An Empirical Evaluation of Trade Potential in Southern African Development Community

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Research Consortium. The findings, opinions and recommendations are those of the author, however, and do not necessarily reflect the views of the Consortium, its individual members or the AERC Secretariat.

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Abstract

This paper attempts to estimate the trade potential expected from the Southern African Development Community Free Trade Area (SADC FTA). Specifically, the study investigates what the southern African countries stand to gain by way of increases in intra-regional trade if all trade barriers are removed. In order to assess the trade potential compared to its current level, a gravity model has been estimated. Results show that the observed intra-regional trade is lower than its potential. The results suggest that there is trade potential in the sub-region. There is no question that an FTA will enhance the prospects for increasing intra-regional trade. The results are in agreement with Evans (1997), who found that the FTA is likely to lead to trade creation, and also the African Development Bank (1993) whose results found that there is considerable potential for the non-Southern African Customs Union (SACU) countries to switch supply from developing countries to South Africa. The results, however, differ with Chauvin and Gaullier (2002) and Cassim (2001) whose results indicated that SADC trade potentials are rather small, especially for South African exports. They also differ with Elbadawi (1997) whose results indicate that SADC did not have a significant effect on trade among its members.

JEL classification: F13, F14, F15

Acknowledgements

1. Introduction

The advent of globalization has sparked renewed interest in regionalism in Africa amidst fears of African marginalization. Africa is a relatively insignificant player in global trade. African countries believe that their coming together under a regional body would be an effective means of asserting their economic independence. There is also consensus that developing countries have a great deal to gain from free trade (Kruger, 1999; Tangermann and Josling, 1999; Huff, 2000). Regional integration in Africa has been seen as a vehicle for promoting trade and securing economies of scale and market access, and pave way for sustainable growth and development (Ogunkola, 1998).

Africa is home to 11 economic blocs, which include the Southern African Development Community (SADC), the Common Market for Eastern and Southern Africa (COMESA), and the Economic Community for Western African States (ECOWAS). However, progress on African regional integration has been slow due to a number of factors including dual memberships, lack of authority and bureaucratic obstacles in dealing with bigger powers, and political instability in some countries (Chauvin and Gaullier, 2002). The New Partnership for Africa's Development (NEPAD) is premised on the building of intra-regional trade blocs as a stepping stone towards an integrated African community.

The SADC[1] Trade Protocol was signed in August 1996 but only came into effect on 1 September 2000. The agreed tariff schedule is to have 85% of intra-SADC trade[2] at zero tariffs by December 2008, and the remaining 15%[3] to be liberalized by 2012.

Research problem

The Southern Africa Development Community (SADC) is one of the richest regions in Africa. The participation of South Africa, the largest economy on the continent, provides the basis for successful cooperation. The SADC Free Trade Area (FTA) is intended to act as a catalyst for increased regional integration and to facilitate trade and investment flows within the region (Chauvin and Gaullier, 2002).

A number of protocols have been implemented under SADC with a positive effect on trade liberalization. The protocols span a wide spectrum of areas of cooperation among its member states, including infrastructure and services (the Protocols on Energy and Transport Communications), economic and industrial policy (the Protocols on Mining, Trade and Finance and Investment), and political cooperation. The trade protocol has concentrated on relaxing the supply-side constraints to trade through regional cooperation in various sectors as diverse as infrastructure, agriculture, transportation and financial sector. About half of the SADC members use the automated system for customs data.

About seven years have passed since the SADC FTA was put into operation, and thus an assessment in predicting trade potentials is highly important. A critical question that arises in discussions on regional integration in southern Africa relates to what trade potential can be expected from the establishment of a free trade area (FTA) among SADC countries.

Justification of the study

A limited number of studies have emerged in the past few years, assessing trade potential in southern Africa (Chauvin and Gaullier, 2002; Cassim, 2001; UNCTAD, 1998; and Evans, 1997). Empirically, there has not been any consensus on the level of trade potential in SADC. Whereas Cassim (2001) and UNCTAD (1998) show that trade potential is increasing, Chauvin and Gaullier (2002) and Evans (1997) indicate that the trade potential in SADC is marginal. The problem with these papers is their inability to estimate trade potential resulting from the SADC FTA, which came into operation in 2001. While the study by Chauvin and Gaullier (2002) was conducted a year later, the time frame was too short to come up with firm results on the extent of trade potential. Therefore, this study attempts to addresses this research gap with more recent data.

As a departure from previous studies, this study uses a group of comparator countries. Thus, we will include in the model - apart from SADC countries - countries that are at a similar level of development with SADC countries and countries that have made significant progress with intra-regional trade liberalization. This is aimed at comparing the relative performance of intra-regional groupings. Unlike previous studies by Chauvin and Gaullier (2002) and Cassim (2001) who used Ordinary Least Squares (OLS) to estimate trade potential in SADC, we use Tobit maximum likelihood estimate. This estimator treats zero or missing/unrecorded trade flows as unobserved data points. Unfortunately, OLS, in this case, is not an appropriate estimator as it would be biased and inefficient. This methodology differs from studies by Chauvin and Gaullier (2002) and Cassim (2001), who used OLS for estimating trade potential.

Objectives of the study

The main objective of this study is to estimate trade potential expected from the SADC FTA using a gravity model. Specifically, this study attempts to:
(i)   Calculate the trade potential among SADC member nations.
(ii) Examine the gaps between potential and actual trade among member countries.
(iii) Make recommendations to guide policy makers, based on the major findings of the study.

In order to assess the trade potential compared with its current level, a gravity model has been estimated.

2. An overview of Southern African Development Community (SADC)

The Southern African Development Community (SADC) evolved out of the Southern African Development Coordination Conference (SADCC). The participation of South Africa in 1994 enhanced the viability of the SADC as an economic community.

Currently, SADC encompasses 14 members, namely: Angola, Botswana, DRC Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Zambia and Zimbabwe. Some members of SADC - South Africa, Botswana, Namibia, Lesotho and Swaziland - belong to the Southern African Customs Union (SACU), which is both a customs union and a common monetary area, with the lead currency being the rand.

SADC is currently one of the strongest regional economic communities (RECs) in Africa by country gross domestic product (GDP). SADC represents a population of over 230 million people.

Institutional framework for regional integration

SADC has committed itself to an ambitious project of regional integration. The SADC Free Trade Area is a product of the SADC trade protocol. A 15-year Regional Indicative Strategic Development Plan (RISDP) was adopted in 2003. In March 2004, the SADC Executive Secretary announced a strategic plan that sets out a time frame for the economic integration of the region.

Trade facilitation in SADC

SADC has undertaken numerous trade facilitation initiatives. Trade facilitation can be defined broadly as encompassing the environment in which trade transactions take place. According to the World Trade Organization (WTO, 1990), trade facilitation is "the simplification and harmonization of international trade procedures", where trade procedures are the "activities, practices and formalities involved in collecting, presenting, communicating and processing data required for the movement of goods in international trade". The United Nations Conference on Trade and Development (UNCTAD, 1998) defines trade facilitation as "the simplification, standardization and harmonization of procedures and associated information flows required to move goods from seller to buyer".

Among trade facilitation initiatives that SADC has undertaken are simplifying and

harmonizing trade-related (customs) procedures, and documentation such as certificates of origin, producer's declaration form for verification of origin, cargo manifest for overland traffic, certificate of authorization of the transport mode, and customs transit inspection reports.

There are also corridor trade facilitation initiatives in SADC, which include Dar es Salaam corridor, Trans-Kalahari corridor, Maputo corridor, North-South corridor, and reduction of corridor transit times and transaction costs.

A lot of work still has to be done in trade facilitation. There is outstanding work on the harmonization of sanitary and phytosanitary measures, which are critical for trade in agricultural products. The experience of many African land-locked countries in SADC, such as Malawi, the Democratic Republic of Congo, Lesotho, Swaziland, Zambia and Zimbabwe (where the margin between c.i.f. and f.o.b. can be as much as 50%) is a clear example of the savings that can be made from improvements in transport networks in Africa.

Tariff reduction schedule

Various studies have been done relating to the determination of tariff reduction schedules, rules of origin[4] of goods and services, the elimination of non-tariff barriers, as well as harmonization of customs and trade documentation and dispute settlement mechanisms.

Tariff phase down is based on a variable geometry, taking into account the asymmetrical level of development in member states. South Africa, which is the most developed member, agreed to lower tariffs on intra-regional imports on the fastest schedule, while less developed members such as Malawi, Mozambique and Zambia are to do so on the slowest schedule.

