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Title: How important to South Africa is trade with Africa?

Abstract

South Africa-Africa trade is examined for 2001-2015. The structure of traded goods; trade intensity; ease of market access into South Africa by products from Africa; and intra-industry trade opportunities are examined. Results show that trade with Africa is very important for South Africa with Africa being an important market for South Africa's manufactured products with greater skill and technology content. While South Africa trades intensively with its major world trading partners, Africa is a more significant trading partner; with regional groupings even more significant as trading partners. However, intra-industry trade is a very insignificant part of South Africa's trade with Africa, and this is expected given the very different levels of industrial development between South Africa and the rest of Africa. Ease of market access by products from Africa into South Africa differs between regions, with SADC having the easiest access due to the SADC FTA and SACU which enable much easier access to products from these groupings. South Africa imports a few high value added manufactured products from Africa, but mainly discriminates against them, making it difficult for them to compete with similar locally produced goods. This therefore provides a level of protection to local domestic industries to help them grow.

Key words: Trade intensity, Revealed trade barrier index, Intra-industry trade.

1. INTROUCTION

Efforts have been made to promote linkages between countries in Africa through various forms of economic integration arrangements. Although Africa's trade links with Europe, the United States and increasingly with Asia, still far outweigh trade links inside the region, intra-Africa trade and linkages have been expanding rapidly in recent years. Improved regional infrastructure and intensified implementation of existing free trade agreements as well as reducing non-tariff barriers would help to increase the scale and importance of intra-Africa trade.

Trade in goods and services, both formal and informal, is a channel thorough which developments in one country can spillover to the other countries. South Africa's linkages with sub-Saharan Africa are large and steadily intensifying, especially through southern Africa though the Southern African Development Community (SADC) and the Southern African Customs Union (SACU) in which it is a member. Thus, South Africa plays a significant role in the structure of intra-sub-Saharan Africa trade.

South Africa is the largest economy in southern Africa and the expansion of investment by its companies and institutions into sub-Saharan Africa has caused a deepening of South Africa's trade and other linkages within sub-Saharan Africa, thus, enabling the country to diversify the market orientation of its exports. As a well-developed economy in the region, South Africa is often strongly regarded as an important intra-regional import source than as an export destination. Therefore, it is important to explore the significance and effects of its trade with Africa and the regional economic groupings in particular. How does this trade differ with South Africa's trade with its other trading partners in the rest of the world? How beneficial is this trade to African countries? How does South Africa benefit from this trade?

Insights into the extent to which trade with Africa is relevant to South Africa are important given that South Africa's major world trading partners are outside Africa. To try and show the extent to which trade with Africa is important to South Africa, this research article examines (i) South Africa's trade flows and structure of products with Africa; (ii) Trade intensity between South Africa and Africa in general and with the regional economic groupings in Africa in particular, compared with South Africa's trade with its major world trading partners. This gives insight into which trade is more significant to South Africa from this angle; (iii) the ease of market access for products from Africa's regional economic groupings into South Africa; and (iv) any intra-industry trade opportunities as this facilitates technology transfers and innovation. Examining South Africa-Africa trade using this approach, adds value to existing knowledge on South Africa's trade with Africa.

A lot of literature on South Africa's involvement in Africa is on South Africa's cross-border investment into Africa and on South Africa's political involvement in Africa. There is very little solid and

comprehensive work on South Africa-Africa trade. Some work that have portions of South Africa-Africa trade are (i) Ahwireng-Obeng and McGowan (1998) who use 1994 and 1995 trade data to examine trade flows, trade balances, significant trading partners; and the importance of infrastructure and structural imbalances; (ii) McGowan and Ahwireng-Obeng (1998) although focussing mainly on South Africa's hegemony in Africa, briefly looks at the structure of exports and imports to Africa using 1984 and 194 trade data; (iii) Daniel, *et al* (2003) who focus mainly on investments and briefly examines trade surpluses and trade with Africa compared to South Africa's major trading partners using 1991 and 2001 trade data; and (iii) Alden and Soko (2005) who mainly focus on South Africa's hegemony in Africa and briefly examines South Africa's trade with SACU using 2004 trade data and South Africa's trade volumes with Africa for 1991-2001.

2. METHODOLOGY, TECHNIQUES AND PROCEDURES

The trade data for empirical analysis in this research paper is obtained from the International Trade Centre trade database at http://www.trademap.org. Details on skill and technology intensity of products are obtained from the UNCTAD database at http://www.unctad.info/en/Trade-Analysis-Branch/Data-And-Statistics/Other-Databases/. Indexes that derived to provide empirical evidence on the extent to which trade with Africa is important to South Africa are explained below.

2.1. Trade intensity index

This is an alternative method of measuring and analysing bilateral trade flows and resistances. The level of intensity shows the proportion of exports of country, *i*, that goes to country, *j*, weighted by the world share of imports for country, *j*. The trade intensity index (i.e. I_{ij}) is expressed as follows:

$$I_{ij} = \frac{(X_{ij})}{(X_i)} \quad divided\ by \quad \frac{M_j}{(M_w - M_i)} \quad \text{-- [1]}$$

Where

X_{ij} is country *i*'s exports to country *j*;

X_i is country *i*'s total exports;

M_j is country *j*'s total imports;

M_i is country *i*'s total imports; and M_w is total world imports.

I_{ij} takes values ranging from zero to an infinite positive number, with higher values indicating greater importance of the selected partner region/or country. When $I_{ij} = 1$, this would mean that the proportion of exports of country i that goes to country *j* is in exact proportion to country *j*'s world share of imports. Thus, the trade partners are trading without geographic bias. When $I_{ij} > 1$, this indicates that the trade

between two countries is more intensive than expected; and when $0 \leq I_{ij} < 1$, this indicates that the trade between two countries is less intensive than expected, which is indicative of a small flow of trade between countries *i* and *j* relative country *j*'s trade with the rest of the world (Weldemicael, 2010:7, 8; Foroutan, 1998:11; Gilbert, 2010:18; Drysdale and Garnaut, 1982:68).

