 769	2 409	6 358	5 482	1 816	434
1982	6 742	2 071	4 571	4 581	1 383	419
1983	4 396	1 256	3 100	3 466	485	392
1984	3 698	1 243	2 455	3 171	296	211
1985	2 837	690	2 217	2 521	307	49
1986	2 949	649	2 300	2 643	368	32
1987	3 210	1 326	1 883	2 334	482	385
1988	2 719	1 010	1 709	2 117	459	100
1989	3 757	1 413	2 344	3 044	832	74
1990	3 069	1 033	2 036	2 121	850	82
1991	2 182	806	1 376	1 385	689	89
1992	2 464	751	1 714	1 824	849	87
1993	2 917	891	2 107	1 903	982	129
1994	2 627	405	2 222	1 504	958	155

Source: USAID, Representação em Maputo. 1995. Um estudo sobre o movimento ferroviário em Moçambique.

C: Railway traffic in Mozambique

Table 14: Goods transported on the Ressano Garcia railway line, 1995-1997 (tons)

	1995	1996	1997
Into Moz			
Coal	474 083	943 986	949 272
Steel	8 840	3 560	8 000
Citrus	101 416	97 682	166 702
Vermiculite	0	9 472	3 256
Clinker	41 962	72 114	38 766
Containers	12 369	9 324	9 114
Cement	40 627	31 707	39 780
Various	110 534	58 106	30 678
Molasses			22 560
Sugar			2 898
Maize			18 647
Chrome			851
TOTAL	789831	1 225 951	1 290 524
Out of Moz			
Steel		1 120	2 240
Semea		6 192	7 792
Bentonite		6 320	7 288
Various	37 488	990	7 510
Vehicles			12 760
TOTAL	37 488	14 622	37 590

Source: CFM Traffic Section (Direcção dos Caminhos-de-Ferro de Mocambique, Departamento de Tráfego, Secção de Estatistica, CFM)

Table 15: CFM railway traffic

	CFM-South	CFM-Central	CFM-North	TOTAL
Tons 1997	1 954 700	748 100	171 900	2 847 700
Tons Jan-Sept 1998	2 247 400	559 700	195 500	3 002 600
Passengers Jan-Sept 1998	2 197 000	371 000	476 000	3 044 000

Source: *Savana*, 08.01.99, Incremento do trafego ferroviário nos caminhos-de-ferro de Moçambique. (*Savana* is a Maputo newspaper.)

Table 16: Railway distances between selected ports and cities in SADC (kms)

	Dar es Salaam	Beira	Maputo	Lobito	Nacala	Durban	East London
Zambia							
Lusaka	2 045	2 026	2 035	2 679		2 812	3 116
Ndola	1 993	2 334	2 353	2 361		3 130	3 434
Zimbabwe							
Harare		698	1 178			2 077	2 404
Bulawayo		1 181	1 061			1 859	1 921
Botswana							
Francistown		1 377	1 257			1 663	1 725
Gaberone		1 813	1 693*			1 409	1 289
Malawi							
Blantyre		567			840	3 342	3 669
South Africa							
Johannesburg			636			777	1 016

- This is via Bulawayo; via Johannesburg the distance is 1 268km.

Source: Fernando Jorge Cardoso, in: Instituto de Estudos Estratégicos e Internacionnais. 1991. *Africa Austral: O Desafio do futuro – intergração nacional e integração regional*. Lisboa, Portugal.

In spite of the longer distances involved, in 1998 85% of Malawi's international trade and 60% of Zimbabwe's international trade went via South African ports (Abrahamson & Nilsson 1998).

D: Port traffic in Mozambique

Table 17: Port traffic in Mozambique, Jan-Sept 1998

	Maputo	Beira	Nacala	Quelimane	Pemba	TOTAL
Tons	2 166 100	1 695 400	312 000	117 000	49 000	4 339 500
Containers (TEUs)	16 774	26 700	8 893	2 406	1 536	57 309

Source: *Savana*, 08.01.99, Incremento do trafego ferroviário nos caminhos-de-ferro de Moçambique. (*Savana* is a Maputo newspaper.)

Table 18: Cargo handled at the port of Lorenço Marques (now Maputo), 1940 to 1970

	Cargo handled (tons)
1940	1 772 638
1950	4 412 695
1960	5 806 634
1970	13 665 799

Source: Servicos dos Portos Camhinos-de-Ferro e Transporte. 1971. *Relatório de contas dos serviços de portos, camhinos-de-ferro e transporte, ano económico de 1969*. Lourenço Marques, Moçambique.