There is serious back-loading of tariff reductions (see Table 1). For example, by the end of the fourth year of liberalization (2004), Southern African Customs Union (SACU)[5] effected only 47% of its liberalization of SADC imports. Tanzania, Zimbabwe and Zambia would have offered 32%, 39% and 37%, respectively, to other SADC partners' imports (excluding South Africa). The picture is even worse in the case of Malawi, Mauritius and Mozambique's commitments to other SADC partners' imports (excluding South Africa) ranging only 12%, 7% and 9%, respectively.

Table 1: Proportion of liberalization achieved (%)

	2004		2008	
	Offer to RSA	Offer to SADC	Offer to RSA	OffertoSADC
SACU	N/A	46.8	N/A	99.5
Malawi	1.0	12.0	70.4	60.0
Mauritius	26.4	7.4	70.4	72.5
Mozambique	9.2	8.7	62.7	76.3
Zambia	18.5	38.7	62.7	76.9
Zimbabwe	18.6	37.4	68.3	57.7

Source: SADC Trade Project (2004)

The back-loading of tariff reductions as well as reports that some member states are lagging behind their implementation commitments remain a serious shortcoming that should be addressed, especially if the RISDP stated goal of the establishment of a

customs union by 2010 is to be achieved.

Non-tariff barriers

The SADC Committee of Ministers responsible for trade matters agreed in November 1999 to immediately eliminate the following core non-tariff barriers (NTBs): cumbersome customs procedures and documentation; cumbersome import licensing/permits; cumbersome export licensing/permits; import and export quotas; and unnecessary import bans/prohibitions. The following NTBs were also to be gradually eliminated: Restrictive charges not within the definition of import or export duties; restrictive single channel marketing; prohibitive transit charges; cumbersome visa requirements; and, restrictive technical regulations.

Anecdotal evidence suggests that no significant progress has been made to eliminate such NTBs. Many countries continue to introduce new NTBs. These barriers include quantitative restrictions on certain imports such as agricultural imports (maize, wheat, dairy products), automatic import licensing system. Other NTBs relate to surcharges on imports; customs documentation and related procedures; border-related controls and transportation of goods and persons; foreign exchange bottlenecks, which tend to discourage trade transactions; delays in payments; and clearance and settlement systems (Chauvin and Gaullier, 2002).

Potential gains and losses of Economic Integration in Southern Africa

Gains expected from the SADC Free Trade Area

Intra-regional trade was estimated at about 9% of total trade in 2000. The figure stood at roughly 10% by 2003 and is expected to increase further by the time the FTA is fully implemented. Several gains are expected from the SADC FTA. Chauvin and Gaullier (2002) identify several potential benefits of the FTA for the smaller countries of SADC:
(i)   Access to an enlarged market, which can foster economic growth because of economies of scale in domestic production.
(ii) Increased competition and hence opportunities for improving efficiencies. While exposure to South Africa competition will inevitably eliminate some production, more efficient firms will improve productivity and output. Moreover, exposure to South Africa competition will help prepare smaller countries for greater integration into the world economy by enhancing both quality and productivity, and thereby competitiveness (Jenkins, 2001).
(iii) Increased intra-regional trade along with inflows of foreign capital (mainly South African) can help to boost industrial development and diversification of the export base. The smaller countries are likely to benefit from South Africa's more advanced technological knowledge.
(iv) Besides smaller members, South Africa can have increased market share and development of new markets especially for manufactured goods in SADC.

Possible constraints and drawbacks to intra-regional trade in SADC

The establishment of the SADC FTA may raise concerns, as it will entail some costs. Thus, the distribution of costs and benefits has to be outlined.

i.   Customs revenue represents a significant source of government revenue for most of the SADC members. For almost all member countries in SADC, revenue from trade taxes is at least 10% of total government revenue. In Zambia and Malawi, import duty collections after full implementation of SADC free trade are predicted to fall by 66% and 50%, respectively, relative to what they would be in the absence of the protocol and of any other reductions in import tariffs. Zimbabwe and Mozambique are predicted to face reductions of 42% and 34%, respectively. The decreases in Mauritius, Tanzania and SACU will be much lower, only 24%, 12% and 4%, respectively, of customs revenues.

     From a broader economic policy perspective, however, the problems are much less serious than they might appear to a customs collector. SADC member states generally rely, to a relatively small and shrinking extent, on import duties as a source of government revenue. For instance, the import duty losses in Zambia, Malawi and Zimbabwe due to full implementation of SADC free trade represent reductions of only 9%, 8% and 7%, respectively, in total government revenues. In Mauritius and Mozambique, the reductions are only 8% and 5% of government revenues, respectively, and in Tanzania and SACU only 1.6% and 0.1%, respectively. Besides, the revenue reductions due to the trade protocol will be more than balanced by the positive revenue impacts of normal economic growth, especially in the early stages of implementation.

ii. Another important issue is that over time, the rules of origin in SADC have become restrictive and product-specific under pressure from member states. The fact that negotiations on the rules of origin are going on in some sectors is probably indicative of a lack of political commitment to liberalization. The complicated and restrictive rules of origin are likely to increase administrative costs and will make it difficult for exporters to take advantage of SADC preferences.

iii. While the agreement calls for elimination of non-tariff barriers (NTBs) and the liberalization of services trade, not much progress has been made in either of these areas. The non-tariff barriers hinder the normal course of transactions and, in particular, cross border transport of goods. There is no institutional mechanism for reporting NTBs or resolution of disputes, while the liberalization of services is a futuristic provision.

iv   The basic conditions of infrastructure (physical, institutional, socio-political, human) with which firms exploit technology are lacking in the SADC region. In the SADC region, the poor state of infrastructure has been the major obstacle to investment. The availability of telecommunication facilities is just part of the problem; for example,

in Malawi, only about 350 international telephone calls can go through at any one time, and e-mail and internet services are only found in a few areas. Generally, the rates charged for communication are often higher in SADC countries than in OECD and other African countries. The reliability of the communication systems and other infrastructure is yet another problem (Ndlela, 2002).

In face of these various issues, regional trade liberalization should be accompanied with a broad policy aimed at helping reap all the benefits of trade liberalization (insofar as inconsistencies between macroeconomic policies and trade regimes might undermine liberalization). In this respect, there is a need for SADC governments to adopt national macro and micro policies that are consistent with promoting trade and investment.

Economic structure and trade patterns in SADC

SADC countries, just like the rest of sub-Saharan African countries, enjoyed strong economic performance in the past decade, thanks both to favourable external conditions and improved domestic policies (see Table 2). In 2008 and 2009, however, the global environment deteriorated. Between 2003 and 2008, sub-Saharan Africa's output grew annually by some 6.0% – the highest in decades. Growth in the region is in some ways more persistent than in the previous decade. The fast growers include resource-rich countries such as Angola and Mozambique. Most of those that are getting ahead have achieved macroeconomic stability, including stable and low inflation and debt sustainability, pursued sound economic policies, and reinforced their institutions.

Table 2: Real GDP growth rate (%)

	1997-2001	2001	2002	2003	2004	2005	2006	2007	2008
Angola	4.8	3.1	14.4	3.4	11.2	20.6	18.6	20.3	13.2
Botswana	6.2	5.2	5.0	6.3	6.0	1.6	5.1	4.4	2.9
Lesotho	1.4	3.3	4.5	3.9	4.6	0.7	8.1	5.1	3.5
Malawi	1.6	-4.1	2.1	5.7	5.4	3.3	6.7	8.6	9.7
Mozambique	9.2	13.0	7.4	6.5	7.9	8.4	8.7	7.0	6.8
Namibia	3.3	2.2	2.5	4.3	12.3	2.5	7.1	5.5	2.9
Zambia	2.4	4.9	3.3	5.1	5.4	5.3	6.2	6.3	5.8
Swaziland	2.9	1.7	2.8	3.9	2.5	2.2	2.9	3.5	2.4
South Africa	2.5	2.7	3.6	3.1	4.9	5.0	5.3	5.1	3.1
Mauritius	5.8	7.1	3.4	4.1	4.3	3.4	3.5	4.2	6.6
SADC	2.3	2.7	3.8	3.9	5.9	6.5	6.9	7.2	5.1
SACU	3.3	3.0	3.7	4.3	6.1	2.4	5.7	4.2	3.0
Sub-Saharan Africa	3.1	3.8	3.7	5.1	7.2	6.2	6.4	6.9	5.5

Source: IMF Database (2009)

Structure of exports and imports

Table 3 and Table 4 show average exports and imports over the period 2003-2007. Exports by trading partner show that Swaziland has the highest share of exports to SADC. For the rest of the countries, with the exception of South Africa, SADC takes up the second

highest share of exports. Regarding South Africa, SADC takes up the second least share of exports. This pattern largely results from South Africa's comparative advantage in production of primary products, which developed countries that have a comparative advantage in higher value-added goods need. Geographic barriers to trade also exist in Southern Africa as many SADC countries are landlocked or have poor transport infrastructure.

