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recent and the future

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African agricultural trade: Recent and the future

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Abstract

This article starts with a profile of African agricultural trade. Using the pre-release version 9.2 of the GTAP database, we then show that the results for tariff elimination on intra-African trade are promising, but these tariff barriers are not as significant as the various trade-related barriers outside of tariffs. Impressive results were forecast by simulating both a 50% reduction in what can be considered traditional non-tariff barriers and a modest 20% reduction in the costs associated with transit time delays at customs, terminals and internal land transportation. Gains from tariff elimination, non-tariff barrier reductions and time in transit cost reductions are likely to be cumulative and would generate very large gains to Africa. The policy implications are clear: while cooperation will enhance the gains, much of the benefits will result from unilateral actions and regional cooperation that does not need the long and drawn-out processes associated with FTA negotiations.

Key words: agricultural trade; Africa; tariff barriers; non-tariff barriers; GTAP model

1. Introduction

The purpose of this article is to explore the benefits to African agricultural trade, and in particular intra-African agricultural trade, of reducing trade barriers. These barriers include both the traditional tariff barriers and, more importantly, the non-tariff barriers inhibiting agricultural trade. To this end we provide a background to recent African and specifically intra-African agricultural trade before introducing the GTAP computer model to simulate liberalisation scenarios. These scenarios are intra-African tariff elimination, a 50% reduction in 'traditional' non-tariff measures, and a reduction in time in transit costs associated with intra-African imports.

This section examines the big picture for African and particularly intra-African agricultural trade over recent periods, up to and including 2013. The data is sourced from the International Trade Centre (ITC), and we caution that some of the big-picture data may be inconsistent for various reasons, such as non-reporting and the use of mirror (partner) data, since some African countries do not report to the ITC. Indeed, the ITC specifically warns against using their data for intra-African trade. There is, however, no better bilateral trade data source, notwithstanding the ITC limitations.

Agriculture is defined according to the World Trade Organisation (WTO) definition, covering HS Chapters 01 through to and including HS 24, with the exception of Chapter 03 (fish products) and the fisheries products from HS 16. In addition, there are selections from later HS chapters that include products such as casein, hides and skins, wool and cotton. This definition differs from that

used in the GTAP model in the next section, but at these aggregated levels this is not regarded as important.

2. Africa's agricultural trade

Table 1 shows African agricultural exports to the rest of the world since 2009. Proportionately, African exports were relatively stable, at between 3.6% and 4.1% of global agricultural exports. The main exporters in 2013 were South Africa, Ghana and Egypt, with the five largest exporters responsible for over half of all exports, and the largest eight responsible for almost two thirds in 2013.

Table 1: African agricultural exports to the rest of the world, 2009–2013

Exporters	2009	2010	2011	2012	2013	Cumulative share of Africa (2013) (%)
% from Africa	3.7	3.8	3.7	4.1	3.6	
	$ million					
World	998 633	1 132 689	1 379 730	1 400 248	1 455 656	
Africa	36 976	43 526	50 697	57 382	52 796	100.00
South Africa	5 324	8 079	8 850	8 648	9 182	17.39
Ghana	1 301	1 136	3 688	5 660	5 522	27.85
Egypt	4 692	5 419	5 588	4 958	5 447	38.17
Côte d'Ivoire	4 907	5 138	5 457	5 024	4 720	47.11
Morocco	2 621	2 778	3 040	2 966	3 387	53.53
Kenya	2 490	2 921	3 171	2 885	2 785	58.81
Ethiopia	1 355	1 907	2 217	2 456	2 225	63.02
Tunisia	1 292	1 263	1 752	1 591	1 621	66.09
Tanzania	816	990	967	1 576	1 338	68.62
Uganda	778	842	1 179	1 226	1 333	71.14

Table 2 shows Africa's agricultural imports. The continent's share of global imports seems to have peaked at 6.9% in 2009, and was 5.8% in 2013. The main importers were Egypt, Algeria and South Africa, who together were responsible for more than a third of imports into the continent – in all three cases wheat was the major import item. Agricultural imports into the continent show a similar concentration pattern as exports, with the top five countries responsible for half of all imports and the top eight for almost two thirds. Nigeria, the largest agricultural producer on the continent, is conspicuously absent from the list of top 10 exporters,[1] but does appear among the top five importers. Egypt and South Africa (the second and third largest producers) are amongst the top three exporters and importers.