Table 19: Main goods handled at the port of Maputo, 1990-1998 (thousand tons)

Table 19a: Goods from South Africa

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Steel (a)	0	33	0	0	1	0	0	0	0
Asbestos	0	5	3	1	3	0	0	0	0
Vermiculite (b)	0	0	0	0		0	15	5	0
Coal (MCMYLER)	204	245	57	144	112	280	564	130	235
Alloys	0	7	0	0	0	0	0	0	0
Coal (Matola) (c)	257	137	94	267	369	113	453	672	1 020
Steel sheet	0	0	0	0	0	0	0	3	0
Potassium	0	0	0	0	0	0	0	1	0
Citrus (d)	91	52	41	0	55	92	103	128	72
Ferrochrome (e)	0	0	0	0		0	0	2	0
Manganese	0	0	0	0	0	0	0	0	0
Granite (f)	0	0	0	0	1	0	0	0	0
TOTAL	**552**	**479**	**195**	**412**	**541**	**485**	**1 135**	**941**	**1 327**

(a) The prospective client is Highveld Steel in Middelburg.
(b) The main client is the Phalaborwa Mining Company.
(c) The main clients are Glencore SA, Benicom, and TCM.
(d) The main client is Outspan International.
(e) The main client is the Phalaborwa Mining Company in Witbank.
(f) The principal clients are Kudo Granite, Maricana Granite and Monaco Granite, all in Rustenburg, and Marlin Granite of Belfast and Machadodorp.

Source: Commercial Directorate of CFM (Direcção Comercial dos Caminhos de Ferro de Moçambique. 1999. *Informação estatistica sobre o movimento ferroviário nos caminhos-de-ferro de Moçambique Sul*.)

Table 19b: Goods from Zimbabwe

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Potassium	0	0	0	0	0	0	0	0	2
Scrap iron	0	0	0	0	14	0	0	0	0
Steel	93	67	127	108	14	0	10	1	4
Sugar	157	0	0	0	0	123	134	163	118
Alloys	18	10	0	0	1	0	0	0	0
Asbestos	19	6	1	13	0	3	0	0	0
Granite	0	0	2	5	0	0	0	0	0
Chrome ore	0	0	0	0	0	0	12	0	0
Coal	0	0	0	0	191	318	148	257	113
Ferrochrome	0	0	0	0	138	213	222	221	203
Maize (export)	0	0	0	13	106	0	0	0	0
Soya (grant)	0	0	79	0	0	0	0	4	0
Rice (grant)	0	0	0	0	0	0	0	4	0
Maize (grant)	0	0	198	102	0	0	9	0	0
Manure	0	0	0	0	0	0	0	12	0
Sulphur	0	0	0	0	2	0	0	0	0
Steel sheet	0	0	0	0	0	0	0	2	0
Livestock	0	0	0	0	4	5	2	1	11
Wheat (grant)	0	0	0	0	0	90	59	67	10
TOTAL	**287**	**83**	**407**	**241**	**470**	**752**	**596**	**732**	**461**

Source: Commercial Directorate of CFM (Direcção Comercial dos Caminhos de Ferro de Moçambique. 1999. *Informação estatistica sobre o movimento ferroviário nos caminhos-de-ferro de Moçambique Sul*.)

Table 19c: Goods from Swaziland

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Sugar	182	6	0	0	0	130	221	205	194
Coal	151	50	63	0	0	0	0	0	0
Citrus	3	3	0	4	12	13	12	13	6
Molasses	81	58	51	39	71	29	68	73	49
Pulp	11	11	34	62	51	24	0	0	0
Wheat	0	0	0	0	3	16	2	0	0
TOTAL	**428**	**128**	**148**	**105**	**137**	**212**	**303**	**291**	**249**

Source: Commercial Directorate of CFM (Direcção Comercial dos Caminhos de Ferro de Moçambique. 1999. *Informação estatistica sobre o movimento ferroviário nos caminhos-de-ferro de Moçambique Sul*.)

Table 19d: Goods from Zambia

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Sugar	0	0	0	0	0	0	26	12	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**26**	**12**	**0**

Source: Commercial Directorate of CFM (Direcção Comercial dos Caminhos de Ferro de Moçambique. 1999. *Informação estatistica sobre o movimento ferroviário nos caminhos-de-ferro de Moçambique Sul*.)

Table 19e: Goods from Botswana

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Wheat	0	0	0	0	0	0	2	0	0
Vehicles	0	0	0	0	0	0	0	S/Inf.	17
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**17**

Source: Commercial Directorate of CFM, Maputo