Table 3: Average exports by trading partner 2003-2007 (US$ million)

Country	SADC	EU	ASEAN	NFTA	MERC
RSA	4,479	16,668.5	7,032.0	5,781	364.6
Malawi	77	142.4	14.3	51.3	2.3
Zambia	394	754.0	110.3	18.4	0.0
Mozambique	287	1187.1	42.1	N/A	0.0
Swaziland	1,414	21.4	112.2	7.1	0.0
Namibia	777	957.3	10.0	258.1	0.0
Botswana	409	3591.2	66.8	37.8	0.0
Lesotho	150	5.8	0.5	385.2	0.0
SADC	7,987	23,327.7	7,388.2	6,539.0	366.9

Source: SADC Database

Regarding imports, all countries (except South Africa) heavily rely on SADC imports, with more than 50% of their imports coming from SADC (Table 4). South Africa, being the main industrial hub of the SADC region, is by far the main source of imports for most countries.

Table 4: Average imports by trading partner 2003-2005 (US$ million)

Country	SADC	EU	ASEAN	NFTA	MERC
RSA	1,382	22,496	12,768	5,196	1,824
Malawi	672	146	162	53	18
Zambia	1,667	367	231	74	5
Mozambique	1,235	337	182	N/A	48
Swaziland	1,163	27	3	138	N/A
Namibia	2,194	179	25	20	N/A
Botswana	2,826	299	N/A	43	33
Lesotho	910	6.0	188	2.0	N/A
SADC	12,049	23,857	13,559	5,526	1,928

Source: SADC Database (2008)

Unrecorded cross-border trade in SADC

There is evidence indicating that informal cross-border trading[6] in agricultural and non-agricultural commodities between neighbouring countries is an important economic activity, in some cases several times the level of the formal cross-border trade. According to the Sustainable Bureau for Africa (1998), substantial volumes of food commodities are traded across the borders to offload seasonal surpluses, to offset seasonal deficits, and to supplement domestic food supplies to towns and cities. Because these food commodity flows are not recorded, it is difficult to make an analytical assessment of

their contribution to local, national, and regional food security. The same is true of the non-food commodities and their contribution to employment and income generation. The agricultural goods include maize, pulses, vegetables, Irish potatoes and fertilizers. The most important non-agricultural goods are sugar, new and second-hand clothes, Carlsberg beer and soft drinks. Table 5 shows the level of informal trade among SADC countries.

Table 5: Estimated annual value of total informal trade for SADC countries (thousands US$) for 1998

Country	Malawi	Zambia	Mozambique	SouthAfrica
Malawi	N/A	20,511	4,179	N/A
Zambia	20,511	N/A	634	N/A
Mozambique	4,179	12,909	N/A	33,395
South Africa	N/A	N/A	33,395	N/A

Source: Office of Sustainable Development Bureau for Africa (1998)

SADC, COMESA and EAC merger

In the fast globalizing market, the combined effect of small market size, weak institutions, low human development, worsening terms of trade, persistent conflict and poor investment climate, pan-African cooperation as enshrined in the African Economic Community and NEPAD has been designated by African governments as the best overall framework for accelerating African development in the 21st century. What many Africans aspire for is that the 53 fragmented economies on the continent become integrated into one strong, robust, diversified, and resilient economy, supported by a first-class transboundary infrastructure; highly educated, flexible and mobile workforce; financial capital that is highly mobile; sound health facilities; and peace and security (UNECA, 2005).

The benefits of regional integration include creating a common market, increasing the bargaining power of African countries, and pooling resources to deal with transboundary issues such as climate change, HIV/AIDS and conflict prevention.

In Eastern and Southern Africa, an initiative was taken in 2008 to join the three regional blocs of the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC) and SADC. Although the process will result in the collapsing of three sets of rules into one, this does not necessarily mean that the process will be easy. In the three regional blocs of Africa, the rules applied by COMESA and EAC are more closely aligned with each other than with those of SADC. The key distinguishing feature is that SADC applies product-specific rules, while the other two apply more general rules.

The formation of a single set of rules will come with numerous challenges. One of these is that there are no standard guidelines, and that rules of origin are, by nature, not simple. Another key challenge is to bring SADC rules closer to those of COMESA and EAC. The methodologies of determining whether manufactured goods have been sufficiently worked will also need to be agreed upon.

The initial steps towards designing a single set of rules should involve looking at the three sets and bringing them together to find common ground. While this will not

happen easily, it does provide a base for such development.

In pursuing a single set of rules, there should be a drive towards their being more objective, understandable, fair, consistent and predictable. The approach towards a single set of rules should thus start with the adoption of the principle of simplicity. Although this is a difficult goal to attain, given the nature of the rules, relative simplicity could be the second best option. This could be achieved by designing rules in such a way that they converge towards the simplest of the three blocs.

The second principle that should be considered is that of narrow objectives. This implies that the primary objective of the rules should be to prevent trade deflection and, where possible, that should also be the only objective. If it happens that rules end up serving other purposes, this should be by default or unintentionally. The deliberate use of rules as protection, to enhance development or to support industrial policy should be avoided. If they are used for other purposes, they end up being unnecessarily protective measures to trade, sometimes to the detriment of the initial objective of encouraging intra-regional trade. Rules of origin are not effective instruments for many roles. If such objectives are desired, then appropriate measures should be designed and applied directly to attain those particular objectives.

3. Literature review

Theoretical literature

The impetus for regional integration draws its rationale from the standard trade theory, which states that free trade is superior to all other trade policies. The case has been made that African countries must pursue an open-economy strategy as an incentive to gaining greater access to markets (especially the big ones in developed countries) where they can express their comparative advantage.

Trade creation and trade diversion

The theory of regional trade agreements (RTAs) may be traced to the seminal work by Viner (1950) that differentiated the effects of trade creation versus trade diversion from RTAs. The key question about a free trade arrangement is whether the benefits of trade creation exceed the costs of trade diversion. Thus, a free trade arrangement is likely to be viewed as beneficial if, on balance, it gives rise to greater trade creation than trade diversion.

Economies of scale argument

Viner (1950) first suggested that significant gains might be associated with economies of scale in the formation of RTAs. Corden (1972) formalized this theory in terms of the importance of scale economies to trade and welfare under customs unions. Of course, this presupposes that firms operating within the RTA would produce more goods following formation of the RTA.

Argument for economic growth through foreign direct investment

It is expected that regional integration would boost investment and result in growth (Brada and Mendez, 1988; Baldwin, 1992). As trade is enhanced by the regional integration process, it tends to raise the returns to some factors of production. Assuming that the cost of capital remains constant, the economy could respond with increased rates of return and, hence, increased capital stock. By and large, this increase in capital stock could lead to a temporary acceleration of growth rates as capital accumulation shifts the economy towards a higher growth path.

Empirical literature

Some studies have been carried out to asses the performance of regional blocs in Africa using a gravity model. Among such studies are those of Foroutan and Pritchett (1993), Ogunkola (1994), Elbadawi (1997), Lyakurwa et al. (1997) and Longo and Sekkat (2004). Although the results of the studies slightly vary, the general conclusion seems to be similar. They all conclude that regional integration in Africa has been a failure in achieving its objectives of increasing intra-regional trade, in particular, and fostering policy coordination in general. There are two approaches in the trade literature by which impacts of RTAs are assessed. One is the ex post approach that assesses the impacts of RTAs by using simple investigation of intra-regional trade patterns following the formation of the RTA. The other is the ex ante approach that is undertaken at an earlier date before the formation of the RTA. We provide a general review of some of the existing findings on the impact of RTAs.

Evidence from ex post studies

Cassim (2001) used a cross section econometric gravity model to look at the potential for trade among SADC countries. According to his results, specific areas where potential trade is less than actual trade are mostly South African and Zimbabwean exports to the region. In the case of South Africa, he found that in all instances, its potential exports are significantly low. This result should, however, be treated with caution. The authors estimated the model using OLS, instead of the Tobit model. This creates problems when you have missing or unrecorded trade flows. Additionally, the model used did not have a comparator group of countries. Additionally, the model did not capture all important determinants of intra-regional trade. This may have biased the results.