The focus of this paper is on intra-African agricultural trade. To this end, Table 3 shows that intra-African agricultural exports constituted between a fifth and a quarter of total African exports over this period. The main intra-African exporters in 2013 were South Africa, Egypt and Uganda, with Nigeria once again conspicuous by its absence. As expected, the largest exporters concentrate on the markets closest to them. The main South African agricultural exports to Africa were beverages, cereals, sugars and miscellaneous edible products, with the main destinations being Namibia, Botswana, Zimbabwe and Mozambique. Egypt's main exports were sugars, processed vegetables, fresh vegetables and dairy products, mainly to Libya, Sudan (both North and South), Morocco and Algeria.

[1] Nigerian trade was not reported by the ITC for 2013, whereas the importers were reported as partner exports to Nigeria (mirror data). This highlights the problems with intra-African trade data and emphasises that caution must be used in the interpretation of the data.

Table 2: African agricultural imports from the rest of the world, 2009–2013

Importers	2009	2010	2011	2012	2013	Cumulative share of Africa (2013) (%)
% from Africa	5.2%	5.5%	6.9%	6.2%	5.8%	
	$ million					
World	1 026 345	1 149 354	1 410 134	1 409 945	1 481 830	
Africa	53 346	63 186	96 962	87 880	86 348	100.00
Egypt	8 180	10 618	15 299	15 914	14 718	17.04
Algeria	6 449	6 712	10 824	10 075	10 522	29.23
South Africa	4 315	5 682	7 196	7 592	6 947	37.28
Morocco	4 336	4 729	6 393	6 273	5 557	43.47
Nigeria	3 420	3 776	18 981	6 901	5 539	50.13
Libya	1 513	2 157	2 408	4 002	4 306	55.12
Angola	2 458	2 723	3 755	3 925	4 264	60.06
Tunisia	2 478	2 964	3 676	3 369	3 324	63.91
Sudan	1 306	3 079	1 729	1 975	2 208	66.47
Kenya	1 652	1 538	2 026	1 915	1 985	71.07

Table 3: The main intra-African agricultural exporters, 2009–2013

Exporters	2009	2010	2011	2012	2013
Share of intra-African exports (%)	22.84	23.62	24.62	22.43	24.4
	$ million				
Total African exports	36 976	43 526	50 697	57 382	52 796
Total intra-African exports	8 446	10 284	12 483	12 869	12 895
South Africa	3 776	3 850	4 370	4 169	4 349
Egypt	527	862	900	1 021	1 158
Uganda	223	284	353	782	786
Zambia	243	382	569	802	679
Côte d'Ivoire	458	514	550	670	635
Kenya	632	668	871	664	574
Tunisia	388	353	843	597	555
Ethiopia	184	304	349	568	544
Namibia	165	542	584	510	474
Morocco	202	212	242	327	382

The main intra-African importers are shown in Table 4. Between 15.4% and 19.9% of African agricultural imports were sourced from other African countries in the period 2009 to 2013, with South Africa, Zimbabwe and Namibia the main importers. During 2013 the main South African imports were from Namibia, Swaziland, Zimbabwe and Mozambique and, in order by product, were sugars, beverages, meat and cotton. Zimbabwe's imports were from South Africa (68%), Zambia and Malawi and concentrated on cereals, food residues and fats, while Namibia's main imports were beverages, sugars and cereals, with almost all (98.6%) sourced from South Africa. Libya's imports are not available by product code, but were mainly from Egypt, Tunisia and Algeria.