2.2 Revealed trade barriers index

Revealed trade barriers (RTB) seeks to establish whether the imports by country, *j,* of a particular commodity, *k*, from country, *i,* are more or less important compared to country *j*'s total imports of that commodity for all sources. The index can thus be calculated using the following formula:

$$RTB^j_{ik} \qquad = \qquad \frac{M^j_{ik}/\sum M^j_i}{\sum M_k /\sum M} \qquad\qquad \text{--- [2]}$$

Where:

$M^j_{ik}/\sum M^j_i$ = the share of commodity *k* in country *j* imports from country *i*

$\sum M_k /\sum M$ = the share of commodity *k* in world imports.

M^j_{ik} = imports of commodity *k* from country *i* by country *j*

$\sum M^j_i$ = total imports from country *i* by country *j*

$\sum M_k$ = total world imports of commodity *k*

$\sum M$ = total world imports

The results can then be interpreted as follows:

$0 < RTB^j_{ik} < 1$, then we may conclude that country, *i,* is exporting relatively more of commodity, *k*, to the rest of the world than to country *j*. Thus, there is possibly discrimination against commodity, *k,* originating from country, *i,* going into country *j*.

$RTB^j_{ik} = 1$, there is no discriminatory trade barrier against commodity, *k,* from *i* in *j*

$RTB^j_{ik} > 1$, Country, *j,* is importing more from country, *i,* than expected. There is possibly preferential treatment of commodity, *k,* originating from country, *i,* going into country, *j* (Kalaba, *et al*, 2005:77)

2.3 Intra-industry trade index

The level of intra-industry trade in each product category was measured using the Grubel-Lloyd intra-industry index stated below as:

$$\beta_i \qquad = \qquad 1 - \frac{\left| X_i - M_i \right|}{(X_i + M_i)} \qquad \text{-- [3]}$$

Where:

X_i = exports of product i;

M_i = imports of product i

$(X_i + M_i)$ = total trade;

$\lvert X_i - M_i \rvert$ = the degree of non-overlap, i.e. the extent to which trade is unbalanced

β_i = the intra-industry trade index, and falls in the range $0 \leq \beta_i \leq 1$

$\beta_i = 0$ indicates that trade flows just one way, thus no intra-industry trade

$\beta_i = 1$ indicates perfect intra-industry trade, trade is balanced with exports equal imports

Between these extremes, a high B_i indicates a greater degree of intra-industry trade (Luey, 1978:64; Krugman, 1981:964; Winters, 1991:60-61; Hakura and Jaumotte, 1999:5; OECD, 2002:160; Tiis and Juriado, 2006:4; Koçyiğit and Sen, 2007:67).

3. RESULTS/FINDINGS

South Africa's trade with selected economic integration arrangements in Africa [i.e. the Southern African Development Community (SADC), the East African Community (EAC) and Economic Community of West African States (ECOWAS), and the Maghreb region] is considered. South Africa's trade with Africa is compared with South Africa's trade with its top 7 world trading partners, *viz.* China, Germany, USA, India, Japan, the UK, and the Netherlands.

3.1 South Africa's trade with Africa compared with its major trading partners

Table 1 shows that the annual growth rate of South Africa's trade with Africa was positive and on an upward trend during the period 2001-2008, and after 2010, it was on a downward trend. The share of Africa's trade in South Africa's total world trade has been growing over the years, from a mere 9.2% in 2001 to 21.5% by 2015. The period 2005-2009 saw a continuous increase in the share and so did the period 2011-2015.

While South Africa trades significantly more with its top 7 world trading partners, the annual growth rate of this trade has fluctuated greatly compared to South Africa's trade with Africa. Furthermore, their share to South Africa's total world trade has also tended to fluctuate greatly compared to Africa's, with the top 7's share experiencing a consistent fall in the period 2008-2012. In the period 2001-2006, it is Germany whose share of South Africa's total world trade exceeded that of Africa's share. Germany's share ranged between 10.35% to 12.10% of South Africa's total trade. In the period 2001-2004, the USA's share alone ranged between 10.02% and 12.94% of South Africa's total trade. While as individual countries, the top 7 continue to contribute handsomely to South Africa's total trade, since 2007 none of them exceeds Africa's share any more.

After 2008, China overtook both Germany and the USA to be South Africa's dominant trading partner. However, its share of South Africa's total trade is yet to exceed that of Africa. Its share of South Africa's total trade rose from 11.90% in 2009 to 13.67% by 2015. Thus, it is yet to be seen whether in the years to come, China's share in South Africa's total would eventually exceed Africa's share. The very high

annual growth rates of China's share in South Africa's trade (which were much higher than Africa's) which it experienced in the period 2001-2007 (i.e. between 18.61% and 71.28%) have not been sustained.

Table 1: South Africa's trade with Africa compared with its major trading partners
(a) South Africa's trade with Africa (2001-2015)

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Annual growth (%)														
	9.1	23.3	24.7	22.2	27.7	23.0	31.5	-24	107	15.6	9.6	1.1	3.2	-21
% of South Africa's total World trade														
9.2	10.5	9.6	9.0	9.5	10.2	10.6	12.4	13.0	19.1	17.4	19.7	20.0	21.5	21.5

(b) South Africa's trade with its top 7 trading partners in the world (2001-2015)

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Annual growth (%)														
	-6.9	36.8	29.3	16.4	17.9	19.8	9.2	-28	36.1	22.6	-7.1	1.0	-6.9	-16
% of South Africa's total World trade														
49.6	48.3	49.3	47.9	48.0	47.7	48.1	46.8	46.4	44.8	43.2	41.7	43.0	41.7	44.8

Source: Own table derived using trade data available from the ITC trade database available on the web
link http://www.trademap.org

Notes: South Africa top 7 trading partners in the world are China, Germany, USA, Japan, India, the United Kingdom and the Netherlands, in that order.