Chauvin and Gaullier (2002) investigate the benefits expected from the SADC FTA given the economic structure disparities existing among its participating members. Specifically, they investigate whether it is feasible to expand intra-SADC trade. To address the potential of increasing intra-SADC trade, Chauvin and Gaullier presented and analysed three complementary approaches: The first two refer to trade indexes: Export diversification indexes, revealed comparative advantages and trade complementary indexes, and the last one was based on the gravity model. Their main finding was that room for further trade within SADC is limited.

Elbadawi (1997) finds results that are compatible with the pattern of intra-regional trade reported by earlier studies. His results indicate that SADC did not have a significant effect on trade among its members, although the performance of the bloc is slightly improved when controlling for exchange rate policy effects.

Evidence from ex ante studies

Evans (1997) develops a multi-country partial equilibrium model that looks at the impact of FTA in SADC on economies of member countries. His findings showed that the SADC FTA is likely to lead to trade creation of around 20%.

Lewis et al. (1999) have conducted a study on Southern Africa. They consider the effects of SADC (parallel to the EU-South Africa FTA) and a trilateral agreement, which includes the EU as well. The results indicate that in either type of RTA, trade creation exceeds trade diversion, suggesting that the EU is more important than South Africa for trade and growth in the rest of Southern Africa, as the latter gains far more from a trilateral RTA.

Methodological literature

Literature offers various methods for empirically investigating the effect of regional integration efforts on trade flows of member states. The fundamental issue about these methods is how to construct trade flows before integration, and how best to predict trade flows that would have occurred in the absence of regional integration efforts. These methods could be used to assess possible gains from potential regional integration efforts even before such integration comes into effect. They can, therefore, be classified differently to reflect the time frame of the particular study (either ex post or ex ante) or according to the particular approach adopted in measuring trade effects.

Survey approach

This approach examines the impact of regional integration efforts on trade flows by assessing the views of major actors and experts on international trade in the region, the anticipated benefits of the regional integration, and how they expect regional integration to affect costs of production and prices of inputs and outputs. Due to the flexibility of this method, sources of different types of inputs and destinations of output can be investigated. Likewise, domestic and foreign data related to costs and prices of inputs in the region can be directly analysed (Ogunkola, 1998).

Analytical approach

This approach is based on an underlying econometric model, which tends to explain patterns of trade and production, and hence can be used to explain changes in those patterns. In practice, identification of key variables is difficult. Therefore, such models resort to dummy variables to capture differences between "with integration" and "non-integration" observations (Ogunkola, 1998). The approach focuses on the effects of economic integration explicitly, including tariff changes as one of the endogenous variables. Therefore, the effect of changes in tariff is measured differently. Generally, the effect of tariff changes on domestic prices of imported goods is estimated. The estimated elasticities are then used to measure the ex post and ex ante effects on the particular member country or the group as a whole. The problems of measuring international trade elasticities are enormous, and various methods have been devised, such as the use of a priori elasticities (Prewo, 1974). Tools under analytical approach include computable general equilibrium model. Elasticities from general equilibrium models and import equations have been applied by Prewo (1974). A good example of a study on SADC using this methodology is Evans (1997).

Computable General Equilibrium (CGE) modelling

CGE modelling is increasingly becoming widespread. It involves setting up the underlying theoretical model, detailing the base data set, calibrating the model to the base data set so that the equation of the model can replicate the data set, and running of experiments (simulations). In a CGE model, integration effects only arise from those chosen to represent integration in the model. Anything omitted will not be picked up (Evans, 1997).

Applying CGE modelling is extremely demanding in terms of data requirements. CGE models are potentially more useful for policy analysis, but they have two drawbacks: (1) they are simulated rather than estimated; and (2) they are almost always based on a very large black box consisting of dozens to hundreds of equations.

Residual method

This is an ex post methodology that relies on comparing observed patterns of trade with a counterfactual (anti-monde) on the pattern of trade in the absence of integration. It is not based on an underlying economic model; instead, it is based on comparing the observed event with some form of trend extrapolation (import demand trends, trends in imports/export shares, etc). It is economical in data requirements and is easy to implement (Ogunkola, 1998). The majority of empirical studies on the effect of economic integration apply this method (Cassim, 2001), which compares the reconstructed pre-integration (post-integration) trade with post-integration (pre-integration) matrixes to measure the effect of integration.

Gravity modelling

The gravity model is the key econometric technique widely used in examining bilateral trade flows. It has become more important in recent years, in particular with the acceptance of the underlying theoretical basis.

Gravity models have been used extensively in recent years to try to quantify potential trade levels (ex post trade analysis). They are less complex to implement and have also proven very easy to implement empirically. In addition, gravity models can be derived from underlying macroeconomic foundations (Bergstrand, 1985), are less subject to simultaneous and omitted variables biases as compared to other two models, and they use much more reliable database (Learmer and Levinsohn, 1995).

Despite the above appealing arguments, the estimated gravity model is a very crude tool for policy analysis because it is based on ad hoc specifications that can be seriously questioned on theoretical grounds. The gravity model does not capture dynamic effects and cross-industry linkages. This might translate into underestimating the impact of tariff on trade. Using a general equilibrium model would be more appropriate if the goal was to measure the impact of trade policy changes, i.e. tariff reductions. For the general purpose of estimating potentials, it is however of minor importance. Finally, one should be cautious in using gravity models for emerging and developing countries. Those countries tend to have a highly sectoral and geographically concentrated distribution of exports (for

example, a large share of Angola's exports is directed to the United States and consists of oil). Standard gravity equation (which considers homogenous trade models, may not be able to accommodate for such high specificities and "distortions" (Ogunkola, 1998).

4. Analytical framework

Theoretical basis of the gravity model

The gravity model of trade is analogous to Newton's gravity law in mechanics: The gravitational pull between two physical bodies is proportional to the product of each of the body's mass divided by the square of the distance between their respective centres of gravity. The analogy for trade is as follows: The trade flow between two countries is proportional to the product of each country's "economic mass" generally measured as GDP, divided by the distance between the country's respective capital cities. In its most basic form, the gravity model explains the level of exports by several variables, the most important being size of an economy and distance between trading partners. In fact, trade between two countries is positively related to the size of the partner countries and inversely related to the distance between them. Distance is used as a proxy for transport cost. In practice, this basic form is augmented using other variables that directly or indirectly explain trade - for instance population size of the involved countries. In addressing the issue of regionalism, the gravity model can be used to simulate trade potentials corresponding to any regional integration scheme.

Anderson (1979) generalized the gravity equation by building on the Hecksher-Ohlin (H-O) international trade theory. Assuming that each country is specialized in the production of one type of commodity, for which it is better endowed in relation to other countries, Anderson deduces the gravity equation from the linear expense system. Similarly, Krugman (1980), by introducing transport costs in the monopolistic competition model, derives a demand equation close to the gravity equation.

Specification of the gravity model

In this paper, the value of trade between country i (the origin or the exporter) and country j (the destination or the importer) depends on demand factors in country j, potential supply factors in country i, and factors that either promote (facilitate) or restrain the specific flows. The supply factors in country i depend on its economic size, which is assumed to vary with outflows of international merchandise trade. The economic size is usually proxied by either gross domestic product (*GDP*) or gross national product (*GNP*) of the particular country i. The study believes that *GDP* describes the domestic economic size more fully than *GNP*.

Another factor that is expected to influence potential supply of international merchandise is the trade intensity of country i. This intensity, which is usually expressed

as the ratio of total exports to total production supply (openness ratio), depends on other factors such as the level of development and size of the particular country. To capture trade intensity, we use, first, per capita GDP as a proxy for the level of economic development. However, it has been shown that population has a strong negative relationship with the degree of openness, hence we try to compare the effect of substituting population with the per capita GDP. The physical size of the country is also included in the model (Ogunkola, 1998). Trade is expected to be negatively related to population, as larger countries tend to be more self-efficient.

For the exporter, the GDP determines economic capacity, while per capita GDP (*PCGDP)* determines the production for export supply. For the importer, a similar argument holds. Again, the higher the GDP, the higher the potential demand for foreign goods while a higher per capita GDP or population would suggest greater self sufficiency and less demand for foreign goods (Ogunkola, 1998).

The next set of variables reflects trade constraining factors. Basically, these factors can be classified into artificial barriers and natural impediments to trade, respectively. These components can, to a reasonable extent, be regarded as total costs of transactions, which include, among others, costs of transaction, distance between trading partners, trade policies (e.g. nominal tariff rates on imports from country i by country j) and non-tariff barriers to trade, such as import restriction, import licensing, foreign exchange rationing, just to mention a few (Ogunkola, 1998). Some of these variables can be quantified while others are qualitative.