Table 4: The main intra-African agricultural importers, 2009–2013

Importers	2009	2010	2011	2012	2013
% intra-African	16.7%	19.9%	15.4%	17.7%	17.1%
	$ million				
$m intra-African	8 901	12 549	14 900	15 518	14 754
South Africa	945	1 303	1 992	2 389	2 267
Zimbabwe	554	686	972	1 074	847
Namibia	4	730	801	823	786
Libya	497	664	830	800	720
Botswana	67	740	740	827	716
Mozambique	381	415	479	590	664
DRC	318	449	397	484	617
Kenya	690	546	567	632	574
Sudan (both)	471	704	673	525	546
Egypt	402	554	515	507	456

Table 5 provides a summary of the major African trade lines for exports and imports in 2013. Intra-Africa exports made up 22.5% of total African agricultural exports, while the comparable share for imports was 20.9%. Tobacco, sugars, beverages and fats and oils were the main items traded. The products shown represent 50% for each of exports and imports, but note that there are inconsistencies in the data, such as tobacco exports being $1 796 million, while imports were a lesser $982 million. The rankings and values for the top four are not consistent, while there is a greater consistency in the lower segment of the table.

Table 5: African agricultural trade by HS Chapters, 2013

Intra-African exports				Intra-African imports			
HS	**Product**	**$m**	**%share**	**HS**	**Product**	**$ m**	**%share**
	Total	92 527	22.5%		Total	85 836	20.9%
	Intra-Africa	20 790	of which		Intra-Africa	17 929	of which
24	Tobacco	1 796	9%	17	Sugars	1 191	7%
17	Sugars	1 532	7%	22	Beverages	1 085	6%
22	Beverages	1 193	6%	15	Fats & oils	1 022	6%
15	Fats & oils	1 025	5%	24	Tobacco	982	5%
9	Coffee, tea	1 013	5%	9	Coffee, tea	977	5%
10	Cereals	921	4%	10	Cereals	914	5%
7	Vegetables	805	4%	7	Vegetables	790	4%
21	Miscellaneous food preparations	801	4%	21	Miscellaneous food preparations	780	4%
11	Milling	673	3%	11	Milling	621	3%
4	Dairy	636	3%	23	Residues	602	3%
	Subtotal	10 395	50%		Subtotal	8 964	50%

Source: GTAP database. Note that this data may differ from the ITC data used earlier, as different definitions are used.

3. African integration: What are the prospects?

It is common cause that intra-African trade is constrained by a lack of appropriate and functioning infrastructure (Longo & Sekkat 2004), by tariff and non-tariff barriers and by overlapping and complex regional trade blocs (Adom *et al.* 2010). To this end, a series of simulations were conducted to examine the impact of a reduction in intra-African trade barriers, using the pre-release version 9.2 of the GTAP database (Badri *et al*. 2012) and recent data sets from the World Bank and others on trade barriers across the African continent. The results show that the elimination of tariff barriers will stimulate intra-African trade, but that the reduction of non-tariff barriers will have an even greater positive impact.

A base simulation was set up to examine the trade and welfare effects of a full and comprehensive tariff liberalisation that sets all intra-African bilateral tariffs to zero. From that point the analysis was extended to a) simulate a reduction in non-tariff measures (NTMs or, interchangeably, NTBs) by 50% using the *ad valorem* equivalents for both agricultural goods and manufacturing goods as provided by Balistreri *et al*. (2014a; 2014b),[2] and b) examine the implication of reducing the costs in transit for African goods by 20% above a benchmark of international best practice. This new database provides tariff equivalents for most GTAP countries. These estimates vary (and often widely), which therefore enables a more accurate estimate of the costs of the barriers. The range in the new estimates for countries of interest to this study for agricultural goods is from 0.0% in Rwanda to 42.5% in Kenya, while for manufacturing goods it is 0.0% in Zambia to Tanzania's 47.4%. These are significant differences, and in the few instances where these values are not shown individually we have estimated a proxy from the aggregates provided by Balistreri *et al*. (2014a; 2014b).

Balistreri *et al*. (2014a; 2014b) decomposed trade costs into three categories, namely those that can be lowered by (1) **trade facilitation**; (2) **by non-tariff barriers**; and (3) **by the costs of barriers to business services**. Trade facilitation addresses costs such as delays at border crossings, roadblocks for trucks and the necessity to pay bribes. For non-tariff barriers the focus is on licenses, quotas and bans; price control measures; competition restrictions; and Technical Barriers to Trade; they do not include customs delays. Poor business services for trade also are a problem and improvements in a wide range of business services, such as banking, insurance and communication, and professional services such as legal, auditing, engineering and computer services, would also lower trade costs.