3.2 South Africa's major trading partners in Africa

Table 2 shows South Africa's top 10 major trading partners[1] in Africa outside the Southern Africa Customs Union (SACU)[2]. The top 5 trading partners are Nigeria, Mozambique, Zambia, Zimbabwe and Angola, in that order. Except for Nigeria and Kenya, South Africa's major trading partners in the top 10 are Southern African Development Community (SADC) member states of which South Africa is a member. The SADC FTA ensures easier market access which stimulates increased trade flows.

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[1] South Africa's total trade with African countries was considered and the countries were ranked accordingly.
[2] SACU countries were excluded because South Africa's export data to Botswana, Lesotho Namibia and Swaziland (BLNS countries) is not available for the period 2001-2009. While the import data is available, the values are very low, especially for Lesotho and Swaziland, ranging from below US$1 000 to US$164 000 for the period 2001-2009. The only plausible import data available is for Namibia and Botswana, but only after 2004.

Table 2: South Africa's top 10 trading partners (2001-2015)

Countries	Period of years														
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Nigeria	4th	3rd	3rd	2nd	2nd	1st	1st	1st	1st	1st	1st	1st	1st	1st	1st
Mozambique	2nd	2nd	2nd	4th	4th	5th	5th	5th	3rd	3rd	2nd	2nd	2nd	2nd	2nd
Zambia	3rd	4th	4th	3rd	3rd	3rd	4th	4th	5th	5th	3rd	4th	3rd	3rd	3rd
Zimbabwe	1st	1st	1st	1st	1st	2nd	3rd	3rd	4th	4th	4th	5th	5th	5th	4th
Angola	5th	5th	5th	5th	5th	4th	2nd	2nd	2nd	2nd	7th	3rd	4th	4th	5th
D.R.C	10th	10th	10th	10th	8th	8th	7th	6th	7th	6th	6th	6th	6th	6th	6th
Kenya	8th	8th	6th	6th	6th	6th	6th	7th	6th	7th	8th	8th	8th	8th	7th
Tanzania	9th	9th	8th	7th	7th	7th	8th	8th	9th	9th	9th	9th	9th	9th	9th
Malawi	7th	6th	7th	8th	10th	9th	9th	9th	8th	10th	10th	11th	10th	11th	11th
Mauritius	6th	7th	9th	9th	9th	10th	10th	10th	10th	11th	11th	10th	12th	11th	11th

Source: Own table derived using trade data available from the ITC trade database available on the web link http://www.trademap.org

Table 3 shows that the annual growth rate of South Africa's trade with its top ten African trading partners was positive and generally on an upward trajectory for the period 2001-2008, but was on a downward trend after 2011. The top 10 trading countries contribute to most of South Africa's trade with Africa, such that in the period 2001-2009, these countries contributed 79%-85% of South Africa's trade with the African continent, after which their contribution fell to between 49% and 55%. With regards to South Africa's total world trade, these countries started off by contributing 7.6% in 2001 and this share had risen to 11.7% by 2015.

Table 3: South Africa's trade with its top 10 trading partners (2001-2015)

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Annual growth (%)														
	6.6	21.3	32.7	13.6	18.7	40.1	30.6	-23	21.1	22.5	14.2	-2.3	5.0	-22
% of South Africa's total trade with Africa														
83.2	81.2	79.9	85.0	79.0	73.4	83.6	83.1	83.9	49.1	52.2	54.2	53.6	54.5	54.2
% of South Africa's total World trade														
7.6	8.5	7.7	7.7	7.5	7.5	8.9	10.3	10.9	9.4	9.0	10.7	10.7	11.7	11.7

Source: Own table derived using trade data available from the ITC trade database available on the web link http://www.trademap.org

3.3 Structure of South Africa's products traded with Africa

Table A-1 (Appendices) shows the top 10 products which South Africa exports to Africa. The major export product (i.e. the one which ranks 1st) is HS27 which is mainly mineral fuels with a few non-fuel primary commodities. The rest of South Africa's exports to Africa are manufactured products of various

levels of skill and technology intensity. HS84, HS87 and HS85 rank 2nd, 3rd, and 4th, respectively. These are high-value added manufactures composed of medium skill & technology-intensive manufactures, high skill & technology-intensive manufactures, a few low skill & technology-intensive manufactures, and few resource-intensive manufactures. Having such high value added manufactured goods as key exports to Africa means that Africa serves South Africa as an important market for its manufactured products with greater skill and technology content. This is beneficial to both South Africa and the African countries as this has developmental potential for both. South Africa has a testing ground and market for its manufactured products, while African countries benefit from high value added products which they cannot produce more efficiently compared to South Africa. While Africa may be a smaller market in consumer terms given the lower levels of income, its geographical nearness and improved infrastructure developments means a nearer export destination for South Africa's high value added manufactured goods.

Table A-2 (Appendices) shows the top 10 products which South Africa imports from Africa. The major import which ranks 1st is HS27 which is mainly mineral fuels with a few non-fuel primary commodities. Non-fuel primary commodities which constitute South Africa's top imports from Africa are HS74, HS44, HS71 and HS26. The rest of South Africa's top ten imports from Africa are manufactured products of various levels of skill and technology intensity; but especially low value added manufactures. These are mainly Resource intensive manufactures in HS62, and HS52 including a few such manufactures from HS71, HS44 and HS85. A few Low skill & technology-intensive manufactures also imported and these are from HS84 and HS85. HS84 and HS85 also contain some few high value-added manufactures which South Africa imports, i.e. High-skill & technology-intensive manufactures and Medium-skill & technology-intensive manufactures. Since South Africa imports and exports HS84 and HS85 to Africa, Section 3.6 examines if there are any opportunities for intra-industry trade as this is beneficial for innovation, technology diffusion and an interchange of knowledge and technological capabilities.

The results discussed above regarding the structure of South Africa's exports and imports from Africa are consistent with the type of products that are expected to be traded between the two given the vast differences in the levels of industrial development between South Africa and the rest of Africa. Since South Africa has a much more developed industrial base, it is expected that South Africa would export mainly high value-added manufactured products to Africa. Since most of the African countries are at much lower levels of industrial development, it is expected that South Africa's imports would mainly be low value-added manufactures. Therefore, South Africa becomes a significant market for African countries' low value-added manufactures. This market would help African countries to develop their respective industries for these products further.