First, we present the quantitative variables. Total cost of transaction is proxied by quality of infrastructure in different trading partners. We decided, in this study, to use quality of infrastructure. Another set of variables in this category (promoting/resistance variables) that is not easily measurable is captured through the use of dummy variables. Two sets of such variables are distinguished as cultural or proximity variables, and artificial trade barriers. People in different countries with a common border dummy (*DCB)* tend to share a number of characteristics such as taste, fashion, and local dialects, and they are usually better informed about different prevailing conditions (Wang and Winters, 1991) in nearby countries, compared with other third countries. A common border dummy variable is used as a proxy for all these factors. It is equal to 1 if the trading partners share a common border, otherwise it takes 0 as its value.

The effect of historical ties is captured through another dummy variable. This historical tie is assumed to be reflected in the official languages of the trading partners' dummy (*DLAN)*. It takes value 1 if both partners share a common language or 0 if they do not. The primary interest of this study is the artificial trade barriers. These variables cannot be easily quantified, hence we use dummy variables to capture their effects. In Southern Africa, three major regional integration efforts can be identified. Thus we introduce two sets of three dummy variables for the Southern African countries, and another set for the preferential trade body to which some of the control or normal trade group of countries belong. In all, we have eight dummy variables.

The first set of dummy variables equals 1 if the importing countries are members of SADC, Common Market of Southern American (MERCOSUR), Association of East Asian Nations (ASEAN), and North American Free Trade Agreement (NAFTA), respectively, otherwise they are equal to 0. This is to test whether trade barriers in each of

the groups are significantly different from what obtains in other countries in the sample. The second set of dummy variables equals 1 if both partners are members of SADC, MERCUSOR, ASEAN, and NAFTA, respectively, otherwise it is assigned 0. This is to test whether the bodies have any significant effect on trade flows of their respective members. These variables for SADC are of interest to us in this study. They are expected to be negative or insignificant prior to the integration period. The value of SADC dummy after integration will depend on the effectiveness of the particular regional body.

In summary, the gravity model for the period prior to integration is specified as:

$$
\begin{aligned}
XA_{ij} = \ & \beta_0 + \beta_1 LGDPIA + \beta_2 LGDJA + \beta_3 LPCGDPJA + \beta_4\ LPCGDPIA + \\
& \beta_5\ LTRANSPC + \beta_6 DLANA + \beta_7 DCB + \beta_8\ LESIM + \\
& \beta_9 LGEOSI + \beta_{10} LGEOSJ + \beta_{11}\ DMERC1 +, \beta_{12} DASEA1 + \\
& \beta_{13} DSADC1 + \beta_{14} DNAFT1 + \beta_{15}\ DMERC2 +, \beta_{16} DASEA2 + \\
& \beta_{17} DSADC2 + \beta_{18} DNAFT2 + e_t
\end{aligned}
\tag{1}
$$

where XA_{ij} is the average flow of trade from country i (origin) to country j (the destination) for the period 1998-2000 and L stands for logarithm (see Appendix 1 for definition of the variables). We measured this variable as amount of imports from country i as recorded by country j's import figure. This measurement takes care of transportation costs, as imports are recorded in c.i.f. values. Furthermore, countries tend to monitor their imports more than their exports, hence our procedure (we believe) will be more accurate than an approach based on export from the origin. The variables *LGDPIA* and *LGDPJA* are the logarithm GDP figures of the exporting country and importing country, respectively. *LPCGDPIA* and *LPCGDPJA* are per capita GDP of the reporter (i), and the partner (j), in logarithm. In the same manner, though not reflected in Equation 2, *LPOPIA* and *LPOPJA* were defined as population figures for country j and country i, respectively, in logarithm.

As a departure from other studies on SADC (Chauvin and Gaullier, 2002; Cassim, 2001; Evans, 1997), this study will use quality of infrastructure to proxy transaction costs between corresponding partners and is represented by *LTRANSPC (*the logarithm of transport costs). We are not using geographical distance to proxy transaction costs because it may bias the results, especially when transport infrastructures are poor and physical obstacles important. Two dummy variables *DLAN* and *DCB* were used to capture language and border effects, respectively. A proxy for economic similarity (*LESIM* expressed in logarithm) in terms of similarities in demand structures, especially at inter-industry level, is defined as absolute difference in per capita GDPs of trading partners. (*LGEOSI*) and (*LGEOSJ*) denote geographical size of countries i and j, respectively, expressed in logarithm. Finally, the dummy variables for artificial trade barriers were included, such as *DMERC1, DASEA1*, *DSADC1,* and *DNAFT1*, and *DMERC2, DASEA2, DSADC2 and DNAFTA2* for MERCOSUR, ASEAN, SADC and NAFTA regional bodies, respectively (see Appendix 2)

The estimation procedure involved another equation similar to Equation 2 to fit post-integration[7] data, we have:

$$XB_{ij} = \beta_0 + \beta_1 LGDPIB + \beta_2 LGDPJB + \beta_3 LPCGDPIB + \beta_4 LPCGDPJB + \\ \beta_5 LTRANSC + \beta_6 DLAN + D\beta_7 DCB + \beta_8 LESIM + \beta_9 LGEOSI + \\ \beta_{10} LGEOSJ + \beta_{11} DMERC1 +, \beta_{12} DASEA1 + \beta_{13} DSADC1 + \\ \beta_{14} DNFT1 + \beta_{15} DMERC2 +, \beta_{16} DASEA2 + \beta_{17} DSADC2 + \\ \beta_{18} DNAFTA2 + e_t$$

$$(2)$$

Where *XB$_{ij}$, LGDPIB, LGDPJB, LPCGDPIB, LPCGDPJB,* and *LESIM* are correspondingly as defined for *XA$_{ij}$, LGDPIA, LGDPIA, LPCGDPIA, LPCGDPJA,* and *LESIM* above. However, unlike those variables in Equation 2, they correspond to post-integration data. All other variables are as previously defined. All variables except the dummy variables are in natural logarithms.

Estimating trade potential of SADC countries

The gravity model estimations are often used as a benchmark to deduce the bilateral trade potential for a specific group of countries. Although the gravity model is not dynamic, one is able to derive "dynamic-like" results. By replacing the estimated set of coefficients with a set reflecting a plausible future state of affairs, one is simulating a potential trade scenario. This is done by using an appropriate non-SADC sample of countries, and inserting the derived coefficients into the predictive equation consisting of Southern African country trade pairs. In general, the coefficients are calculated by inserting the main variables into the equation, which are then calculated and added to give potential or theoretical trade.

The method consists of estimating the bilateral trade equation, based on the gravity model in the first phase and then the equation is used for simulation in the second phase. In the comparative analysis, intra-trade flows of the normal trade bloc are critical to the analysis. In this cease, the group is more appropriately referred to as a control group. However, the second analysis has to do with trade flows between the countries in the different groups. Therefore, the analysis is independent of the intra-trade flows among comparator group of countries (Ogunkola, 1998).

For this study, however, our emphasis is on two different but related issues. The first is whether given the determinants of trade flows among SADC countries, there is any substantial gain to be derived from the formation of the trading bloc. In other words, if these countries should remove all trade barriers, to what extent can they increase the trade flows among themselves? The second issue has to do with the effect of the formation of the community on the trade flows of the member states.

The first issue calls for a group of comparator countries that have similar characteristics. A group of open economies may be used to examine what would be the change in the level of trade flows had SADC opened up as much as this group of countries. This will set an upper limit to the potential trade flows. If the members of this group of comparator countries are as open to themselves as to third countries, then a confirmation of the result of the model using another sample may be necessary, or the sample size may be widened to include another group of countries. The second issue that may be approached from a different perspective just like the first approach is examined in terms of trade flow

relationships between SADC and other similar group of countries.

Practical issues involved in sample selection cut across some of the concerns raised above. Indeed, the comparability of economies in the sample is usually considered. This involves the use of GDP, GNP, per capita income and amount of trade flows (imports and exports), among other criteria for selecting the group of comparators

Data

The data sample spans the years 1998 and 2007. It is necessary to note that the selection of countries for the control trade blocs is not an easy task. Different researchers have adopted different methods in this process, albeit with due consideration given to the objectives of their studies. In some cases, two samples were used, which made comparison of results possible.