Technically the NTBs were reduced by 50% in two separate ways. This was done as we consider that there are two pathways from which welfare gains can result. These are (1) the distribution gains that can be proxied by reducing tariffs, and (2) the increases in economic efficiency that result from reducing barriers. To proxy the first component of half of the gains coming from the distributional effects of reducing tariffs we started by recalibrating the initial GTAP v 9 database to represent half of the World Bank's average estimates of NTB as tariff equivalent in the database generating tariff revenues, and then reducing these NTB tariffs by 50% to give us an overall 25% reduction in NTBs. Secondly, to assess the economic efficiency component, we represented the remaining 25% reduction in the average of the World Bank's NTB estimate as an increase in efficiency by augmenting technical change in the respective countries. Our welfare results, or equivalent variation (EV), therefore represent the combined effects of reducing the average NTB tariff calibrated into the database and the efficiency augmenting technical change.

For the 'time in transit' analysis in simulation (3), only the data for imports into African countries are used in order to avoid any possible danger of double-counting gains inherent in using both days in transit to import and days in transit to export. The use of imports only is considered the best method of ensuring that the benefits accrue to those making the changes. Although only handling and transit times in Africa are adjusted for imports, there still will be some gains to countries outside of Africa in that their costs of exporting are effectively lowered, even though they will not get all the gains. In contrast to a tariff reduction scenario, whereby those outside of the FTA almost invariably lose, it is anticipated that there will be gains to all, albeit with the gains outside of Africa being modest. While this may result in a lower bound estimate, such an approach is consistent with economic theory, which generally argues for gains of liberalisation accruing to the liberalising country. Technically, these gains are modelled as efficiency gains to the importing country, and therefore the benefits will show up directly in the results as technical efficiency gains in the welfare decomposition.

[2] These are World Bank estimates, which are based, in turn, on data from Kee *et al*. (2009). The estimates are based on estimates for 105 countries at the HS 6-digit level.

Minor (2013) shows that the 'time to trade' costs reflect the willingness of the importer to pay for a product delivered earlier, based on a comprehensive database from Hummels and Schaur (2013) estimating the *ad valorem* cost of one day saved in transit estimated for over 600 products defined at the HS4 level. There is significant variation in these costs by product, and these are then aggregated into the GTAP sectors by country, with statistical adjustments made for missing variables. Minor (2013) then combines this data with the World Bank's *Doing Business* dataset for 2012, showing the numbers of days to import, and maps this data to the GTAP sectors by country to give a tariff equivalent of import barriers to trade. Thus, even though the time in transit is the same for each importer by country, the *ad valorem* equivalents by GTAP sector are not.

The results in terms of welfare gains as measured by EV in the year 2025 are as shown in Table 6, which shows (1) the baseline of tariff elimination across Africa for intra-African trade; (2) a 50% reduction in NTBs only across Africa; and (3) a 20% reduction in the time of transit for goods over and above a four-day Singaporean benchmark respectively. The scenario in terms of which tariff elimination, NTB reductions **and** reductions in transit costs are implemented simultaneously has not been modelled, as these are likely to be additive and therefore would produce very large gains for Africa. Rather, a conservative approach has been followed in order to emphasise the NTB and the costs of the delays in transit. An improvement in trade-related service barriers for Africa has also not been simulated for much the same reason: these results are expected to be significant and essentially additive to tariff reductions, NTB reductions and reductions in transit times. Importantly, many of the solutions to these problems are in African hands.

In general, the gains from complete African integration in the form of tariff elimination are substantial and spread across all Africa countries except Zimbabwe,[3] and a similar pattern applies to the Africa-wide reduction in NTB costs, with the important difference that Zimbabwe now reports modest gains. Those outside of Africa lose, as they are displaced through increased intra-African trade.

The interesting outcome is from examining the benefits to Africa of reducing the costs of transit delays that plague much of the continent (but not much of the rest of the world). The World Bank and others simulate these delays and their associated costs to Africa.[4] This is not the first African analysis using this data, as Mevel and Karingi (2012) show that, although an African-wide FTA would significantly contribute to increasing trade within the African continent, the removal of tariff barriers would not meet the political objective of doubling the share of intra-African trade by 2022. Meeting that objective needs actions on trade barriers such as the length of customs procedures and port handling. Even using a conservative 20% reduction in these costs over and above an international benchmark, the welfare gains are substantial and about double those from tariff elimination, and around the same as tariff elimination and an NTB reduction combined. These results support Mevel and Karingi (2012) in showing that intra-African non-tariff constraints to trade are at least as important, but probably more important, than actual tariff barriers.