3.4. How intensively does South Africa trade with Africa compared to major trading partners?

Table 4 below shows how intensively South Africa trades with Africa. Trade intensity between South Africa and major regional groupings in Africa is also presented so as to show which regional grouping South Africa tends to trade most intensively with in Africa. This is also compared with South Africa's trade with its top 7 major world trading partners.

Table 4: Trade intensity between South Africa and the selected regions (2001-2015)

	Period of years														
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Proportion of exports that goes to Africa weighted by the share of imports by Africa															
I_{ij}	8.094	9.430	8.061	7.639	7.460	6.565	5.989	6.014	6.142	8.995	7.980	9.112	8.896	9.155	9.982
Proportion of exports that goes to SADC weighted by the share of imports by SADC															
I_{ij}	18.06	19.55	16.38	12.57	12.96	11.36	10.88	12.72	13.57	24.79	20.48	22.50	22.66	24.26	28.08
Proportion of exports that goes to ECOWAS weighted by the share of imports by ECOWAS															
I_{ij}	4.199	6.217	5.213	9.277	8.678	5.162	4.295	5.050	4.521	2.837	2.521	3.695	3.188	3.509	3.391
Proportion of exports that goes to EAC weighted by the share of imports by EAC															
I_{ij}	16.02	22.11	20.02	22.32	18.71	14.98	13.52	12.41	15.52	10.98	8.22	13.89	8.076	6.918	8.289
Proportion of exports that goes to Maghreb weighted by the share of imports by Maghreb															
I_{ij}	1.112	1.259	0.725	0.553	1.055	1.417	1.005	0.824	0.725	0.527	0.685	0.657	0.619	0.464	1.020
Proportion of exports that goes to Germany weighted by the share of imports by Germany															
I_{ij}	1.175	1.093	0.980	1.045	0.959	0.990	1.056	1.050	0.871	0.949	0.732	0.648	0.636	0.724	0.946
Proportion of exports that goes to the United Kingdom weighted by the share of imports by the United Kingdom															
I_{ij}	1.916	1.926	1.818	1.943	2.125	1.743	1.581	1.529	1.266	1.074	0.923	0.900	0.990	1.035	1.146
Proportion of exports that goes to the USA weighted by the share of imports by the USA															
I_{ij}	0.746	0.577	0.712	0.713	0.634	0.731	0.818	0.811	0.706	0.673	0.609	0.623	0.584	0.553	0.536
Proportion of exports that goes to Japan weighted by the share of imports by Japan															
I_{ij}	1.600	1.256	1.985	2.094	2.242	2.490	2.478	2.342	1.727	1.707	1.504	1.196	1.320	1.245	1.372
Proportion of exports that goes to China weighted by the share of imports by China															
I_{ij}	0.459	0.434	0.521	0.436	0.466	0.617	0.955	0.837	1.313	1.069	1.209	1.057	1.219	0.921	0.814
Proportion of exports that goes to the Netherlands weighted by the share of imports by the Netherlands															
I_{ij}	1.403	1.742	1.559	1.503	1.692	1.759	1.498	1.539	1.240	0.950	0.995	1.041	1.190	1.225	1.027
Proportion of exports that goes to India weighted by the share of imports by India															
I_{ij}	1.764	1.741	1.270	1.329	1.866	1.018	1.352	1.588	1.807	1.597	1.231	1.425	1.274	1.705	1.899

Source: Own table derived using trade data available from the ITC trade database available on the web link http://www.trademap.org

Africa is a significant trading partner for South Africa as evidenced by $I_{ij} > 1$ throughout the period considered. Among the regional groupings in Africa, South Africa trades most intensively with SADC[3] as evidenced by the very high trade intensity index for this regional grouping. I_{ij} is highest with this regional grouping and higher I_{ij} values indicate greater importance of the selected partner region. South Africa is a member of SADC and as such it trades intensively with the group as there is easier market access of goods. Furthermore, SADC includes SACU members[4], with South Africa's exports to SACU rising significantly after 2009.

After SADC, South Africa's significant trading regional grouping is the EAC[5]. This is followed by ECOWAS[6]. While the EAC is a much smaller regional grouping compared to ECOWAS, South Africa trades more intensively with this small regional grouping than with ECOWAS. One of the reasons is geographical location whereby the EAC is much closer to South Africa than ECOWAS. The other reason is ease of market access, as will be discussed in Section 3.5 below. South Africa trades least with the Maghreb region[7], as evidenced by the very low I_{ij} values and where for most years $I_{ij} < 1$. This regional grouping is located furthest from South Africa.

With regards to its top 7 major world trading partners, Table 4 shows that South Africa consistently trades intensively with Japan and India, as shown by $I_{ij} > 1$ throughout the period considered. With the Netherlands $I_{ij} > 1$ except for 2010 and 2011, and with the United Kingdom it is so except for 2011-2013. While South Africa trades intensively with some of its top 7 major trading partners, Africa is a more significant trading partner for South Africa than any of the top 7 major trading partners as evidenced by higher I_{ij} values with Africa. The regional groupings, except the Maghreb region, are even more significant as trading partners to South Africa than any of the top 7 major trading partners, as evidenced by the even higher I_{ij} values. This is mainly due to Africa's geographical nearness to South Africa, influential and good political relations South Africa has with Africa which often translate into favourable trade relations, and free trade arrangements, especially with southern African countries.

3.5 Market access conditions

Table A-3(a) – (d) in Appendices shows revealed trade barrier indexes (RTB^{j}_{ik}) for the top 10 imports South Africa buys from regional groupings in Africa. The indexes indicate whether there is possibly discrimination against a commodity originating from a particular region and coming into South Africa

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[3] SADC member states are Angola, Botswana, Democratic Republic of Congo, Lesotho, Mauritius, Madagascar, Malawi, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.
[4] SACU member states are South Africa, Botswana, Lesotho, Namibia, Swaziland.
[5] Members of the EAC are Kenya, Tanzania, Uganda, Rwanda and Burundi.
[6] ECOWAS is made up of Nigeria, Ghana, Liberia, Cote d Ivoire, Senegal, Guinea, Burkina Faso, Benin, Niger, Mali, Togo, Sierra Leone, Gambia, Cabo Verde and Guinea Bissau.
[7] Maghreb is made up of Algeria, Morocco, Tunisia, Libya and Mauritania.

or there is no discriminatory trade barrier against that commodity, or there is possibly preferential treatment of the commodity.