Notwithstanding the problem with African trade flow data, trade flow figures for this study are expressed in US$ million, and are extracted from the IMF's *Direction of International Trade Database* and *SADC Database*. The GDP data measured in US$ million are constructed as follows: Conversion factors from the *World Tables* and GDP in various currencies (also from the *World Tables)* are used to obtain GDP in US$ (all figures are expressed in US$ billions). The population figures expressed in millions are obtained from the *World Tables*. Geographical sizes of the countries are obtained from the *World Development Report* and expressed in thousand square kilometres. Distances between trading partners are straight line distances obtained from PC Globe. They are expressed in kilometres.

5. Empirical implementation

Descriptive statistics

We first conduct a descriptive analysis of the data for variables used in the study. Table 6 shows that the variables do not follow a normal distribution.

Table 6: Descriptive statistics

Variable	Mean	SD	Skewedness	Kurtosis	Normality
Exporter's GDP	6.2751	0.7287	-0.2838	1.968	1.86479
Importer's GDP	7.6766	0.8149	-2.1511	5.883	35.76
Exporter's population	8.5304	0.7402	-0.2664	2.113	1.4272
Importer's population	2.8828	0.8244	-0.1808	2.211	1.0036

Empirical results

This study covers two periods: Pre-integration and post-integration. The pre-integration is chosen to be the average of 1998-2000 to capture the period before SADC FTA came into operation. The post-integration is chosen as the average of 2003-2007 to capture the impact of SADC FTA. Different specifications were generated by using trade figures at origin (exports) and at destination (imports). We substituted population for per capita GDP to generate scenarios. Since all the specifications yielded similar results, we present in Table 7 the result of the model for both pre-integration and post-integration periods, with trade flows measured as average of total trade flows (average of the imports and exports) as the dependent variable. The variant that is reported and analysed here uses population figures and not per capita GDP as one of the explanatory variables.

Pre-integration

Most estimates of common gravity variables carry the right signs and are in line with theoretical justification. We start with variables that determine the capacity to demand and supply goods: GDP and population. The income variable as measured by the GDP of both the importer and exporter exhibited a strong positive relationship with the average trade flow between trading partners. The coefficients of GDP of both the exporter and importer are statistically significant at 5% level of significance. The elasticities on GDP of exporting (importing) country imply that for 1% increase in GDP of exporting (importing) country, bilateral export flow would increase by 0.62% (1.02%). The elasticity of GDP

of the importing country is higher than the effect of a corresponding change in GDP of the exporter on the supply of foreign goods. These results are in line with similar findings by Chauvin and Gaullier (2002) and Cassim (2001), although the coefficients in our results are smaller.

The population variables of exporting and importing countries are used as a proxy for market size and, jointly with GDP, determine the capacity to demand and supply foreign goods. The population of both the exporting and importing countries are not statistically different from zero. The elasticities on population variables are also very low (-0.036 and -0.043 for importer's population and exporter's population, respectively) as compared to previous studies such as Chauvin and Gaullier (2002), Cassim (2001) and Evans (1997). Thus, the populations of the importing and exporting countries exert insignificant effect on trade flows between trading partners over the period under consideration.

Table 7: Maximum likelihood estimates of the Tobit gravity model for SADC: Average data for 1995-1999 (pre-integration) and 2003-2007 (post-integration)

Dependent variable: log of average exports

	Pre-integration		Post-integration	
	Estimate	**t-ratio**	**Estimate**	**t-ratio**
Constant	6.0244	8.2531	5.0271	7.4370
Capacity variables				
Exporter's GDP	0.6162	3.5475	0.4987	3.250
Importer's GDP	1.0170	4.3259	1.0248	4.231
Importer's population	-0.0431	-0.829	-0.5131	-1.983
Exporters's population	-0.0363	-0.656	0.6172	3.754
Transportation variable				
Quality of infrastructure	-1.6543	-6.321	-1.592	-6.151
Trade preferential variables				
SADC	0.321	2.253	0.294	2.373
MERCUSOR	-0.596	-2.589	-1.360	-4.674
ASEAN	1.523	5.575	1.870	5.246
NAFTA	1.654	5.723	0968	1.072
Others				
Common language	1.3278	5.5421	5.4250	1.3467
Common border	0.0606	0.9504	0 . 0 7 2 9	0.9341
Physical area of the exporter	-0.0628	-0.9560	-0.0437	-0.783
Physical area of the importer	-0.7890	-3.6781	-0.5234	-2.349
Linder effect	0.0325	-0.4356	0.1761	-0.0243
Sigma (ä)	7.7563	4.9734	9.3265	4.9767

The effect of transportation costs, captured by quality of infrastructure, is negatively correlated with trade. This implies that transportation costs in terms of delays in the supply of foreign goods and other costs of transaction are major inhibiting factors to trade flows among the countries in our sample for the period between 1998 and 2000. This finding is in line with results by Chauvin and Gaullier (2002) and Cassim (2001).

Language effects on trade flows, as expected, came up with a positive sign. It is also significant at 5%. This suggests that countries with a similar language have the probability of trading more with each other. A common language tends to exert a positive effect on trade flows among the countries in the sample. Chauvin and Gaullier (2002) did not include this variable in his model. The common border effect, which with the language captures the impact of cultural ties, common tastes and other proximity advantages on intra-regional trade flows did not come up with significant positive sign. The advantage in common border is eroded by high levels of unrecorded trans-border trade in the sub-region. The effect of land mass on the amount of trade flows across the border came up with expected signs. However, they are both not statistically different from zero. Area for both exporting and importing country has the expected negative sign, indicating that larger countries are less likely to trade than smaller ones.

On the artificial trade barriers, pre-integration dummy variables for all the regional arrangements included had the positive sign, except for MERCUSOR, which came up with a negative coefficient. The results of the model indicate that trade barriers in MERCUSOR are higher than in the other group of countries included in our sample. Compared to ASEAN and NAFTA, the trade barriers in SADC are higher.

Post-integration

Results for post-integration are shown in columns 3 and 4 of Table 7. The elasticities of GDP of exporter and that of importer are positive and statistically significant. The elasticities on GDP of exporting (importing) country imply that for 1% increase in GDP of exporting (importing) country, bilateral export flow would increase by 0.50% (1.02%). The elasticity of GDP of importing country is higher than the effect of a corresponding change in GDP of exporter on the supply of foreign goods. Taken jointly, this suggests that there is capacity to import from each other by the countries in the sample, while the constraints seem to be lack of capacity to meet demand. This approximate proportional relationship between bilateral export flows and size of the economy (either exporter or importer) indicates that intra-SADC trade could rise significantly if SADC countries could maintain strong economic growth. The elasticity of GDP of importing country is higher than the effect of a corresponding change in GDP of exporter on the supply of foreign goods. These results are in line with similar findings by Chauvin and Gaullier (2002) and Cassim (2001), although the coefficients in our results are smaller.

The population effect of the exporter is positive and significantly different from zero, while the population of the partner is negative and insignificant at 5%. These results are in line with findings by Cassim (2001), but are in conflict with findings by Chauvin and Gaullier (2002), who found a negative significant relationship. Therefore, the model suggests that among the factors that could be used to explain trade flows between the countries in our sample, the GDPs of the importer and exporter and the population of the exporter are very important.

The effect of transportation costs, captured by quality of infrastructure, is negatively correlated with trade. It shows that intra-trade flows decreased with the increase in the effect of natural trade barriers. It suggests that the longer the distance between two countries, the less the amount of bilateral trade between them. This finding is in line

with results by Chauvin and Gaullier (2002) and Cassim (2001). One advantage of SADC is the geographic proximity of member states. The estimate of common border effect is not statistically different from zero. This differs with findings by Chauvin and Gaullier (2002), who found this variable significant. But unlike the previous studies on SADC, we used quality of infrastructure as a proxy of transaction costs. On the other hand, the estimate of cultural effect on trade flows turned up with the expected sign and is statistically different from zero. Political history gives stronger ties in SADC. As a result, cultural and language barriers in SADC are limited.

As expected, the coefficients for the physical size of the importer and exporter suggests an indirect relationship with trade flows. The coefficients, though low, are statistically significant from zero.

On the artificial trade barriers, post-integration dummy variables for all the regional arrangements identified came up with the positive sign, except for MERCUSOR, which came up with a low negative coefficient. This implies that existence of SADC has a trade creating impact. Intuitively, intra-regional trade in SADC has increased marginally in the last decade. Its share, however, remains small relative to the extra-regional orientation of these countries. The Linder effect is negative and statistically significant.