Intra-Africa tariff elimination is generally, but not always, welfare-enhancing for African countries, as shown in the second column of Table 6. South Africa, as is usually the case, is the biggest gainer, with an increase in welfare of $5.7 billion by 2025. Others to gain over a billion dollars each are

[3] In the initial database representing the year 2011, Zimbabwe is already enjoying tariff-free access to its main trading partners and thus experiences preference erosion when tariffs are liberalised within Africa. In addition, Zimbabwe has high tariffs on imports into the country, which are reduced to zero, lowering factor prices within Zimbabwe and making the economy more competitive on export markets. But these lower factor prices are not enough to compensate for the preference erosion.

[4] The African Union Commission and Economic Commission for Africa (2012) discuss this issue in paragraphs 54 to 59 inclusive, and again on pages 34 and 35, and Mevel and Karingi (2012) use this data in their MIRAGE model.

Kenya, Nigeria, the Angola/DRC aggregation, Senegal and our residual 'rest of Africa'[5] aggregation. Although not reported here, the cells in a bilateral matrix of GTAP output show where each country is making gains or losses, and this highlights that many countries gain from their own liberalisation, as greater efficiencies flow through their economies. These countries include, for example, Kenya (which reforms and compacts its own inefficient sugar sector) and Nigeria, while Zimbabwe loses heavily from its own liberalisation. South Africa is a major gainer in secondary agriculture, as are Namibia, Morocco and Senegal, while the rest of Africa gains in both primary and secondary agriculture.

NTB reductions across Africa were simulated because the focus of trade liberalisation is becoming more intensely spotlighted on non-tariff barriers (NTBs). The results (column 3 in Table 6) show that South Africa's welfare gains of $2 690 million are only 47% the magnitude of full tariff elimination, but then the NTB levels are relatively low and especially so for agriculture in South Africa. Conversely, the gains for Tanzania are 271% of the initial tariff elimination gains, as the NTBs for Tanzania are extremely high. Gains to South Africa are still the highest individual country gains, but both Kenya and the Angolan/DRC aggregation are now very close behind, at around $2 billion each. Several countries gained more from NTB reduction than from tariff elimination, and Zimbabwe managed to turn a major loss from intra-Africa tariff elimination into a gain with NTB reductions. Overall, the results have significant policy implications by adding further support to the argument that NTBs are a bigger barrier to intra-Africa trade in Africa than are tariffs.

Again, many of the solutions to these problems are in African hands, as the reduction in 'own' NTBs are directly under the control of the home government. Coordinated efforts to reduce NTBs are the first-best option, but a lot can be gained by unilateral actions in those countries with high barriers. By GTAP sectors there is an emphasis on gains in agriculture for most, but not all, countries, as almost all of the NTBs used are higher for agriculture than they are for manufacturing. As the emphasis on NTBs is focused on agriculture in most countries, their elimination often leads to significant gains to agricultural production.

[5] The 'rest of Africa' includes Benin, Burkina Faso, Cameroon, the Ivory Coast, Guinea, Togo and the rest of North, Central and West Africa. Some of these countries are major agricultural exporters, and changes to their individual trade profiles are hidden in the aggregation.

Table 6: Simulation results, welfare as EV in $ million in 2025

	Tariff elimination	NTBs by 50%	Time in transit by 20%
Total Africa	17 072	18 060	30 507
South Africa	5 742	2 690	8 519
Botswana	68	12	376
Namibia	463	188	173
Swazi/Lesotho	100	61	64
Kenya	1 289	2 117	1 122
Tanzania	377	1 024	880
Uganda	683	471	553
Rwanda	301	66	141
Egypt	518	1 422	81
Morocco	572	489	25
Rest east Africa	15	59	785
Nigeria	2 031	1 399	5 112
Angola/DRC	1 168	1 917	2 331
Ethiopia	255	91	620
Madagascar	-1	22	38
Malawi	41	100	213
Mauritius	76	223	59
Mozambique	14	44	371
Zambia	454	232	848
Zimbabwe	-1 486	174	921
Ghana	813	485	634
Tunisia	357	755	49
Senegal	1 211	703	261
Rest of Africa	2 012	3 316	6 330
EU	-2 386	-2 667	655
UK	-364	-306	197
USA	-726	-1 037	116
China	-2 351	-2 767	506
India	-1 539	-1 395	607
Brazil	-188	-261	-4
Russia	553	188	-571
Rest world	-2 771	-4 529	-780
Total world	7 299	5 285	31 231