The SADC region has the easiest access into South Africa's market. Most of South Africa's top 10 imports from the SADC region are offered preferential treatment into South Africa's market. This is shown in Table A-3(c) where HS74 and HS52 have $RTB^j_{ik} > 1$ throughout the period; HS27, HS62, HS61, HS71 and HS26 have $RTB^j_{ik} > 1$ for most years; while HS33 has $RTB^j_{ik} > 1$ after 2009. Only HS85 and HS84 experienced discriminatory trade barriers throughout the period. This result is consistent with the fact that the SADC FTA is in place with most tariffs lowered (or removed) for most products originating from SADC, thus affording these products much easier market access into South Africa's market. Furthermore, SACU member states are also members of SADC, and their products enter into South Africa duty free due to the Customs Union.

The EAC ranks 2nd with regard to market access into South Africa. Table A-3(b) shows that among South Africa's top 10 imports from this regional grouping; HS09, HS24, HS07, HS28 and HS08 experienced preferential treatment throughout the period as shown by $RTB^j_{ik} > 1$ throughout the period, and HS61 only after 2008. Tanzania is a member of SADC and its products which form part of the EAC's exports to South Africa receive preferential treatment. Among South Africa's top 10 imports from ECOWAS, only HS27 experienced preferential treatment with $RTB^j_{ik} > 1$ throughout the period; while HS18 and HS78 had preferential treatment in most years. The Maghreb region ranks least in terms of ease of access into South Africa's market. None of its top 10 products imported by South Africa experienced preferential treatment throughout the period. Preferential treatment was experienced only for most of the years, as shown for HS28, HS62, HS61, HS04, and HS16, with $RTB^j_{ik} > 1$.

Table A-3 shows that while South Africa top 10 imports from each of regional grouping are mainly low value-added manufactures and non-fuel primary products, it also imports high value added manufactures, viz. HS84 (Machinery, nuclear reactors, boilers, etc.), HS85 (Electrical, electronic equipment), HS87 (Vehicle other than railway, tramway) and HS90 (Optical, technical, medical, etc. apparatus). However, in the period considered, South Africa did not offer any preferential treatment (i.e. $RTB^j_{ik} < 1$) to these products except for HS85 from the Maghreb region in 2001 and 2004. HS33 (Essential oils, perfumes, toiletries, cosmetics) is high value-added manufactured products, which appears only in South Africa's top 10 imports from the SADC region and only started offering it preferential treatment after 2009. Therefore, it can be concluded that South Africa _**does**_ discriminate against the high value-added manufactured products it imports from Africa and thus make it difficult for them to compete with similar locally produced goods. By discriminating against these products, South Africa is able to give protection to its own domestic industries and help them to grow.

3.6 Intra-industry trade potentials

Tables A-1 and A-2 (Appendices) show that HS84 and HS85 are South Africa imports from and exports to Africa. HS84 and HS85 have products which are mainly Medium-skill & technology-intensive and High-skill & technology-intensive manufactures. OECD (2002), Mahon (2003) and Appleyard, *et al* (2008) note that intra-industry trade (IIT) is highest and more beneficial for more sophisticated manufactured products as these are the products which are more likely to benefit from economies of scale in production and are easier to differentiate so as to facilitate trade in similar goods.

Intra-industry trade indexes ($ß_i$) were calculated for the high value-added manufactured products which South Africa imports from and exports to the regional groupings and appear among South Africa's top 10 imports from each grouping. The results are presented in Table A-4(a) to (d) in the Appendices. With EAC, the high value-added manufactured products in South Africa's top ten imports from this grouping are HS84, HS85 and HS90. Trade in these products is merely inter-industry as the intra-industry trade indexes ($ß_i$) are very low for all three products and throughout the period, i.e. $0.015 \leq ß_i \leq 0.166$. In trade with ECOWAS, the high-value added manufactured products in South Africa's top ten imports from this grouping are HS84, HS85 and HS90. Trade in these products is also merely inter-industry as the intra-industry trade indexes ($ß_i$) are very low for all three products and throughout the period, i.e. $0.010 \leq ß_i \leq 0.148$. With the Maghreb region, the high-value added manufactured goods in South Africa's top ten imports are HS84, HS85 and HS87. Trade in these products is mainly inter-industry, although for HS85 in the period 2002-2004 and 2013-2015 the intra-industry trade indexes ($ß_i$) were above 50% percent, i.e. $0.535 \leq ß_i \leq 0.815$. For the rest of the years and for all the three products, intra-industry trade indexes were very low, i.e. $0.001 \leq ß_i \leq 0.493$. With the SADC region, the high-value added manufactured products in South Africa's top ten imports from this grouping are HS33, HS84 and HS85. Trade in HS84 and HS85 is merely inter-industry, with very low intra-industry trade indexes throughout the period, i.e. $0.028 \leq ß_i \leq 0.298$. Intra-industry trade became a significant part of trade in HS33 after 2009, with the intra-industry trade indexes ($ß_i$) constantly rising, i.e. from $ß_i = 0.563$ in 2010 to $ß_i = 0.995$ by 2015.