Effectiveness of SADC

Since SADC is geared mainly towards promoting intra-regional trade, we examine the effects of artificial intra-regional trade barriers, which are mainly policy induced. The model shows that these activities have marginal effects on intra-regional trade flows, while other regional bodies identified in the model, except MERCUSOR, have a positive impact on their respective intra-regional trade flows. The positive coefficient for the SADC variable implies that SADC efforts have affected the intra-regional trade flows. Regional efforts that have positively affected intra-SADC trade include trade facilitation and harmonization, and cooperation with regard to customs documents and procedures, a single customs declaration form, and relaxing the supply-side constraints to trade through regional cooperation in various sectors such as infrastructure, agriculture, transportation and financial sector which, hopefully, facilitate trade among member states. The coefficient for SADC also suggests that there is potential trade among the members. If this is the case, then it means that if all the intra-regional barriers to trade are removed, intra-regional trade flows would increase. On the relative effectiveness of the identified regional bodies, though not statistically significant, the magnitude and direction of estimates show that ASEAN and the NAFTA performed better than SADC. Indeed, all the regional bodies except MERCUSOR positively affected their respective regional arrangements.

Simulated trade potential

Whereas the estimated model indicates that capacity to trade variables are positively related to intra-regional trade flows, the estimates do not allude to the presence or otherwise of trading potential among the members. While the significant impact of SADC on intra-regional trade flows corroborates the trade ratio approach, the gravity model provides further insight into estimating trade potential analysis. Therefore, apart from indicating the progress of integration, the gravity model is a useful tool for the measurement of trade potential.

The coefficients of the base estimation using the SACU control group are shown in Appendix 7. What is important about the control group is that a dummy capturing the group, such as SACU, is excluded from the model simply because the aim is not to test the impact of SACU on trade but to structure a sample that characterizes intra-SACU trade relative to SACU countries' trade with other partners outside of the Customs Union. Therefore, SACU is the reporting country in this sample and the rest of the trade combinations consist of their trading partners.

SACU is a very relevant and appropriate experiment. It has existed for a long time and has been one of the few, if not the only success story of market integration in Africa. Intra-regional trade is higher than that of the European Union, and the economies in the region have converged considerably over the years. It is in a sense, a "best case" microcosm of SADC in the future.

The sample used for the estimation of Equation 2 was divided into SADC members and SACU members. The SACU members are used to estimate a gravity model that was then applied to predict intra-SADC trade flows. These estimates, which are presented in Appendix 7, are combined with the independent variables from SADC data to generate potential intra-regional exports for the SADC members. Thus, SACU countries in the sample provide a comparative underlying socioeconomic structure for the SADC countries. Other studies that have used this kind of methodology include Foroutan and Pritchett (2003), Ogunkola (1998) and Cassim (2001).

Table 8 presents potential export estimations of SADC countries. To facilitate the comparison, the data related to observed exports have been included in this table. Since our aim is to assess trade potential in SADC, we compare observed and predicted flows for each SADC member's average exports towards the bloc after the formation of the SADC FTA. The table is composed of seven columns. The first column enumerates countries at sub-regional level. The second relates to the value of current exports in million dollars to partner countries. The third calculates the shares related to current exports directed to countries at the regional level in relation to total exports. The fourth provides the simulated exports obtained by applying the gravity model estimated above to trade flows of countries at the regional level. The fifth column features the relative shares of simulated exports directed to countries at the regional level in relation to total observed exports. Overall, the table compares actual trade flows to potential trade flows.

The table shows that total exports and actual intra-regional exports for the period amounted to US$ 67.3 billion and US$ 8.0 billion. The dominant countries at intra-regional exports are Republic of South Africa (RSA) and Swaziland. Being the more industrialized nation in the region, RSA is able to meet a large portion of SADC import needs. The actual share of intra-regional exports in total exports was 11.9% for the period. The model, however, predicted the intra-regional trade flows at about US$ 13.9 billion.

Table 8: Average actual and predicted trade flows of SADC (2003-2007)

Country	Total exports (US$ mn)	Actual intra-regional exports (US$ mn)	Predicted intra-regional trade (US$ mn)	Actual share of intra-regional trade (%)	Predicted intra-regional trade (%)	Ratio of predicted share of actual share
	(1)	(2)	(3)	(4) = (2)/(1)	(5) = (3)/(1)	(6) = (5)/(4)
Malawi	386	77	92	19.9	23.8	1.19
Mozambique	1,745	286	520	16.4	29.9	1.82
Zambia	1,839	394	405	21.4	22.0	1.03
Botswana	4,450	409	983	9.2	22.1	2.40
Swaziland	1,781	1,414	1,428	79.4	80.0	1.01
Lesotho	474	150	207	30.8	42.5	1.38
Namibia	2,506	777	851	31.0	34.0	1.10
Mauritius	2,033	28	516	1.4	3.2	1.96
RSA	52,089	4,479	8,760	8.6	16.8	1.96
SADC	67,316	8,015	13,961	11.9	20.0	1.66

Generally, the results indicate that the observed intra-regional trade (11.9%) is lower than its potential (20.0%). The results suggest that there is trade potential in the sub-region. Potential for more trade exist for all countries, with the only exception of Swaziland. Swaziland, with actual trade intra-SADC exports at 79.4% appears to be close to exhausting its trade potential in SADC. The ratio of predicted trade to the actual share is interpreted as the potential trade; this was calculated as 166%, suggesting that the observed intra-regional trade for the period is capable of increasing by this factor. These results are in agreement with findings by Evans (1997) who found that the FTA is likely to lead to trade creation, and also ADB (1993) whose results found that there is considerable potential for the non-SACU countries to switch supply from third countries to South Africa. The results, however, differ with findings by Chauvin and Gaullier (2002), whose results indicated that SADC trade potentials are rather small or negative, especially for South African exports, and Cassim (2001) who found specific areas where trade potential is low, mostly for South African and Zimbabwe exports. They also differ with Elbadawi (1997), whose results indicate that SADC did not have a significant effect on trade among its members. One can imagine that intra-trade could expand especially in vertically differentiated goods; for instance, South Africa could specialize in high quality food products, while importing from regional partners for middle and low range of quality.

6. Conclusion and policy implications

This paper examines the trade potential in SADC using a gravity model. The major findings that emerge from the study are that bilateral trade flows among countries in a regional grouping could be explained by standard variables as demonstrated by results of the conventional gravity model. Regional groupings have significant impact on the flow of bilateral trade flows. These econometric results are also corroborated by simple descriptive intra-regional trade statistics.

The model, using SACU as a comparator, predicts that the community is capable of raising intra-regional exports from 11.9% to about 20.0%, given the structural relationship that obtains in SACU. The paper demonstrates empirically that if the experience of the SACU is imbibed, intra-regional trade would increase slightly. In other words, the SACU formula of relevance is the promotion of limited regional cooperation and policy harmonization in infrastructure, power and communications as a prelude to preferential trade arrangement. The gradual approach to regional integration in SACU is noted. Another instructive characteristic of the SACU is the promotion of country-specific growth and development that are consistent with increase in intra-regional trade and cross-border investments. The roles of export-oriented strategies and country-specific multilateral trade liberalization are also useful lessons for SADC. More importantly, policy coordination in external economic relations is of importance.

Perhaps the greatest opportunities for trade in the region lie in the exploitation of comparative advantages to create supply chains. SACU has realized much of its trade potential, a potential which many non-SACU SADC countries are yet to realize. SADC's main comparative advantage in the SACU market lies in primary and intermediate commodities. The specific products for which SADC has a relative comparative advantage in both the SACU and international markets are sugar and related products, tobacco and tobacco manufactures and non-metallics.

The negative result on transaction costs variable suggests that one of the main problems of African trade does not only result from lack of diversification of comparative advantages but also from transport infrastructure network. More generally, improvement in infrastructure may be a prerequisite for successful trade integration and growth. The policy implications associated with findings of untapped trade potential will extend from the necessity of country-specific trade promotion and bilateral trade integration to the need to anticipate relevant distributional changes due to the effect of expansion in bilateral trade flows in the near future.

The challenge that faces many African countries is the need to develop requisite capacities needed to implement modern techniques of doing trade. Developing the necessary infrastructure and human skills are two of the most important challenges Africa faces. This involves: Improvement in internal transport and communications infrastructure; simplifications and improvement of customs procedures at the borders so

that having a common border with a trading partner exerts a stronger positive influence on trade of SADC than at present; and improvement in compliance with agreements, with penalties for non-compliance.