The reduction in the time costs of transit examined trade facilitation by addressing the trade facilitation or infrastructural costs, as outlined earlier, as costs such as delays at border crossing, roadblocks for trucks and the necessity to pay bribes. African countries are well aware of these problems, and trade facilitation was the main outcome of the 2013 Bali WTO Ministerial Conference, with an agreement to streamline customs procedures and minimise delays at borders, with Africa expected to be the main beneficiary. Minor (2013) uses estimates created by Hummels *et al.* (2007) on the willingness to pay to avoid time delays to produce a database of per day *ad valorem* costs to use in GTAP. These *ad valorem* equivalents are then combined with the World Bank's group estimates of the number of days' delay in doing business trading across borders.[6] In implementing the GTAP model, Singapore is used as the international best-practice benchmark of four days for imports. A reduction of 20% in the days over and above this benchmark for imports is implemented in the GTAP model. This means, for example, that a country initially taking ten days to import a commodity is envisaged to reduce the number of import days to $(4 + (10 – 4)0.8) = 8.8$ days.

[6] The World Bank's "Doing business trading across borders" indicator series can be the found at http://www.doingbusiness.org

The data shows that Africa is particularly affected by these costs of delay in transit, even though the approach to measure these costs is conservative. There still is plenty of 'slack' in the African system, although there are countries in Africa that are very close to international benchmarks, thus proving that the potential to improve does exist.

The welfare gains to Africa are substantial (right-hand column of Table 6). For South Africa they are some $8 519 billion in real terms, and, as is usually the case, this is the most significant result for both Africa and the total worldwide gain of $31 231 billion. Following close behind are large gains to Nigeria and the 'rest of Africa' aggregation. In direct contrast to the tariff elimination scenarios, there are gains to many of the large economies outside of Africa, as their export prices rise in response to more efficient transit times in Africa.

As expected, almost all of the gains 'created' by each country accrue to that same country. This may in part be an artefact of the way in which the reductions have been modelled, as only changes in import times in transit have been addressed, whereby the benefits accrue to the importer. Notwithstanding these technical issues, the facts remain that (a) these gains are substantial, (b) they mostly accrue to the liberaliser and, (c) in only taking 20% of the costs of time over and above an international benchmark, we are leaving plenty of room for improvement in most African countries. And the gains in welfare, although concentrated in Africa, are global in nature.

To address the impacts on African agriculture, the GTAP agricultural sectors have been aggregated into primary agriculture, secondary agriculture and sugar, given the latter's importance in East Africa in particular. Table 7 shows the contributions that agriculture makes to the welfare changes outlined in Table 6, while Table 8 shows changes in agricultural production in selected countries.

There is significant variation in the proportion that agriculture contributes to the welfare gains by country, as shown in Table 7. For the tariff elimination scenario, these contributions range from 2% in the Angola/DRC GTAP aggregation to the 57% contribution that it makes in Kenya, with several other countries at 25% or above. For our NTB reduction there are several countries in which agriculture's contribution is around 30% or higher,[7] while the lowest is Tanzania, with 7%. For the time in transit the contributions generally are lower, with Morocco's 50% being the highest and some values reported as being under 10%. Most of these contributions are from secondary rather than primary agriculture, and from the tariff elimination scenario it should be noted in particular that there are large gains to South Africa, Kenya and Uganda from sugar tariff reforms. This is because South Africa now has duty-free access to the highly protected and inefficient sugar sector in Kenya in particular. This is consistently the outstanding result coming through in all the GTAP output indicators for tariff elimination across Africa.