Therefore, the results show that intra-industry trade is a ***very insignificant*** part of South Africa's trade with Africa's regional groupings. These results are consistent with what is expected of trade between countries at significantly different levels of industrial development. The level of industrial development in other African countries is at a much lower level than in South Africa and thus, trade in ***similar goods*** (***goods of similar factor endowment***) which embody ***high skills and technologically complex manufacturing processes*** is limited. Therefore, even though, South Africa trades more intensively with the regional groupings in Africa much more than any of its top 7 world trading partners (as shown by trade intensity indexes in Section 3.4), South Africa benefits very little in its trade with Africa in terms of expected intra-industry trade benefits like (i) mutual interdependence on differentiated products; (ii) stimulating innovation and valuable interchange of knowledge about technology and technology

diffusion; and (iii) encouragement of joint research as firms share ideas, processes and improved ways of producing high value added manufactured goods. As shown in Mutambara (2016), intra-industry trade forms a significant part of South Africa's trade with the United Kingdom, India, the Netherlands, Germany and Japan, in that order. Thus, South Africa benefits more and enjoys the expected benefits that come with intra-industry trade in its trade with these countries and not African countries.

4. CONCLUSION

Even though South Africa's major trading partners are outside Africa, trade with Africa is still very important for South Africa and therefore, South Africa should continue to strengthen its trade relations with African countries. South Africa's major exports to Africa are high value-added manufactures composed of medium skill & technology-intensive manufactures, high skill & technology-intensive manufactures, a few low skill & technology-intensive manufactures, and few resource-intensive manufactures. Therefore, Africa is an important market for South Africa's manufactured products with greater skill and technology content. Such products have developmental benefits for both. South Africa has a testing ground and market for its manufactured products, and a geographical close and easier to access market; while African countries benefit from high value-added products which they may not produce more efficiently than South Africa. South Africa's major imports from Africa are mainly mineral fuels and non-fuel primary commodities. Manufactured goods' imports from Africa are mainly low value added manufactures, with high value added manufactures contributing very little to South Africa's major imports from Africa. This structure of exports and imports is due to the significantly different levels of industrial development between South Africa and the rest of Africa.

While South Africa trades intensively with some of its top 7 major trading partners, Africa is a more significant trading partner for South Africa as evidenced by higher I_{ij} values with Africa, and this is mainly due to its geographical location. The regional groupings, the EAC, ECOWAS and SADC are even more significant as trading partners to South as evidenced by the even higher I_{ij} values. However, when it comes to intra-industry trade, this type of trade forms a very insignificant part of South Africa's trade with Africa. This is consistent with what is expected given the very different levels of industrial development between South Africa and the rest of Africa, with the latter at much lower levels of industrial development.

The ease of access by products from the regional groupings into South Africa's market differs between regions, with the SADC region having the easiest access. This is due to the SADC FTA as well as SACU which both enable much easier access to products originating from both SADC and SACU. Products from the EAC have relatively much easier access than those from ECOWAS, whilst those from the Maghreb region have the least access. While South Africa imports some high value added manufactured products from the regional groupings, South Africa mainly discriminates against these

manufactured products, thus making it difficult for them to compete with similar locally produced goods. By discriminating against these products, South Africa is thus able to give some protection to its own domestic industries and help them to grow. It is hoped that South Africa would eventually be able to ease market access to these products so that African countries could be able to develop their own industrial bases by accessing more easily the South African market. This would also improve opportunities for intra-industry trade which is essential for developing industrial bases further.

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APPENDICES

Table A-1: Structure of the top 10 products South Africa exports to Africa (2001-2015)

HS code	Skill & technology intensity	Period of years														
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
ʹ27	Mineral fuels, few NFPC	1st	1st	1st	1st	1st	1st	2nd	3rd	3rd	1st	1st	2nd	1st	1st	1st
ʹ84	Mainly MSTI, some HSTI, few LSTI manufactures	2nd	2nd	2nd	2nd	2nd	2nd	1st	1st	1st	2nd	2nd	1st	2nd	2nd	2nd
ʹ87	Mainly MSTI, LSTI, few RI manufactures	3rd	3rd	3rd	5th	3rd	3rd	3rd	2nd	2nd	3rd	3rd	3rd	3rd	3rd	3rd
ʹ85	HSTI, MSTI, few LSTI, few RI manufactures	4th	5th	5th	4th	5th	5th	5th	6th	6th	4th	4th	4th	4th	4th	4th
ʹ73	LSTI manufactures	8th	9th	7th	6th	6th	6th	6th	5th	5th	5th	6th	5th	5th	5th	5th
ʹ72	LSTI, few NFPC	5th	4th	4th	3rd	4th	4th	4th	4th	4th	6th	5th	6th	6th	6th	6th
ʹ39	Mainly HSTI, some MSTI, few Resource intensive manf	6th	6th	6th	7th	7th	7th	7th	9th	9th	7th	7th	7th	7th	7th	7th
ʹ48	Resource intensive manuf.	7th	7th	8th	8th	8th	8th	8th	8th	8th	8th	8th	8th	8th	10th	11th
ʹ22	NFPC; very few HSTI manf.	9th	8th	9th	10th	12th	12th	11th	12th	11th	9th	9th	9th	9th	11th	8th
ʹ38	HSTI; few Mineral fuels	10th	10th	11th	9th	10th	9th	9th	10th	12th	14th	14th	14th	12th	12th	10th

Source: Own table derived using trade data available from the ITC trade database available on the web link http://www.trademap.org

Notes: NFPC = Non fuel primary commodities

RI manuf. = Resource intensive manufactures

LSTI = Low skill & technology intensive manufactures

MSTI = Medium skills & technology intensive manufactures

HSTI = High skills & technology intensive manufactures

Skill and technology intensity of products is Available at: http://www.unctad.info/en/Trade-Analysis-Branch/Data-And-Statistics/Other-Databases/

Table A-2:   Structure of the top 10 products South Africa imports from Africa (2001-2015)