South Africa has realized much of its potential, a potential which many non-SACU SADC countries are yet to realize. The current situation, where the smaller and weaker members of the region export mainly resource-based products to South Africa and import manufactured products is unhealthy. However, if investment is forthcoming and the relative comparative advantages are exploited, there is some scope that benefits of regionalism could flow to the disadvantaged countries as well. As countries move into the production of those products where they have a revealed comparative advantage, it is possible that trade dynamics would result in the expansion of the regional market, ensuring that the current dominant players do not suffer an absolute fall in export earnings. However, in many cases, this will require a relaxing of the protectionist attitude towards sensitive products. Until this is accomplished, the true benefits of a free trade arrangement are unlikely to be felt in the SADC region.

Notes

1.   SADC comprises Angola, Botswana, Democratic Republic of Congo, Lesotho, Malawi,

Mauritius, Mozambique, Namibia, South Africa, Seychelles, Swaziland, Tanzania, Zambia and Zimbabwe.

2.   SADC has announced plans for the establishment of a SADC Customs Union and implementation of a common external tariff by 2010, a common market pact by 2012 and establishment of a SADC Central Bank, and preparation for a single SADC currency by 2016, and a monetary union in 2018.

3.   The remaining 15% is made up of sensitive industries, which comprise textiles, clothing, sugar and motor vehicles.

4.   The basic condition is that goods are considered to originate from a given country or group of countries when they are produced entirely within the community, or are partially derived from inputs originating in a third country (the degree of derivation being at least 35% of local value added).

5.   The Southern Africa Customs Union (SACU) consists of Botswana, Lesotho, Namibia, South Africa and Swaziland. It was established in 1910, making it the world's oldest Customs Union.

6.   The informal cross-border trade consists of those goods that are exchanged across the borders, either bypassing the official customs checks and recording points, or passing through these customs points while deliberately undervalued, misspecified or unrecorded. The implication in both cases is that informal cross-border trade is not well captured in national accounts.

7.   Pre-integration refers to the period before the SADC FTA commenced operation. The post-integration refers to the period after SADC FTA became operational.

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Appendix 1

Definition of variables

XA_{ij}	=	average flow of trade from country i to country j
GDPIA, GDPJA	=	GDP (gross domestic product) figures of the exporting country and importing country

PCGDPIA, PCGDPJA   =   per capita GDP of the reporter (i), and the partner (j)
POPIA, POPJA   =   population figures for country j and country i
LDIST   =   logarithm for distance between trading partners
DLAN   =   dummy for language
DCB   =   dummy for border effects
LESIM   =   proxy for economic similarity in terms of similarities in demand structures, especially at inter-industry level, is defined as absolute difference in per capita GDPs of trading partners LGEOSI, LGEOSJ denote geographical size of countries i and j, respectively
DMERC1, DMERC2   =   dummy variables for regional body MERCUSOR (South American Common market)
DASEA1, DASEA2   =   Dummy for regional body ASEAN (Association of East Asian Nations)
DSADC1, DSADC 2   =   dummy variable for regional body SADC
DNAFT1, DNAFTA2   =   Dummy variable for regional body NAFTA
Pre-integration   =   before SADC FTA came into operation
Post-integration   =   after SADC FTA came into operation

Appendix 2

List of countries in the sample

SADC: RSA, Malawi, Tanzania, Mozambique, Botswana, Mauritius, Namibia, Swaziland, Lesotho (Zimbabwe not included due to data quality problems)

East Africa: Kenya, Uganda, Rwanda, Burundi, Sudan, Somalia

Asian Region/ASEAN: Indonesia, Malaysia, The Philippines, Singapore, and

	Thailand
SEAN:	Association of East Asian Nations
Other Asia:	India, China, Japan, Hong Kong, Korea, Pakistan
Mercosur:	Argentina, Brazil, Paraguay, Uruguay
AMERCUSOR:	South American Common Market

Other-Latin America:

EU:	Denmark, France, Germany, Greece, Italy, Spain, United Kingdom, Italy, Netherlands, Sweden, Switzerland, Portugal, Norway
SACU:	South Africa, Botswana, Lesotho, Swaziland, Namibia
North America:	USA, Canada
Other:	Australia and New Zealand

Appendix 3

Dimensions of landlockedness

Country	Freight costs (index)	Distance to port (km)
Botswana	0.75	905
Lesotho	0.81	575
Malawi	0.76	803
Zambia	0.72	1,975
Swaziland	0.35	456

Appendix 4

Quality of infrastructure - road and rail networks in SADC

	Total highways (km)	Paved highways (km)	Percentage paved (%)	Railways (km)
Botswana	18,482	4,343	23.5	888
Lesotho	4,955	887	17.9	2.6
Malawi	16,451	3,126	19.0	789
Mauritius	1,910	1,834	96.0	0
Mozambique	30,400	5,685	18.7	3,131
Namibia	63,258	5,250	8.3	2,382

South Africa	358,596	59,753	16.6	21,431
Swaziland	3,000	850	28.3	297
Zambia	66,781	N/A	N/A	2,164

Source: Trade data, International Monetary Fund; World Development Indicators (2005).

Appendix 5

Maximum likelihood estimates of the Tobit gravity model for SADC: average data for 1995-1999 (pre-integration) and 2003-2007 (post-integration)

Dependent variable: log of average exports (*with distance as proxy for transaction costs*)

	Pre-integration		Post-Integration	
	Estimate	**t-ratio**	**Estimate**	**t-ratio**
Constant	5.0167	7.3325	4.01087	6.318
Capacity variables				
Exporter's GDP	0.6583	3.7558	0.5802	3.570
Importer's GDP	1.0289	4.4632	1.0108	4.328

	Estimate	t-ratio	Estimate	t-ratio
Importer's population	-0.0421	-0.765	-0.4234	-1.845
Exporter's population	-0.0456	-0.789	0.7274	3.840
Transportation variable				
Distance between exporters and importers	1.522	-5.572	-1.256	-5.260
Trade preferential variables				
SADC	0.435	2.348	0.382	2.453
MERCUSOR	-0.487	-2.476	-1.245	-4.546
ASEAN	1.453	5.465	1.759	5.148
NAFTA	1.521	5.604	0.958	1.059
Others				
Common language	1.2431	5.3650	1.2180	5.3271
Common border	0.0521	0.8654	0.0632	0.9283
Physical area of the exporter	-0.0501	-0.846	-0.0357	-0.695
Physical area of the importer	-0.6742	-3.636	-0.4021	-2.219
Linder effect	0.0325	-0.4860	-0.0243	-0.4356
Sigma (δ)	7.6264	4.855	9.2274	4.8505

Source: Author's estimation results.

Appendix 6

Maximum likelihood estimates of the Tobit gravity model for SADC: average data for 1995-1999 (pre-integration) and 2003-2007 (post-integration)

Dependent variable: log of average exports (*for SADC using quality of transport and border to proxy transaction costs*)

	Pre-integration		Post-integration	
	Estimate	**t-ratio**	**Estimate**	**t-ratio**
Constant	4.0254	6.2432	3.00897	5.564
Capacity variables				
Exporter's GDP	0.5489	3.6012	0.5234	3.428
Importer's GDP	1.0101	4.3240	1.0107	4.250

Importer's population	-0.0365	-0.648	-0.3212	-1.768
Exporter's population	-0.0326	-0.657	0.6895	3.7523
Transportation variable				
Quality of infrastructure	-1.421	-5.432	-1.112	-5.153
Trade preferential variables				
SADC	0.382	2.221	0.214	2.327
Others				
Common language	1.2254	5.216	1.2017	5.2355
Common border	0.0421	0.776	0.0528	0.8854
Physical area of the exporter	-0.0432	-0.765	-0.0235	-0.544
Physical area of the importer	-0.5432	-3.532	-0.3422	-2.1132
Linder effect	-0.0437	-0.4962	-0.0281	-0.4418
Sigma (δ)	7.5143	4.7633	9.1202	5.2261

Source: Author's estimation results.

Appendix 7

Maximum likelihood estimates of the Tobit gravity model using SACU as a set of reporter countries and their trade with partners: average data for 2003-2007

Dependent variable: log of average exports

	Estimate	t-ratio
Constant	1.0387	7.5643
Capacity variables		
Exporter's income	0.7652	6.8991
Importer's income	1.0357	7.5654
Importer's population	-0.0421	-0.6823
Transportation variable		
Infrastructure quality	-1.6534	-5.5755
Trade preference variables		

ASEAN	0.7596	0.6766
Others		
Common language	1.2333	1.6672
Common border	1.8246	1.9851
Physical area of the exporter	-0.0405	-0.3490
Physical area of the importer	-0.3276	-0.5411
Linder effect	-0.028	-0.5626
Sigma (φ)	6.4112	4.9867

Source: Author's estimation results.

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