[7] Morocco and Kenya are examples where the NTBs were assessed as being very high for agriculture and not for manufacturing, whereas for Senegal the values were exactly the same for both. Therefore the outcome is not simply a function of the initial values, but rather the trade-weighted effects.

Table 7: The contribution of agriculture to welfare changes in selected African countries, $ million and % of total

	South Africa	Kenya	Tanzania	Uganda	Egypt	Morocco	Nigeria	Angola/ DRC	Zimbabwe	Ghana	Senegal	Rest of Africa
Tariff elimination on all intra-African trade												
Primary	329	44	20	17	11	12	21	36	9	64	12	353
Secondary	1,032	130	0	51	47	273	59	-52	-474	28	405	229
Sugar	591	558	24	103	-18	-1	11	37	-8	0	10	-10
Ag as %	34%	57%	12%	25%	8%	50%	4%	2%	32%	11%	35%	28%
NTB reductions of 50% across Africa												
Primary	169	221	27	24	131	18	155	102	101	66	49	461
Secondary	412	567	29	38	235	178	141	88	-42	69	203	875
Sugar	70	44	13	8	46	2	5	11	5	2	6	85
Ag as %	24%	39%	7%	15%	29%	40%	22%	10%	37%	28%	37%	43%
Time in transit reductions of 20% across Africa (above international benchmarks)												
Primary	95	45	10	9	67	1	296	135	77	22	16	252
Secondary	79	22	64	16	116	8	683	258	59	53	19	560
Ag as %	2%	6%	8%	6%	23%	50%	19%	17%	15%	12%	17%	13%

Source: GTAP output, where PAgri is primary agriculture and SAgri is secondary agriculture

Table 8 presents the proportional changes in agricultural production in selected countries from the scenarios that were simulated, showing a lot of variation. Firstly, the impact of tariff elimination in the sugar industry is relatively high for South Africa, Kenya and Uganda, but is hardly discernible in the case of the reductions in NTBs or transit time. Secondly, the changes in secondary agriculture are generally higher than the changes in primary agriculture across the table, thus indicating that barriers in all three simulations (tariffs, NTBs and cost of transit time) are higher in secondary agriculture.

Table 8: Proportional changes in agricultural production

	South Africa	Kenya	Uganda	Nigeria	Angola/ DRC	Zimbabwe	Senegal	Rest of Africa
Tariff elimination on all intra-Africa trade								
Primary	0.39	0.60	0.31	0.07	-0.15	1.51	-0.04	0.22
Secondary	2.96	3.43	2.77	-0.18	-0.63	-14.67	6.29	0.09
Sugar	26.38	-32.78	-21.43	-0.52	12.60	6.81	3.13	-1.32
NTB reductions of 50% across Africa								
Primary	0.31	0.25	0.16	-0.03	-0.06	0.12	-0.14	0.14
Secondary	1.25	3.29	1.52	-0.22	0.00	-5.49	3.84	0.46
Sugar	3.37	-3.78	0.33	-0.28	0.94	0.83	3.00	0.61
Time in transit reductions of 20% across Africa (above international benchmarks)								
Primary	0.37	0.21	0.15	0.05	0.03	0.11	0.00	0.07
Secondary	0.81	1.15	0.76	-1.41	-0.48	0.34	0.50	-0.26
Sugar	1.32	-0.12	-1.88	-1.18	1.35	2.29	0.70	1.15

Thirdly, separate simulations, in which tariff elimination was combined with NTB reductions, showed that the increases in agricultural production often, but not invariably, were close to the additive values from each simulation separately. This was the case for South Africa, Kenya, Uganda and Zimbabwe, for example, but not for Nigerian primary agriculture.

4. Conclusion

The powerful result from this research is that, while the elimination of intra-African agricultural tariffs will boost trade and welfare on the continent, the various trade-related barriers outside of tariffs are more important. Specifically, these are what can be considered traditional non-tariff barriers and the costs associated with that particular African problem of transit time delays at customs, terminals and internal land transportation. While tariff elimination (or reduction) is usually associated with a negotiation process, reductions in non-tariff barriers and the infrastructural constraints generally can and should be addressed unilaterally. This is especially relevant as gains from reductions in these latter constraints accrue overwhelmingly to the own country, rather than to trade partners.

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