HS code	Skill & technology intensity	Period of years														
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
'27	Mineral fuels, few NFPC	1st	1st	1st	1st	1st	1st	1st	1st	1st	1st	1st	1st	1st	1st	1st
'62	Resource intensive manuf.	7th	9th	11th	12th	10th	12th	9th	11th	6th	10th	8th	9th	8th	4th	3rd
'74	Mainly NFPC, few LSTI	5th	8th	13th	4th	5th	5th	5th	5th	3rd	4th	4th	5th	7th	10th	5th
'85	HSTI, MSTI, few LSTI, few RI manufactures	10th	6th	8th	11th	4th	11th	8th	7th	11th	2nd	5th	5th	10th	8th	6th
'71	Mainly NFPC, few RI manufactures	20th	11th	6th	10th	2nd	2nd	2nd	2nd	2nd	5th	12th	6th	3rd	3rd	7th
'84	Mainly MSTI, some HSTI, few LSTI manufactures	6th	4th	4th	9th	11th	8th	12th	6th	5th	7th	7th	7th	11th	7th	11th
'26	NFPC, few mineral resources	11th	2nd	2nd	2nd	3rd	4th	4th	4th	13th	12th	6th	10th	5th	21st	12th
'44	Mainly NFPC; few RI manf.	4th	7th	7th	6th	6th	7th	7th	9th	12th	15th	14th	11th	12th	11th	15th
'24	NFPC	3rd	5th	5th	5th	7th	9th	10th	10th	7th	22nd	23rd	28th	25th	23rd	19th
52	Mainly RI manf.; few NFPC	2nd	3rd	3rd	3rd	6th	6th	6th	8th	4th	16th	13th	17th	13th	24th	25th

Source: Own table derived using trade data available from the ITC trade database available on the web link http://www.trademap.org

Notes: NFPC = Non fuel primary commodities

RI manuf. = Resource intensive manufactures

LSTI = Low skill & technology intensive manufactures

MSTI = Medium skills & technology intensive manufactures

HSTI = High skills & technology intensive manufactures

Skill and technology intensity of products is Available at: http://www.unctad.info/en/Trade-Analysis-Branch/Data-And-Statistics/Other-Databases/

Table A-3: Revealed trade barrier indexes for South Africa's import trade with major regional economic integration arrangements in Africa

(a) RTB$^j_{ik}$ for South Africa's trade with ECOWAS (for top ten imports)

	Period of years														
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
HS27	8.57	9.42	8.62	8.21	6.74	6.47	6.70	5.11	6.55	6.11	5.43	5.33	5.56	6.00	8.65
HS18	21.4	14.7	13.3	7.46	10.56	4.34	4.51	4.31	3.56	4.58	2.23	1.85	1.65	1.33	0.96
HS40	0.72	0.69	0.73	0.73	0.68	0.63	0.98	1.03	0.56	0.52	0.25	0.29	0.09	0.08	0.13
HS44	0.98	0.98	1.00	0.71	0.96	0.47	0.50	0.58	0.29	0.34	0.25	0.16	0.16	0.08	0.09
HS23	2.99	2.13	1.87	1.47	1.16	0.84	0.99	0.87	0.47	0.46	0.18	0.16	0.22	0.27	0.12
HS71	0.00	0.13	0.23	0.08	0.17	0.12	0.09	0.13	0.02	0.08	0.02	0.01	0.06	0.02	0.02
HS84	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.04	0.01	0.01	0.01	0.03	0.02	0.00
HS85	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
HS78	8.83	9.00	16.84	12.11	22.02	6.52	9.23	6.96	6.21	7.49	3.99	7.79	3.74	1.79	0.58
HS90	0.01	0.01	0.02	0.01	0.02	0.00	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00

(b) RTB$^j_{ik}$ for South Africa's trade with EAC (for top ten imports)

	Period of years														
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
HS09	23.29	51.03	22.20	13.11	30.98	53.80	32.01	38.98	56.97	54.14	50.15	60.02	41.92	49.79	94.58
HS61	0.04	0.00	0.30	0.23	0.19	0.47	0.43	0.42	1.41	2.14	2.65	2.24	2.68	8.28	13.35
HS24	24.25	71.97	38.83	38.67	16.04	37.10	47.12	49.63	69.87	32.08	6.94	12.08	5.65	14.35	29.80
HS07	1.93	3.31	4.77	1.60	1.78	3.34	3.81	2.79	2.35	4.91	10.80	20.06	18.81	17.07	14.59
HS84	0.30	0.35	0.43	0.13	0.17	0.31	0.35	0.42	1.21	0.50	0.27	0.99	0.45	2.13	0.36
HS06	3.14	3.77	8.84	3.08	4.48	7.36	9.44	11.76	17.73	23.72	29.25	31.43	24.07	31.48	33.77
HS28	2.14	15.70	7.88	3.18	5.82	7.00	12.92	16.61	21.14	3.40	4.30	1.09	1.46	1.46	3.54
HS90	0.46	0.22	0.42	0.21	0.16	0.21	0.19	0.32	0.26	0.36	0.31	0.92	0.28	0.76	0.39
HS85	0.19	0.22	0.07	0.07	0.15	0.06	0.10	0.05	0.22	0.13	0.08	0.08	0.08	0.12	0.06
HS08	6.33	3.85	5.69	4.49	4.84	6.86	5.01	2.79	3.99	2.76	1.75	2.48	0.34	1.08	1.02

Source: Own table derived using trade data available from the ITC trade database available on the web link http://www.trademap.org

(c) RTB$^j_{ik}$ for South Africa's trade with SADC (for top ten imports)

	Period of years														
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
HS27	0.60	0.78	0.12	2.38	1.39	1.24	3.61	3.33	4.68	2.75	2.19	2.64	2.46	2.67	3.42
HS33	0.10	0.21	0.09	0.11	0.05	0.06	0.02	0.03	0.04	4.01	4.69	6.95	8.30	8.04	9.59
HS62	2.54	2.22	1.47	1.04	0.96	0.87	0.88	0.74	1.44	1.93	2.24	2.34	2.79	3.18	3.59
HS61	1.81	1.18	0.74	0.89	0.89	0.94	0.71	0.70	1.25	1.67	2.19	2.47	2.91	3.05	3.28
HS74	9.86	7.33	3.30	9.24	7.97	6.38	3.56	3.21	5.37	3.10	4.12	3.46	3.32	2.87	4.56
HS71	0.14	1.34	2.46	0.88	14.64	13.13	5.21	4.47	2.75	1.03	0.70	0.67	0.99	1.30	1.07
HS85	0.21	0.33	0.27	0.10	0.11	0.14	0.11	0.11	0.09	0.30	0.29	0.21	0.18	0.20	0.22
HS84	0.28	0.56	0.62	0.09	0.07	0.16	0.03	0.13	0.11	0.20	0.23	0.20	0.20	0.24	0.19
HS26	1.29	23.03	38.75	31.14	20.14	10.08	8.03	4.76	0.70	1.23	2.31	1.49	2.52	0.67	1.30
HS52	30.82	25.81	23.68	28.63	12.69	8.15	5.79	3.98	7.57	3.58	4.70	3.34	4.63	4.17	2.46

(d) RTB$^{j}_{ik}$ for South Africa's trade with the Maghreb Region (for top ten imports)

	Period of years														
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
HS28	39.36	48.56	59.89	12.22	2.17	0.25	10.17	0.43	4.14	48.89	11.83	0.08	37.15	19.87	72.42
HS84	0.06	0.11	0.11	0.24	0.02	0.00	0.06	0.02	0.50	0.17	0.05	0.23	0.31	0.16	0.70
HS03	0.00	0.01	0.05	2.32	0.29	0.01	0.18	0.08	28.39	4.66	0.10	1.81	16.65	19.43	12.16
HS85	1.12	0.89	0.99	1.29	0.48	0.04	0.28	0.23	0.97	0.90	0.66	0.57	0.64	1.00	0.26
HS27	0.00	0.00	0.00	0.00	5.07	6.53	5.18	4.28	0.47	0.00	3.11	0.00	0.20	0.70	0.30
HS62	6.02	2.01	1.88	3.28	1.54	0.35	2.17	3.05	10.01	7.29	4.23	8.62	9.69	11.01	2.18
HS61	0.86	0.94	1.13	2.18	1.25	0.16	1.72	1.90	5.11	4.18	2.69	4.31	5.03	4.66	1.13
HS04	0.00	0.00	5.32	12.57	4.83	0.54	4.76	4.80	15.31	11.86	6.92	8.51	6.26	5.32	2.43
HS87	0.05	0.02	0.02	0.95	0.02	0.00	0.01	0.03	0.06	0.03	0.05	0.38	0.52	0.51	0.10
HS16	25.22	4.54	8.62	19.06	3.09	0.54	4.03	6.56	14.64	5.22	2.05	1.54	1.60	1.64	1.78

Source: Own table derived using trade data available from the ITC trade database available on the web link http://www.trademap.org

Table A-4: Intra-Industry Trade (IIT) opportunities in trade between South Africa and the selected regional groupings (2001-2015)

(a) Intra-Industry Trade (IIT) opportunities in trade between South Africa and EAC (2001-2015)

High skill & technology intensive manufactured products	Intra-Industry Trade (IIT) Indexes for the period of years														
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
HS84: Machinery, nuclear reactors, boilers, etc.	0.044	0.041	0.076	0.041	0.037	0.064	0.086	0.101	0.166	0.079	0.036	0.103	0.074	0.270	0.040
HS85: Electrical, electronic equipment	0.038	0.043	0.019	0.031	0.056	0.016	0.035	0.015	0.070	0.048	0.022	0.028	0.025	0.035	0.019
HS90: Optical, photo, technical, medical, etc. apparatus	0.102	0.037	0.103	0.070	0.042	0.062	0.051	0.072	0.046	0.071	0.043	0.119	0.051	0.075	0.040

(b) Intra-Industry Trade (IIT) opportunities in trade between South Africa and ECOWAS (2001-2015)

High skill & technology intensive manufactured products	Intra-Industry Trade (IIT) Indexes for the period of years														
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
HS84: Machinery, nuclear reactors, boilers, etc.	0.050	0.047	0.039	0.054	0.046	0.030	0.068	0.041	0.086	0.025	0.022	0.017	0.101	0.148	0.015
HS85: Electrical, electronic equipment	0.019	0.018	0.007	0.010	0.011	0.013	0.024	0.021	0.019	0.040	0.052	0.017	0.045	0.017	0.034
HS90: Optical, photo, technical, medical, etc. apparatus	0.068	0.039	0.071	0.040	0.064	0.046	0.024	0.051	0.034	0.074	0.048	0.062	0.053	0.097	0.038

(c) Intra-Industry Trade (IIT) opportunities in trade between South Africa and Maghreb region (2001-2015)

High skill & technology intensive manufactured products	Intra-Industry Trade (IIT) Indexes for the period of years														
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
HS84: Machinery, nuclear reactors, boilers, etc.	0.055	0.155	0.065	0.099	0.026	0.016	0.119	0.027	0.011	0.075	0.035	0.101	0.205	0.125	0.677
HS85: Electrical, electronic equipment	0.189	0.535	0.599	0.550	0.493	0.314	0.546	0.098	0.193	0.567	0.125	0.158	0.541	0.815	0.637
HS87: Vehicles other than railway, tramway	0.037	0.034	0.019	0.094	0.005	0.002	0.001	0.002	0.001	0.001	0.001	0.008	0.011	0.026	0.065

(d) Intra-Industry Trade (IIT) opportunities in trade between South Africa and SADC region (2001-2015)

High skill & technology intensive manufactured products	Intra-Industry Trade (IIT) Indexes for the period of years														
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
HS33: Essential oils, perfumes, cosmetics, toiletries	0.012	0.022	0.017	0.027	0.010	0.017	0.010	0.016	0.014	0.563	0.578	0.891	0.962	0.909	0.995
HS84: Machinery, nuclear reactors, boi	0.074	0.227	0.264	0.046	0.048	0.124	0.028	0.122	0.064	0.116	0.113	0.113	0.112	0.123	0.099
HS85: Electrical, electronic equipment	0.125	0.233	0.232	0.115	0.186	0.250	0.215	0.219	0.136	0.350	0.298	0.270	0.229	0.220	0.273

Source: Own table derived using trade data available from the ITC trade database available on the web link http://www.trademap.org